Prevention of childhood anxiety disorders : Is screening and offering a child- or parent-focused intervention (cost-)effective?

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Prevention of Childhood Anxiety Disorders

Is Screening and Offering a Child- or Parent-focused Intervention (cost-)effective?

Proefschrift

Ter verkrijging van de graad van doctor aan de Universiteit Maastricht,
op gezag van de Rector Magnificus, Prof. Mr. G. P. M. F. Mols,
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❧ We may encounter many defeats
But we must not be defeated ❧

- Maya Angelou -

Introduction

Child Anxiety

Anxiety disorders are highly prevalent. That is, estimations of life-time prevalence of anxiety disorders in childhood and adolescence range between 8-27% (Costello, Egger, & Angold, 2005) and in adulthood anxiety disorders are the most common psychiatric disorders, with a 29% lifetime prevalence (Christiana et al., 2000). The mean age of onset of anxiety disorders is 11 years (Kessler et al., 2005), and early onset anxiety disorders (< 13 years of age) have a tendency to follow a chronic course (Cohen et al., 1993; Feehan, McGee, & Williams, 1993; Keller et al., 1992), and to have a more disabling and severe character (Giaconia et al., 1994; Hoehn-Saric, Hazlett, & McLeod, 1993; Kovacs, 1996) than anxiety disorders with a later onset. Anxiety disorders are pre- and comorbid with other psychiatric disorders, such as depression and substance use (Brady & Kendall, 1992; Lipsitz et al., 1994; McGee et al., 1990; Otto, Pollock, Rosenbaum, Sachs, & Asher, 1994; Pine, Cohen, Gurley, Brook, & Ma, 1998; Strauss, Last, Hersen, & Kazdin, 1988; Wittchen & Essau, 1994). Consequences of anxiety disorders in children at a personal level are difficulties at school, difficulties in social interactions (Dweck & Wortman, 1982; Essau, Conradt, & Petermann, 2000; Strauss, Lease, Kazdin, Dulcan, & Last, 1989; Turner, Beidel, & Costello, 1987), low self-esteem, and experiencing a high level of family conflict (Ginsburg & Schlossberg, 2002; Siqueland, Kendall, & Steinberg, 1996). Additionally, anxiety disorders place a burden on society via indirect (e.g. decrease in functioning) and direct costs (e.g. treatment), (Bodden, Dirksen, & Bögels, 2008). The high prevalence of anxiety disorders, as well as the negative consequences and impact on society are important arguments in favor of the prevention of anxiety disorders. Over the years, a number of anxiety prevention studies have been performed (Barrett & Turner, 2001; Dadds, Spence, Holland, Barrett, & Laurens, 1997; Mifsud & Rapee, 2005). Earlier anxiety prevention studies have not yet examined the usefulness of aiming their preventive interventions at the children or at their parents. Also, the cost-effectiveness of the preventive interventions and the screening procedures has never been studied. The current anxiety prevention study aimed to investigate these issues.

Current Study

Children (aged 8-12) were recruited via a screening procedure at their schools. Both high- and median-anxious children were selected and followed in their development for 2 years. Based on randomization, the high-anxious children either received a child-focused intervention (including only children), a parent-focused intervention (including only parents) or no intervention (natural course). The median-anxious children were also followed in their natural course, and all four groups were measured on anxiety, factors associated with anxiety, and their societal costs.

This thesis aims to provide insight into three areas that are of importance for the prevention of anxiety disorders: 1) the identification of risk factors of anxiety disorders (Chapter 2); 2) the efficacy and cost-effectiveness of a child- and a parent-focused intervention (Chapter 4 and Chapter 5); 3) the usefulness and (cost)effectiveness of applying a screening procedure for early identification purposes (Chapter 3 and Chapter 6).

Risk Factors of Child Anxiety

The identification of both genetic and environmental risk factors is important within the field of the prevention of (mental) health disorders. Examples of environmental risk factors that have been identified for anxiety disorders are parental anxiety, dysfunctional parenting styles, insecure attachment, and dysfunctional family functioning (Bögels & Brechman-Toussaint, 2006). Risk factors of anxiety disorders that have been subject of study are mostly postnatal (i.e. occurring during one's development) of nature. Contrastingly, little attention has been paid to prenatal (i.e. occurring during pregnancy) and perinatal (i.e. occurring during birth) risk factors as the earliest environmental risk factors of anxiety disorders. If pre- and perinatal risk factors would be related to anxiety disorders, this would provide useful information for clinicians and physicians.

Pre- and perinatal risk factors (e.g. maternal smoking during pregnancy) have been related to externalizing disorders, such as Attention Deficit Hyperactivity Disorder. However, only a few studies examined these risk factors in relation to internalizing disorders, such as anxiety disorders (Allen, Lewinsohn, & Seeley, 1998; Bandelow et al., 2002; Bandelow et al., 2004; Buka, Tsuang, & Lipsitt, 1993; P. Cohen & Velez, 1989; Hirschfeld-Becker et al., 2004; Velez, Johnson, & Cohen, 1989). Because these studies showed mixed results and some contained methodological flaws, no strin-

gent conclusions regarding the interrelation between pre- and perinatal risk factors and anxiety can be drawn. In this thesis, pre- and perinatal complications in relation to later anxiety development were studied (Chapter 2).

Prevention of Child Anxiety

In order to prevent the onset or further development of anxiety disorders, several preventive interventions for anxiety disorders have been developed over the years. These interventions are usually based on cognitive behavioral treatment, as this type of treatment has proven to be highly effective (Compton, March, Brent, Albano, & Weersing, 2004). Preventive interventions can be classified in universal, selective and indicated/early intervention studies (Mzarek & Haggerty, 1994). In universal anxiety prevention studies, all children within a certain community are selected to participate in an intervention, whereas in selective anxiety prevention studies, children exposed to certain risk factors are approached via the community, and in indicated prevention/early intervention studies, children with anxiety symptoms or diagnoses are selected from a community sample. Even though effect sizes of cognitive behavioral preventive interventions for anxiety are modest (range between .04 and .63, see review Neil & Christensen, 2007) compared to those of treatment (mean .86, see review In-Albon & Schneider, 2007), a larger number of people can profit from prevention programs, and prevention strategies can thus be cost-effective from a public health perspective (Rose, 1993a).

Selective, indicated and early prevention studies on child anxiety commonly aim their intervention fully at parents or include a parental component (Dadds, Spence, Holland, Barrett, & Laurens, 1997; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). Reasons for including a parental component are related to the effect of parental anxiety on child anxiety. That is, parental anxiety has been implicated as a risk factor for anxiety disorders in children (Rosenbaum et al., 1988; Turner, Beidel, & Costello, 1987; Weissman, Leckmann, Merikangas, Gammon, & Prusoff, 1984). Multiple studies point to a large overlap the anxiety levels of children and their parents (e.g. Cartwright-Hatton, McNicol, & Doubleday, 2006), and heritability for symptoms of anxiety has been estimated at 40–50% (Thapar & McGuffin, 1995). Children of anxious parents are seven times more likely to develop an anxiety disorder than children of non-anxious parents (Turner, Beidel, & Costello, 1987). Anxiety-enhancing parenting styles (e.g. overprotection) and family patterns are likely to form moderating or mediating mechanisms through which parental anxiety exerts its influence on child development (e.g. Bögels &

Brechman-Toussaint, 2006; Dadds & Roth, 2008; Donovan & Spence, 2000; Ginsburg & Schlossberg, 2002; Manassis & Bradley, 1994). Aiming at parents has important benefits when considering preventive contexts. In preventive contexts, the main goal is to deliver an intervention that prevents the development of future dysfunctional child anxiety, whereas in clinical contexts, the focus is on delivering an intervention that cures current child anxiety. Therefore, a parental intervention focuses on decreasing parental anxiety and anxiety-enhancing parenting. Moreover, as normal child anxieties vary as a result of development, parents may be in a better position than children to (help) generalize the acquired skills in overcoming fear for new developmental challenges that will arise in the future. Furthermore, the feasibility of the intervention depends less on the child's cognitive capacities when aiming at parents, thus facilitating intervening early in child's development, as is common in preventive contexts. Nevertheless, surprisingly little is known about differential effects of intervening via child or parent in the field of anxiety prevention, because no prevention study actually compared these effects. In this thesis, the efficacy of the child- and parent-focused preventive interventions and not intervening (non-intervention) are evaluated (Chapter 4).

In line with society's growing interest in optimizing the balance between outcomes and costs, it is of importance to perform an economic evaluation of the interventions as well. The quantitative comparison between relative costs and outcomes of competing strategies, such as interventions, guides society's accurate decision making regarding investments in interventions. Several types of economic evaluations exist, and can be distinguished in the way the outcomes are measured. First, in a cost-utility analysis, outcomes are measured as Quality Adjusted Life Years. Second, in a cost-effectiveness analysis, outcomes are measured as any unit of effect (e.g. anxiety diagnosis free year). Third, in a cost-benefit analysis, the outcomes are also expressed in monetary terms. Finally, when the outcomes of all strategies are equivalent, the strategy with the lowest costs is selected based on the cost minimization analysis. Economic evaluations in the mental health field are scarce, and non-existent regarding the prevention of child anxiety disorders. In this thesis, the economic evaluation took the form of a cost-effectiveness analysis, and the cost-effectiveness of the child-focused, parent-focused and non-intervention groups were discussed (Chapter 5).

Screening for Child Anxiety

Early onset and enduring anxiety disorders lead to delays in initiating treatment (Christiana et al., 2000). Additionally, early onset anxiety disorders tend to have a more disabling and severe character. Screening procedures for child anxiety at primary schools would enable early and rapid identification of those children high at anxiety symptomatology, and would create the opportunity to inform children and parents about anxiety and to intervene closer to onset. Moreover, applying a screening procedure decreases the child's dependence on the parents, given the fact that a child can report on his/her own anxiety. Based on these arguments, earlier scientists argued that applying an anxiety screening tool would be a useful and cost-effective strategy (e.g. Kenardy, Spence, & Macleod, 2006; Nauta et al., 2004). In this thesis, the usefulness of a school-based one-time screening (Chapter 3) and cost-effectiveness of applying a screening procedure and offering an intervention (Chapter 6) were evaluated.

Main Research Questions

In sum, the main research questions of this thesis are

1. Are pre- and perinatal risk factors related to child anxiety?
2. Is screening for child anxiety useful?
3. Is offering high-anxious children a child- or parent-focused intervention efficacious?
4. Is offering high-anxious children a child- or parent-focused intervention cost-effective?
5. Is applying a screening followed by offering a child-or parent-focused intervention cost-effective?

2

Risk factors Occurring During Pregnancy and Birth in Relation to Brain Functioning and Child's Anxiety

This study examined whether the most objective risk factors during pregnancy (prenatal) and delivery (perinatal) precede child's anxiety, and whether these factors exerted their influence via child's non-specific cerebral functioning. Median-anxious ($n = 82$) and high-anxious ($n = 188$) children (8–12), enrolled via the use of an anxiety screening questionnaire. Mothers were interviewed on pre-/perinatal risk factors, and children completed a visuospatial copying task. High-anxious children were exposed to more prenatal (not perinatal) risk factors and deviated more on the visuospatial copying task. Prenatal risk factors, deviation on visuospatial copying, and their interaction were significant predictors of anxiety, accounting for 13.5% of the variance of anxiety. Conclusions: This percentage is impressive, given the fact that anxiety emerges from various combinations of risk factors and nature–nurture interactions. This study underlined the importance of considering risk factors occurring during pregnancy in relation to child anxiety and brain functioning.

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INTRODUCTION

Pre- and Perinatal Risk Factors and Later Anxiety of the Child

The need for the identification of risk factors of childhood anxiety disorders is apparent given the fact that anxiety disorders are highly prevalent (Costello et al., 2002; Ollendick & King, 1998), cause severe dysfunction in daily living (Dweck & Wortman, 1982; Essau, Conradt, & Petermann, 2000; Strauss, Lease, Kazdin, Dulcan, & Last, 1989; Turner, Beidel, & Costello, 1987), and often persists through adolescence and childhood (P. Cohen et al., 1993). Identifying risk factors helps tracing anxiety problems in an early stage, thereby increasing chances that disorders can be prevented. Risk factors can be of a biological, psychological and social character and can occur at any time during one's development: from gestation till death. Most research on risk factors of child anxiety focus on those occurring in early childhood and adolescence. Examples of potential postnatal risk factors are attachment, family functioning and rearing styles (Bögels, 2001; Bögels & Brechman-Toussaint, 2006; Rapee, 1997). Genetic risk factors of anxiety have also been investigated frequently (e.g. Hettema, Neale, & Kendler, 2001; Thapar & McGuffin, 1995). However, risk factors that occur during pregnancy and birth (pre- and perinatal risk factors) concern a relatively neglected type of risk factors within the field of anxiety disorders. Pre-/perinatal risk factors, such as maternal smoking during pregnancy, may increase the probability of developing externalizing disorders, like schizophrenia and attention deficit hyperactivity disorders (Fergusson, Woodward, & Horwood, 1998; McNeil, 1988). Only a few studies have looked at interrelations between pre- and perinatal risk factors and internalizing emotional disorders, like anxiety disorders. Maternal stress or emotional problems of the mother during pregnancy or delivery have been studied the most frequently in this respect (Luoma, Tamminen, & Kaukorien, 2001; O'Connor, Heron, Golding, Beveridge, & Glover, 2002; Van den Berg & Marcoen, 2004). Although maternal stress is a meaningful risk factor that has been related to the development of offspring anxiety disorders, the difficulty inherent to this risk factor is that maternal stress does not necessarily end when the child is delivered. This creates problems interpreting whether it is mother's pre-/perinatal stress, or postnatal stress, or a combination, that contributes to an anxious phenotype of the child.

To our knowledge, only seven studies have focused on pre-/perinatal risk factors of child anxiety other than maternal stress (see Table 1). The results of these studies were mixed; four studies (Allen, Lewinsohn, & Seeley, 1998; P. Cohen & Velez, 1989; Hirschfeld-Becker et al., 2004; Velez, Johnson, & Cohen, 1989) reported

associations between pre- or perinatal risk factors and later anxiety, whereas three did not report such associations (Bandelow et al., 2002; Bandelow et al., 2004; Buka, Tsuang, & Lipsitt, 1993). An explanation for this inconsistency is that these three studies possibly underestimated the presence of pre- or perinatal risk factors. This underestimation could have resulted from inadequate sampling of pre- and perinatal risk factors, or how the data was assessed. For example, in both studies of Bandelow, adult participants were interviewed about their own pregnancy or birth (e.g. did you have a low birth weight?).

Four studies thus offer support for a relationship between the earliest environmental stressors and (the development of) anxiety or anxiety disorders. Unfortunately, these results should be interpreted carefully, due to several methodological flaws, including their retrospective nature combined with the inclusion of subjective items (e.g. upsetting family circumstances during pregnancy). In retrospective studies, it is of high importance to include objective items. This increases chances of proper recall, and reduces the effect of current maternal psychopathology on how the mother reports pre- and perinatal risk factors.

Furthermore, the working mechanisms via which pre- and perinatal risk factors are translated in later anxiety remain unclear. The studies above focus on possible working mechanisms linked to the child's physical and mental health, parental mental health (disorders or in response to pre-/perinatal risk factors) or family functioning. As early as 1961, Pasamanick and Knobloch (1961) theorized that neural or other physical damage to the child could mediate the effect of pre- and perinatal risk factors on the development of psychopathology. So far, only animal studies have addressed this area with respect to anxiety and they support this hypothesis (Seckl, 2004; Uno et al., 1990; Welberg & Seckl, 2001; Welberg, Seckl, & Holmes, 2001). For example, Welberg & Seckl (2001) exposed rats to glucocorticoids (steroid hormones) during pregnancy. He reported an increase in corticotrophin releasing hormone in the rat pups, with its main effect in the central nucleus of the amygdala. This hormonal increase was related to anxious behavior observed in the pups at a later date.

Human studies on brain functioning of anxious persons, after exposure to pre- and perinatal risk factors do not yet exist. However, some investigators examined how complications during pregnancy and delivery affected non-specific cerebral dysfunction (e.g. deviations in motor, sensory and integrative function) with respect to general psychopathology. For example, Hertzog (1981) studied 66

premature and low birth weight children, at the age of 8. Approximately one-third of these children showed two or more signs of non-specific cerebral dysfunction. These children were also significantly more likely to have experienced prenatal risk factors and to have been referred for psychiatric consultation than children without non-specific cerebral dysfunction. Additionally, in a recent investigation (Gunther, Slavenburg, Feron, & Van Os, 2003), pathways to child psychiatric care were predicted by child's social, motor, and early speech development. Being small at birth (a prenatal risk factor) was among the most important risk factors for a deviating development of social, motor or speech skills.

Table 1

Summary of Studies on Pre- and Perinatal Risk Factors in Relation to Child Anxiety

Study(n)	Recruitment procedure	Measuring PPR ^a	Measurement of child anxiety	Tested Mediators	Significant results of PPR's and mediators	Limitations
Cohen et al., 1989 (n = 725)	Random inclusion of families with children aged 1-10	Age child: Between 1-10 years PPR: Sumscore of: birth weight, physical trauma during pregnancy, serious illnesses during pregnancy, caesarean section, jaundice, trauma to the baby following delivery Method: Parental interview	Age child: One measurement between 9-18 years Method: DIS ^b	Child's health problems + low IQ, maternal rejection, and family dissolution	PPR ^a -overanxious disorder No significant mediators	No differentiation between pre- and perinatal risk factors, possible underestimation anxiety due to use DIS, retrospective, restricted amount of PPR
Velez et al., 1989 (n = 776)	Random inclusion of families with children aged 1-10	See Cohen et al. (1989)	Age child: One measurement between 11-20 years Method: DIS		PPR ^a -overanxious disorder	See Cohen et al. (1989)
Buka et al., 1993 (n = 693)	Inclusion via Providence Center of Collaborative Perinatal Project	Age child: 0 years PPR: Three groups of PPR: 1)chronic hypoxia, 2)preterm birth, 3)other complications Method: Prospective registration of difficulties during pregnancy and birth	Age child: One measurement between 18-27 years Method: DIS		No significant findings	No differentiation between pre- and perinatal risk factors, several subjects were placed in more than one PPR-group, possible underestimation anxiety due to use DIS, restrictive amount of PPR

Bandelow et al., 2002 (n = 239)	Patients with panic disorder	Age child: $M = 38.1$ (SD 10.6) PPR ^a : Sumscore of: mother's and father's age at childbirth, percentage of Caesarean sections or premature birth, week of premature birth, birth weight, and birth complications Method: Child interviews	Age child: $M = 38.1$ (SD 10.6) Method: Confirmatory interview: SCID ^b		No significant findings	Parents not interviewed, patients relatively old when measuring PPR, no differentiation between pre- and perinatal risk factors, restricted amount of PPR
Bandelow et al., 2004 (n = 270)	Patients with social anxiety disorder	See Bandelow et al. (2002)	Age child: $M = 39.9$ (SD 10.4) Method: Confirmatory interview: SCID		No significant findings	See Bandelow et al. (2002)
Hirshfeld-Becker et al., 2004 (n = 306)	Children of parents with panic disorder, major depression, mood disorders or anxiety	Age child: 6.8 yrs (range 5-25 yrs) PPR: Light bleeding, heavy bleeding, excessive nausea or vomiting > 3 months, weight gain > 25 lbs/loss > 10 lbs, infection, high blood pressure/fluid retention, convulsions, accidents, emotional problems, family problems, taking medication, smoking > 1 pack per day, alcohol abuse, taking non-prescribed drugs, breech position, caesarean section, other delivery difficulties Method: Developmental history module of the DICA-P ^a	Age child: 6.8 yrs (range 5-25 yrs) Method: K-SADS ^c	Parental psycho-pathology (subjects received an official psychiatric diagnosis in the past and received treatment)	Number of pregnancy problems predicted multiple anxiety disorders. Effect was accounted for by heavy bleeding, high blood pressure/fluid retention, illness, family problems No significant mediators	Subjective items in sumscore (e.g. emotional problems), restricted amount of delivery complications

Note.

"Child" refers to participants studied for the possible effects of PPR at the time the participant was a foetus, regardless of the current age of the participant
^a PPR: Pre- and perinatal risk factors. ^b DIS: Diagnostic Interview Schedule. ^c K-SADS: Schedule for Affective Disorders and Schizophrenia for School-age Children. ^d SCID: Structured Clinical Interview for DSM-IV. ^e DICA-P: Diagnostic Interview for Children and Adolescents-Parent version

Purpose of the Study

This study is part of an ongoing longitudinal study on the prevention of anxiety disorders. An important goal of the ongoing study is the identification of risk factors that may lead to the development of clinical anxiety disorders. High- and median-anxious children were recruited via primary schools by applying a screening questionnaire. The choice of a median-anxious group was based on the fact that a certain level of anxiety is part of normal development (e.g. Roth, 1988; Slater & Shields, 1969). The focus of the current study is the identification of pre- and perinatal risk factors in high-anxious children and whether these pre- and perinatal risk factors affect non-specific cerebral functioning. Mothers of high-anxious children were interviewed on pre- and perinatal risk factors. To reduce maternal recall biases and the influence of maternal psychopathology, mothers' anxiety levels were measured. Non-specific cerebral dysfunction was measured by a visuospatial copying task (Gurvits et al., 2002). This task, which is perceptual-motor in nature, was chosen for a number of reasons, the most important one being its non-invasive character. Moreover, the task minimizes memory involvement because the participant has the model of the figures available during the entire task. Furthermore, the availability of the figures reduces test anxiety in participants. Additionally, Gurvits and colleagues (2002) proposed that difficulties copying a three-dimensional task could reflect an executive/planning problem, a deficit which could make individuals more prone to experiencing anxiety. Finally, Gurvits and colleagues studied 46 different neurological soft signs (minor neurological signs that indicate non-specific cerebral dysfunction) and reported that the visuospatial copying task was best at discriminating between participants that would or would not develop posttraumatic stress disorder response to a traumatic event.

It is expected that high-anxious children have more pre- and perinatal risk factors and they will deviate more on the visuospatial copying task than median-anxious children. Another expectation is that an interaction exists between pre- and perinatal risk factors and visuospatial copying deviation. That is, those children in which a higher number of pre- and perinatal complications is combined with more deviation on the visuospatial copying task will report the highest anxiety levels.

METHOD

Participants

The participants were recruited at primary schools via a screening procedure for a longitudinal ongoing study on the prevention of anxiety disorders, aiming at children aged 8–12. Of all children and parents contacted for study participation, 52% ($N = 2494$) completed the anxiety questionnaire that was used as a screening tool (SCARED-71, Bodden, Bögels, & Muris, 2009). The obtained anxiety scores were distributed normally ($S = .90$, $K = .59$), and ranged from 0 to 127. The participants eligible for the longitudinal study scored either in the top-15% ($n = 412$, referred to as high-anxious) or from two points below to two points above the median ($n = 172$, referred to as median-anxious) on the SCARED-71, and of these children 188 (46%) high-anxious children and 82 (48%) median-anxious children agreed to further participation. Written consents were obtained from the parents and the children for the screening procedure as well as for further participation in the study. Demographic features of the participants are depicted in Table 2. As can be seen in Table 2, parents of high-anxious children are significantly more often divorced or living apart than parents of median-anxious children, but no significant differences were found with respect to all other demographic variables.

Assessment of Anxiety Level of the Children and their Mothers

The Screen for Child Anxiety Related Emotional Disorders (SCARED) was originally developed by Birmaher and colleagues (1999; 1997) and has been modified and revised over the years (e.g. Muris, Merkelbach, Schmidt, & Mayer, 1999). In this study, a revised version of the Screen for Child Anxiety Related Emotional Disorders (SCARED-71, Bodden, Bögels, & Muris, 2009) was used to screen for anxiety in children. To achieve comparability of child and mother's anxiety, the adult version of the SCARED-71 was used to measure anxiety symptoms of the mother (SCARED-A, Bögels & Van Melick, 2004). The SCARED-71 and SCARED-A assess a range of DSM-IV based anxiety symptomatology. The original and modified versions of the SCARED has been found to possess good internal consistencies of the total and subscales scores, good test–retest reliability (Birmaher et al., 1997; Muris, Merkelbach, Schmidt, & Mayer, 1999) and to correlate well with other measures of anxiety, like the Spence Children's Anxiety Scale (Spence, 1998). The current study yielded homogeneity scores of $\alpha = .94$ for both child- and mother-report.

Table 2
Family Demographic Features of Participants
of High-Anxious and Median-Anxious Children

	High-anxious, <i>n</i> = 188	Median-anxious, <i>n</i> = 82
Boys (<i>n</i> , %)	84 (45%)	44 (54%)
Age child (<i>M</i> , <i>SD</i>)	9.92 (1.23)	10.22 (1.13)
Professional help for mental health children (<i>n</i> , %) ^a	19 (10%)	4 (5%)
Children in family (<i>M</i> , <i>SD</i>)	2.27 (.94)	2.15 (.79)
Children first-born (<i>n</i> , %)	103 (55%)	50 (61%)
Parents divorced/living apart (<i>n</i> , %)	39 (21%)	7 (9%)**
Caucasian		
Father (<i>n</i> , %)	181 (96%)	79 (96%)
Mother (<i>n</i> , %)	181 (96%)	78 (95%)
Parental age		
Father (<i>M</i> , <i>SD</i>)	41.84 (4.43)	42.39 (3.92)
Mother (<i>M</i> , <i>SD</i>)	39.59 (5.00)	40.11 (4.29)
Parental educational level ^b		
Father (<i>M</i> , <i>SD</i>)	5.11 (1.96)	5.29 (2.10)
Mother (<i>M</i> , <i>SD</i>)	4.94 (1.98)	5.06 (2.00)
Current unemployment		
Father (<i>n</i> , %)	12 (6%)	4 (5%)
Mother (<i>n</i> , %)	59 (31%)	27 (33%)

Note.

^aProfessional help from psychologist, psychiatrist for any mental difficulty, as indicated by parents on pre-measurement. ^bOn a scale from 0 (no education) to 8 (university)

** *p* < .01, tested two-sided

The SCARED-71 taps symptoms of panic disorder (13 items), generalized anxiety disorder (9 items), social phobia (9 items), separation anxiety disorder (12 items), obsessive compulsive disorder (9 items), post-traumatic stress disorder (4 items), and specific phobia (15 items). The SCARED-71 consists of 71 items rated on a three-point scale (0 = almost never, 1 = sometimes, 2 = often). The minimum score that could be obtained is 0 and the maximum score that could be obtained is 142. The current study indexed girls with a cut-off above 60, and boys with a cut-off above 46 as “high-anxious”, and girls with scores around the median of 30 (range 28– 32), as well as boys with scores around the median of 23 (range 21– 25) were labeled median-anxious. Differences in cut-off scores between boys and girls are based on the fact that anxiety symptoms and disorders are more frequently endorsed in girls than in boys.

Assessment of Pre- and Perinatal Risk Factors

Pre- and perinatal risk factors were assessed with a structured interview. Only those items that were found to have the capacity of affecting brain development were included and strict coding criteria were provided. When the interviewer was not entirely certain, he/she was trained to describe the answer as specifically as possible. In this case, the first author checked whether this factor (e.g. a specific kind of medication) could possibly affect brain development. Both the interviewers as well as the first author were not aware of the child’s group membership.

The composite score Prenatal Risk Factors included: high blood pressure, eclampsia (and HELPP), lack of oxygen during pregnancy, weight under 46 kg, diabetes, fever over 39.5 °C, haemolysis, convulsions, Sexually Transmitted Disease, bacterial/viral infection, use of medication, smoking more than 15 cigarettes a day, drugs usage (soft drugs: more than three times a week, or hard drugs more than three times during pregnancy), excessive alcohol consumption (more than 5 beverages in one time or more than 7 per week), lead poisoning, mercury poisoning, radiation, prematurity (born at least 3 weeks premature), dysmaturity (weighing less than 2500 g), mothers age above 34, and other prenatal risk factors found to affect brain functioning. The composite score Perinatal Risk Factors included: epidural, difficult/abnormal delivery (e.g. caesarean section, breach position, cord around neck), lack of oxygen, Apgar score under eight, brain damage, icterus, other perinatal risk factors found to affect brain functioning. Mothers were asked: “During pregnancy/birth, did you (encounter) [item, e.g. high blood pressure]?”, and mothers did not indicate to experience difficulties recalling the presence of items. One point was scored for every present risk factor.

Assessment of Visuospatial Copying Deviation

The visuospatial copying task (Gurvits et al., 2002) consists of six three-dimensional figures, to be copied by the participants. Using a standardized protocol, each figure is scored as follows: 0 = near perfect reproduction; 1 = mild distortion or rotation, loss of one line or moderate micropsy; 2 = moderate distortion or rotation of any figure, severe micropsy, or loss of three-dimensionality; or 3 = gross distortion of the basic gestalt, i.e. figure virtually unrecognizable. Gurvits and colleagues (2002) reported good inter-rater reliability for the visuospatial copying task. For this study, the rater was a graduated psychologist assistant, who was blind for group membership of the child. To determine inter-rater reliability, the first author scored 12.7% of the material. The first figure contains few three-dimensional features, which makes it challenging to examine and agree on the deviation in visuospatial copying abilities (intraclass correlation .16). Therefore, we decided to exclude the first figure from further analyses and create a total score of items 2–6. Cronbach's alpha for the revision was good: .85. Inter-rater reliability analysis (intraclass correlation) was .90. The first author was not aware of group membership of the children.

Procedure

Children completed the SCARED-71 screening questionnaire at their primary schools during regular classes, which approximately took 15 min. They received a standardized explanation of the difficult questions. In addition, at least one of the research assistants was present in the classroom to help the children in case of difficulties. Approximately 3 months later, the children that were selected as high- and median-anxious participated in the visuospatial copying task, again at their schools. The task takes approximately 5 min to administer and children were instructed to copy the figures, without the use of a ruler. At that time, the mothers of the selected children reported on their own anxiety using the SCARED-A and they were interviewed with the checklist on pre- and perinatal risk factors at their homes. The research assistants were not aware of group membership of the children.

Statistical Analyses

Mann–Whitney U-tests were employed to check for differences between median-anxious and high-anxious children on prenatal risk factors, perinatal risk factors, deviation on visuospatial copying and mother's anxiety symptoms. Logistic regression analyses were performed to measure the effects of prenatal risk factors, perinatal risk factors and deviation in visuospatial copying abilities on being high-

anxious for anxiety. Age and sex of the child as well as mother's anxiety level were controlled statistically. The logistic regression analysis was repeated without non-significant predictors.

RESULTS

Preliminary Analyses

Of all participants, 260 (96%) completed the pre- and perinatal checklist. Unfortunately, due to later inclusion of the visuospatial copying task in the ongoing project, only 217 (80%) children participated in the visuospatial copying task. In the group of visuospatial copying task completers, no significant differences were identified between high-anxious and median-anxious children with respect to age, $t = .95$, $df = 215$, $p > .10$, and gender, $\chi^2(1) = .96$, $p > .10$. Means and standard deviations for the predictor variables: mother's anxiety score, prenatal risk factors, perinatal risk factors, and deviation on visuospatial copying were investigated. Mean anxiety scores of mothers of median-anxious children was 26.16 ($SD\ 14.47$), and of mothers of high-anxious children 29.52 ($SD\ 18.49$), $t = -1.38$, $df = 233$, $p > .10$.

None of the mothers endorsed 'lead poisoning; or 'mercury poisoning' and these factors were not included in the final score for prenatal risk factors. Means and standard deviations for the prenatal risk factor score was .52 ($SD\ .84$) for median-anxious children, ranging from 0 to 4 risk factors, and .88 ($SD\ 1.21$) for high-anxious children, ranging from 0 to 7 risk factors per child. High-anxious children experienced significantly more prenatal risk factors than median-anxious children, Mann-Whitney $U = 6706$, $p < .01$, pooled $es = .35$.

Means and standard deviations for the perinatal risk factor score was .42 ($SD\ .61$), for median-anxious children, ranging from 0 to 2 risk factors, and .58 (.89) for high-anxious children, ranging from 0 to 4 risk factors. High-anxious children did not differ significantly from median-anxious participants with respect to perinatal risk factors, Mann-Whitney $U = 6830.00$, $p > .05$, pooled $es = .21$.

Finally, means and standard deviations of visuospatial copying deviation were 5.29 ($SD\ 3.51$) for median-anxious children, and 7.28 ($SD\ 4.20$) for high-anxious children (the higher the score, the more deviation from perfect reproduction). Median-anxious children performed significantly better on the visuospatial copying task than high-anxious children, Mann-Whitney $U = 3633.00$, $p < .01$, pooled $es = .51$. A logistic regression analysis was performed to investigate the relative effect of pre- and perinatal risk factors and deviation in visuo-

spatial copying abilities on the anxiety status (median-anxious versus high-anxious) of the child. The Box–Tidwell approach showed that the linearity assumption of the logit was not violated. In order to avoid multicollinearity, the predictor variables were mean-centered. Because of the non-significant results regarding the perinatal risk factors in the preliminary analyses, perinatal risk factors were expected to have no effect on child's anxiety status. Therefore, the first test compared a model with the three predictors (prenatal, perinatal, and visuospatial copying) and all possible interaction terms, to a model including only prenatal risk factors, visuospatial copying deviation, and their interaction. Removing perinatal risk factors from the model did not lead to a significant deterioration in model fit, $\chi^2(4) = 3.47$, $p = .48$, and were, therefore, removed from the model. Results retrieved from the model without perinatal risk factors are reported below.

Age and sex of the child were no significant predictors of the child's anxiety status. Additionally, maternal anxiety was not a significant predictor of the child's anxiety status. Both prenatal risk factors and visuospatial copying deviation appeared to be significant predictors of child's anxiety status. Furthermore, the factor reflecting the interaction between prenatal risk factors and deviation on visuospatial copying was a significant and positive predictor of child's anxiety status. The parameter estimates are presented in Table 3. To facilitate the interpretation of this interaction, separate equations for those children with 0, 1, 2 and 3 prenatal risk factors were computed. Table 4 presents the effect of visuospatial copying deviation on the anxiety status for these four groups. The proportionate change in odds for being high-anxious increases strongly with increasing levels of prenatal difficulties and corresponding level of deviation on visuospatial copying. In other words, more prenatal difficulties in combination with a lower performance on three-dimensional copying predict child anxiety. In terms of Nagelkerkes R-square, the full model explained 13.5% of the variance of anxiety status of the child.

Table 3
Logistic Regression Analysis of Anxiety Status

Variable	<i>B</i> (<i>SE B</i>)	<i>Exp B.</i>
Constant	.81 (.16)**	1.11
Age	-.16 (.14)	.85
Sex	.04 (.32)	1.04
Mother's anxiety score	.01 (.01)	1.01
Prenatal risk factors	.57 (.22)**	1.76
Visuospatial deviation	.14 (.05)**	1.15
Prenatal risk factors* visuospatial deviation	.10 (.06)*	1.11

Note.

$R^2 = 13.50$. (Nagelkerke). Model $\chi^2(21.28) = p < .01$

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

Table 4
B and *Exp (B)* (Proportionate Change in Odds for Being High-anxious) for 0, 1, 2, and 3 Prenatal Risk Factors (Linked to Level of Visuospatial Deviation)

	0 prenatal risk factors* visuospatial deviation	1 prenatal risk factor* visuospatial deviation	2 prenatal risk factors* visuospatial deviation	3 prenatal risk factors* visuospatial deviation
<i>B</i>	.06	.17	.27	.66
<i>exp(B)</i>	1.06	1.18	1.31	1.92

DISCUSSION

This study examined differences between median-anxious and high-anxious children with respect to the earliest environmental risk factors: those occurring during pregnancy and during birth (pre- and perinatal risk factors). The results revealed that: (I) mothers of high-anxious children reported more prenatal, but not perinatal, risk factors than median-anxious children; (II) performance on visuospatial copying was poorer for high-anxious than median-anxious children; (III) prenatal risk factors and deviation on the visuospatial copying task were positive predictors of the child's anxiety status, whereas mothers' anxiety was not; (IV) the interaction between prenatal risks and visuospatial deviation was a positive predictor of the child's anxiety status.

The hypothesis that high-anxious children experienced more prenatal risk factors was supported, whereas the expectancy that high-anxious children experienced more perinatal risk factors was not supported. Additionally, prenatal risk factors predicted being high-anxious. These findings are consistent with the results of Allen and colleagues (1998) and Hirschfeld-Becker and colleagues (2004) who reported a predictive effect of prenatal, but not perinatal, risk factors on child's anxiety. Cohen and colleagues (P. Cohen & Velez, 1989; Velez, Johnson, & Cohen, 1989) found a combined score of pre- and perinatal factors predicted child anxiety, but it is not clear whether perinatal risk factors independently predicted child anxiety.

Two explanations can be offered for the fact that perinatal risk factors were not predictive of child's anxiety status. Firstly, prenatal risk factors were found to correlate with perinatal risk factors. Therefore, part of the variance of perinatal risk factors is explained by prenatal risk factors, leaving perinatal risk factors non-significant in a regression analysis. However, regarding the current study, this does not account for the lack of a significant difference between the normal and high-anxious children with regard to the number of perinatal risk factors. A second explanation lies in the specific items constituting the variable perinatal risk factors, such as abnormal delivery or brain damage. Consequences of these items could be more severe than consequences of prenatal risk factors. Note that in the current study children were approached via regular primary schools and were excluded in case of developmental delay, and therefore specific and severe cerebral dysfunctions were excluded. The hypothesis that high-anxious children would deviate more on visuospatial copying than median-anxious children was supported. Moreover, deviation in visuospatial copying abilities predicted child's current anxiety status. These results are consistent with ear-

lier studies, pointing to an associative and causal relation between non-specific cerebral dysfunction and later anxiety (Kaplan, Busner, Gallagher, Chaput, & Acosta, 1996; Shaffer et al., 1985). Furthermore, in this study, odds ratio's for being high-anxious increased with increasing numbers of prenatal risk factors in combination with deviations in visuospatial copying. These findings support the possibility that prenatal risk factors impact anxiety level via non-specific cerebral dysfunction, indicated by a lack of visuospatial copying abilities. However, despite the fact that we tried to reduce performance anxiety on the copying task by stressing they would not receive a grade on their drawing, the possibility that poorer scores on visuospatial copying is explained by the child's performance anxiety instead of neurobiological deficits remains. The full model accounted for 13.5% of the variance of child's anxiety status, largely explained by the variables prenatal risk factors, deviation in visuospatial copying and the interaction between these two factors. This percentage is impressive, given the fact that anxiety emerges from various combinations of risk factors and nature–nurture interactions (Vasey & Dadds, 2001). This contributes to the need for further investigating difficulties during pregnancy or birth and how they lead to neuro(bio)logical deficits underlying anxiety disorders. Also, interactions of prenatal risk factors and neurological soft signs with environmental factors such as life events and family functioning deserve further examination.

Limitations

The results should be interpreted in the light of the study's limitations. The first limitation is the retrospective nature of the data. The validity and reliability of measuring pre- and perinatal risk factors is likely to increase when they are measured prospectively. However, the pre-/perinatal items were operationalized in such a manner to minimize the effects of time-related biases and current maternal psychopathology. Additionally, there can be no uncertainty regarding one of the most important aspects that characterize risk factors: temporal precedence. That is, prenatal risk factors temporally precede the measured outcome: child anxiety.

This study did not address the possibility that certain pre-/perinatal risk factors potentially affect the fetus more than other pre-/perinatal risk factors because there is a lack of basis for such weighing. Instead, we chose to base the operationalization on previous animal and human studies that focused on links between risk factors occurring during pregnancy and birth and later neurological dysfunction. For example, alcohol consumption was defined as: consuming more than seven beverages per week or more than five beverages at one

time. Because all of the items were selected based on the same principle (presence can cause neurological dysfunction), the necessity of weighting items decreased.

In order to uncover relationships between pre-/perinatal risk factors and brain functioning among children with anxiety, more measures of non-specific and specific cerebral functioning are needed. Results of this study offer support of such relationships, and provide ground for future scientists to study these matters in more detail by including more measures of cerebral functioning.

High-anxious children are more likely than median-anxious children to have parents with anxiety disorders. The set-up of this study cannot exclude the possibility that mothers with anxiety disorders are at an increased risk for negative reproductive outcomes, such as prematurity. We did not find mothers' current anxiety level to be correlated to prenatal risk factors, but we did not assess mothers' prenatal anxiety. It would, therefore, be interesting to study the effects of pre- and perinatal risk factors on child's anxiety by including pregnant mothers that are anxious and compare them to non-anxious pregnant mothers prospectively.

Finally, the extent to which these results can be generalized to children with clinical anxiety disorders remains unclear. It could be that clinically anxious children have experienced more pre-/perinatal risk factors or deviate more on measures on non-specific cerebral dysfunction than high-anxious children.

Conclusion

To prevent anxiety disorders, the identification of risk factors is of high importance. Risk factors occurring during birth and delivery have received remarkably little attention in comparison to genetic and postnatal risk factors regarding the anxious child. This study pointed to a relationship between prenatal risk factors and child's anxiety that merits further investigation using prospective longitudinal designs.

Screening for Anxiety Disorders in Children

Anxiety disorders are highly prevalent and have negative consequences on individual and societal level. This study examined the usefulness of screening for anxiety disorders in primary school children. More specifically, the value of the screening method to discriminate between and to predict anxiety disorders was studied. Children and their parents were selected if the children had self-reported scores on the screening questionnaire Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71) within the top-15% (High-anxious) or from two points below to two points above the median (Median-anxious). Of the selected children, 183 high-anxious children and their parents, and 80 median-anxious children and their parents took part in a diagnostic interview, the Anxiety Disorder Interview Schedule (ADIS). Of the high-anxious children, 60% had an anxiety disorder versus 23% of the median-anxious children, whereas groups did not differ on rates of dysthymia/depression and attention deficit hyperactivity disorder. The diagnoses separation anxiety disorder, social phobia and specific phobia were specifically predicted by the corresponding subscales of the screening questionnaire, while the diagnosis generalized anxiety disorder was not predicted by any of the subscales. The screening method has proven its utility for discriminating between children with and without anxiety disorders when applying the top-15% cut-off. Moreover, separation anxiety disorder, social phobia, and specific phobia, all known to be prevalent and debilitating childhood anxiety disorders, can be predicted by the corresponding subscale of the screening instrument.

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INTRODUCTION

Anxiety disorders have detrimental effects on an individual's quality of life and functioning. For children, this entails difficulties at school and in social interactions (Dweck & Wortman, 1982; Essau, Conradt, & Petermann, 2000; Strauss, Lease, Kazdin, Dulcan, & Last, 1989; Turner, Beidel, & Costello, 1987). Additionally, anxiety disorders are comorbid with other anxiety or affective disorders (Anderson, Williams, McGee, & Silva, 1987; Last, Strauss, & Francis, 1987; McGee et al., 1990) and can lead to depression (Barlow, DiNardo, Vermilyea, & Blanchard, 1986; Brady & Kendall, 1992; Pine, Cohen, Gurley, Brook, & Ma, 1998; Strauss, Lease, Kazdin, Dulcan, & Last, 1989), other mental disorders such as substance use disorder (Wittchen & Essau, 1994) and more severe anxiety disorders (Lipsitz et al., 1994; Otto, Pollock, Rosenbaum, Sachs, & Asher, 1994).

Furthermore, the decrease in quality of life and functioning, together with the need for treatment, place a burden on society via indirect and direct costs. For example, in 2003, anxiety disorders accounted for 0.5% of the total health care costs in The Netherlands, and costs were estimated at 275.2 million euro's (Slobbe et al., 2006). Moreover, a recent cost-of-illness study (Bodden, Dirksen, & Bögels, 2008) revealed that families with clinically anxious children reached societal costs that were more than 20 times higher than families from the general population. Estimations of lifetime prevalence of anxiety disorders in childhood and adolescence range between 8 and 27% (Costello, Egger, & Angold, 2005), and Costello and colleagues reported that the lifetime prevalence of anxiety disorders is already 9.9% at age 16 (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). In adulthood, anxiety disorders are the most common psychiatric disorders, with a 29% lifetime prevalence (Kessler et al., 2005). In another study, 80.5% of 21 years of age with a diagnosis of anxiety had received an anxiety diagnosis before they reached the age of 18 (Newman et al., 1996). The majority of anxiety disorders thus have their onset in childhood and adolescence. Early onset anxiety disorders (< 13 years of age) have a tendency to follow a chronic course (P. Cohen et al., 1993; Feehan, McGee, & Williams, 1993; Keller et al., 1992). Even though effective treatment of anxiety disorders exists (Ollendick & King, 1998), only 40% of individuals hindered by an anxiety disorder initiates help seeking within a year. Christiana and colleagues reported that 60% of all individuals with an anxiety disorder seek help with a mean delay of 8 years. In fact, help-seeking behavior was found to be inversely associated to time since onset and age at onset (Christiana et al., 2000).

Moreover, early onset anxiety disorders have been found to have a more disabling and severe character (Giaconia et al., 1994; Hoehn-Saric, Hazlett, & McLeod, 1993; Kovacs, 1996).

The negative consequences of anxiety disorders on a personal and societal level, together with the fact that enduring and early onset anxiety disorders lead individuals to initiate treatment less, add up for the need to detect children with anxiety (disorders) in an early stage. A screening tool generally provides insight in the anxiety level within a matter of minutes and laypersons can administer it (Essau & Barrett, 2001). Therefore, screening tools, such as questionnaires, enable to measure anxiety symptoms in a time- and cost-effective manner. This creates the opportunity to identify high-anxious children, to inform children and parents about anxiety and its consequences, to prevent anxiety disorders, and to intervene closer to onset. Additionally, utilizing a screening tool possibly decreases the child's dependence on parents or teachers to play an active part in or be aware of possible anxiety problems. Due to the fact that children do not readily disclose anxious feelings and that anxiety symptoms are usually not easy to observe for the environment, dysfunctional child anxiety remains relatively unnoticed by caretakers.

The Screen for Anxiety Related Emotional Disorders (SCARED) (Birmaher et al., 1999), Dutch translation and revision by Muris and colleagues (SCARED-R, Muris, Merckelbach, Schmidt, & Mayer, 1999), is a questionnaire suitable for screening childhood anxiety disorders, also in community populations. Its subscales are linked to the categories of the Diagnostic and Statistical Manual of Mental Disorders (APA, 1994): separation anxiety disorder, generalized anxiety disorder, social phobia, panic disorder, obsessive-compulsive disorder, specific phobia, and posttraumatic stress disorder. The SCARED-R possesses good internal consistencies of the total and subscales scores (Muris, Dreesen, Bögels, Weckx, & Van Melick, 2004; Muris, Merckelbach, Van Brakel, & Mayer, 1999), satisfactory test-retest reliability (Muris, Merckelbach, Van Brakel, & Mayer, 1999), and discriminates well between anxiety problems and other behavior problems (Muris, Dreesen, Bögels, Weckx, & Van Melick, 2004; Muris & Steernema, 2001). Additionally, it correlates well with other measures of anxiety, like the Spence Children's Anxiety Scale (Muris, Schmidt, & Merckelbach, 2000; Spence, 1998), and is sensitive for treatment effects (Muris, Merckelbach, Gadet, Mouleart, & Tierney, 1999). The current study uses the 71-item SCARED (SCARED-71, Bodden, Bögels, & Muris, 2009). The SCARED-71 adds 5 extra items to the social phobia subscale, which was composed of 4 items in the subscale of the SCARED-R.

The 4 original social phobia items all address fear of interaction with unfamiliar people, whereas the 5 added items refer to other important aspects of social phobia: fear of interaction with familiar people, fear of being evaluated, and psycho-physiological aspects of social phobia (Bögels & Van Melick, 2004). Two studies examined the predictive/discriminative value of the subscales of the SCARED-R, both yielding promising results. The first study was performed with a sample of elementary school children ($n = 82$) and used the child edition of the Structured Clinical Interview (KSCID, Hien et al, 1998) for DSM as diagnostic standard. It appeared that the diagnoses separation anxiety disorder and generalized anxiety disorder were specifically predicted by their matching subscales of the SCARED-R (Muris et al., 2001). The second study used a sample of clinically referred children/adolescents ($n = 233$) and also used the KSCID as diagnostic standard. It was shown that the SCARED-R subscales separation anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, panic disorder and social phobia predicted their corresponding diagnoses on the KSCID (Muris, Dreesen, Bögels, Weckx, & Van Melick, 2004).

This study aims to investigate the usefulness of screening for anxiety disorders by children's self-report of anxiety symptoms on a questionnaire (SCARED-71) in primary school settings. It does so by comparing SCARED-71 scores to a diagnostic standard, the Anxiety Disorder Interview Schedule (Siebelink & Treffers, 2001) in a large sample of children ($N = 263$). Moreover, the discriminative value of the subscales of the SCARED-71 is examined. To our knowledge, only one comparable study has been performed that also used a sample of primary school children (Muris et al., 2001). Whereas that study relied only on the child interview, the current study includes both child and parent as informants in the interview. It was expected that (I) children selected as 'high-anxious' (SCARED-71 scores in the top-15%) display significantly more anxiety diagnoses on the ADIS than children selected as median-anxious; (II) the subscales of the screening questionnaire predict the diagnoses on their corresponding category in the diagnostic interview.

METHOD

Participants

The participants were recruited for a longitudinal still ongoing study, approved by a Medical Ethical Committee, on the prevention of anxiety disorders. Children aged 8–13 were recruited via primary schools in rural and urban schools in the Southern part of the Ne-

therlands. Of all approached children and parents, 52% ($N = 2,494$) signed informed consent and these children completed the anxiety questionnaire that was used as a screening tool (SCARED- 71). The participants eligible for the longitudinal study scored either in the top-15% ($n = 412$, referred to as high-anxious) or from two points below to two points above the median ($n = 172$, referred to as median-anxious) on the SCARED-71. In order to achieve a balance in the number of boys and girls in the median and top-15%, separate top-15% and median cut-offs for boys and girls were calculated. Girls tend to score more anxiety symptoms than boys (Castellanos & Hunter, 1999; Craske, 1997). Participants were excluded from further participation if the children were found to show obvious developmental deviation, as based on clinical observation ($n = 1$). Of the children labeled as high-anxious children, 188 (46%) children and parents participated in the diagnostic interview. Of the children labelled as median-anxious, 82 (48%) children and parents participated in the diagnostic interview. Demographic features of the high- and median-anxious children are depicted in Table 1. In the high-anxious and median- anxious group, there were 3 and 2 sibling dyads, respectively. As can be seen in Table 1, parents of high-anxious children are significantly more often divorced or living apart than parents of median-anxious children. No significant differences were found with respect to all other demographic variables. Among others, the parents of high-anxious and median-anxious children did not differ with respect to seeking professional help for their child's mental health.

Anxiety Screening

The Screen for Child Anxiety Related Emotional Disorders (SCARED) was originally developed by Birmaher and colleagues (Birmaher et al., 1999; Birmaher et al., 1997) and has been modified and revised over the years (Muris, Merckelbach, Schmidt, & Mayer, 1999). In this study, the selection of the children was based on the child version of the 71-item Dutch version of the screening questionnaire, the SCARED-71. The choice for only using the child version came forth from pragmatic reasons (classical employment is more time efficient). Moreover, as children with anxiety disorders are often not referred for treatment because the environment is not sufficiently aware of the severity of the anxiety symptoms (Horowitz, Leaf, & Leventhal, 1998), it seems important to detect children with severe anxiety and anxiety disorders on the basis of their own report.

Furthermore, in the study of Wren and colleagues (2004), it appeared that the child version yielded more information (on symptoms of separation anxiety disorder and panic disorder) than the parent ver-

sion. The SCARED-71 assesses a range of DSM-IV based anxiety symptomatology. More specifically, it taps symptoms of panic disorder (13 items), generalized anxiety disorder (9 items), social phobia (9 items), separation anxiety disorder (12 items), obsessive-compulsive disorder (9 items), post-traumatic stress disorder (4 items), and specific phobia (15 items). The SCARED-71 consists of 71 items rated on a three-point scale (0 = almost never, 1 = sometimes, 2 = often). The minimum score that could be obtained is 0 and the maximum score that could be obtained is 142. The current study indexed girls with a cutoff above 60, and boys with a cut-off above 46 as "high-anxious" (top-15%) for developing anxiety disorders. Girls with scores 2 points below/above the median of 30, and boys of 23 were labeled median-anxious. For this study, the homogeneity of the child-report of the 71 item SCARED-71 was high, $\alpha = 0.94$, for the total score, and satisfactory for the social phobia scale, $\alpha = 0.73$. The homogeneity of the subscale social phobia could not be ameliorated by deleting items, pointing to a unique contribution of every item within the scale. The homogeneities of the other subscales were as follows: panic disorder: $\alpha = 0.86$, generalized anxiety disorder $\alpha = 0.82$, separation anxiety disorder $\alpha = 0.76$, obsessive-compulsive disorder: $\alpha = 0.58$, post-traumatic stress disorder: $\alpha = 0.79$, specific phobia: $\alpha = 0.76$.

Table 1

Family Demographic Features of High- and Median-anxious Children

	High-anxious, <i>n</i> = 188	Median-anxious, <i>n</i> = 82
Boys (<i>n</i> , %)	84 (45%)	44 (54%)
Age child (<i>M,SD</i>)	9.92 (1.23)	10.22 (1.13)
Professional help for mental health children (<i>n</i> , %) ^a	19 (10%)	4 (5%)
Children in family (<i>M,SD</i>)	2.27 (.94)	2.15 (.79)
Children first-born (<i>n</i> , %)	103 (55%)	50 (61%)
Biological father (<i>n</i> , %)	174 (93%)	81 (99%)*
Biological mother (<i>n</i> , %)	187 (100)	81 (99%)
Parents divorced/living apart (<i>n</i> , %)	39 (21%)	7 (9%)**
Caucasian		
Father (<i>n</i> , %)	181 (96%)	79 (96%)
Mother (<i>n</i> , %)	181 (96%)	78 (95%)
Parental age		
Father (<i>M,SD</i>)	41.84 (4.43)	42.39 (3.92)
Mother(<i>M,SD</i>)	39.59 (5.00)	40.11 (4.29)
Parental educational level ^b		
Father (<i>M,SD</i>)	5.11 (1.96)	5.29 (2.10)
Mother(<i>M,SD</i>)	4.94 (1.98)	5.06 (2.00)
Current unemployment		
Father (<i>n</i> , %)	12 (6 %)	4 (5 %)
Mother (<i>n</i> , %)	59 (31%)	27 (33%)

Note.

^aProfessional help from psychologist, psychiatrist for any mental difficulty, as indicated by parents on pre-measurement;^bon a scale from 0 (no education) to 8 (university)

**p* < .05, ** *p* < .01, tested two-sided

Anxiety Diagnoses

The Anxiety Disorder Interview Schedule (ADIS) is a well validated semi-structured diagnostic interview, suitable for measuring all anxiety disorders as listed in the DSM-IV as well as mood disorders and attention deficit hyperactivity disorder, in children from 7–17 years of age. This study utilized the child and parent version of the Dutch version of the ADIS (Siebelink & Treffers, 2001) and was used to measure the presence of anxiety disorders, mood disorders and attention deficit hyperactivity disorder in the past year. Both the parent and child version of the ADIS possess good inter-rater and high test–retest reliability (Silverman, Saavedra, & Pina, 2001). For the current study, more than 10% ($n = 29$) of the interviews were videotaped and rerated by two trained research assistants. Regarding the presence of an anxiety disorder (any anxiety disorder present/no anxiety disorder present), the research assistants reached perfect agreement on the child interview, $\kappa = 1.00$, $p < 0.01$, and substantial agreement on the parent interview, $\kappa = 0.73$, $p < 0.01$. With respect to the number of diagnoses, the research assistants reached almost perfect agreement on both the child, $r = 0.84$, $p < 0.01$, and the parent interview, $r = 0.95$, $p < 0.01$. Finally, the research assistants reached almost perfect agreement regarding the severity of the primary diagnosis on the child interview, $r = 0.99$, $p < 0.01$ and the parent interview, $r = 0.86$, $p < 0.01$. Conform standard ADIS procedures, a child receives a diagnosis in case a specified amount of criteria are met and the child or parent reports substantial interference at school, at home or in social contacts (4 or higher on a scale from 0 to 8). The combined diagnosis represents a sum of the diagnoses of the child and the parent interview.

Procedure

Children completed the SCARED-71 during regular classes, which approximately took 15 min. They received a standardized explanation of the difficult questions. In addition, a research assistant was present in the classroom to help the children in case of difficulties. Children were selected based on the child version of the screening questionnaire, and those scoring in the top-15% or from 2 points below to 2 points above the median were selected and asked to participate in the entire anxiety prevention study. Maximum 3 months later, the children and their parents were interviewed separately using the ADIS (Siebelink & Treffers, 2001) concerning the child's anxiety disorders and other psychopathology.

Statistical Analyses

Missing items (<10%) of the screening questionnaire were replaced via regression within the standard missing value analysis provided by SPSS. Independent sample t-test were performed to calculate differences between median-anxious and high-anxious children regarding separate SCARED-71 subscales. Chi-square and Odds ratios were calculated to measure possible differences between the high-anxious and median-anxious children with respect to diagnostic status (yes/no), and Cohen's kappa was calculated in order to measure child-parent correspondence of diagnoses. The predictive values of the SCARED-71 subscales on their corresponding diagnosis on the ADIS were calculated by logistic regression analyses. All analyses were performed utilizing Statistical Package for Social Sciences 15.0.

RESULTS

Preliminary Results

In case either the parent or the child interview was not completed (high-anxious, $n = 5$, median anxious, $n = 2$), data of these participants were excluded from the analyses. Regarding the parent interviews, in the high-anxious group, 172 (94%) mothers took part in the interview and 65 (36%) fathers. A trend was found, that is, children whose father did not participate had higher self-reported anxiety scores than children whose father did participate, $t(180) = 1.83$, $p = 0.06$. In the median-anxious group, 76 (95%) mothers took part in the interview and 17 (21%) fathers, and no differences were present on child-reported anxiety scores between children whose father did participate and those children whose fathers did not participate, $t(77) = 0.04$, $p > 0.10$.

Descriptive Statistics of the SCARED-71

The means and standard deviations of the SCARED-71 child version of high-and median-anxious children are depicted in Table 2.

Table 2

Means and Standard Deviations of the Screening Questionnaire, and Comparisons of Total and Subscale Scores of Entire High- and Median Anxious Group, as well as Comparisons of Boys' and Girls' scores within the High- and Median-anxious Group

	High-anxious (<i>n</i> =183)			Median-anxious (<i>n</i> = 80)		
	<i>(Mean, SD)</i>			<i>(Mean, SD)</i>		
	Entire group	Girls	Boys	Entire group	Girls	Boys
Total score (71 items)	66.31 (15.69)	71.24 (16.23)	60.24 (12.65)**	25.97 (3.81)	28.92 (2.65)	23.32 (2.52)**
Panic disorder (13 items)	10.18 (5.08)	11.05 (5.36)	9.10 (4.52)**	2.14 (1.40)	2.46 (1.50)	1.85 (1.26)
Generalised anxiety disorder (9 items)	9.55 (3.61)	10.16 (3.55)	8.79 (3.57)*	3.12 (1.98)	3.92 (2.07)	2.39 (1.59)**
Social phobia (9 items)	8.43 (3.41)	9.20 (3.38)	7.49 (3.21)**	4.00 (1.87)	4.51 (1.89)	4.02 (1.73)*
Seperation anxiety disorder (12 items)	10.65 (3.79)	11.45 (4.02)	9.65 (3.22)**	4.04 (1.84)	4.05 (1.91)	4.02 (1.80)
Obsessive-compulsive disorder (9 items)	8.84 (2.71)	9.18 (2.61)	8.41 (2.79)	4.46 (1.76)	4.73 (1.79)	4.22 (1.71)
Animal phobia (3 items)	1.95 (1.87)	2.43 (2.03)	1.35 (1.45)**	.73 (1.30)	.84 (1.48)	.63 (1.11)
Blood injection injury phobia (7 items)	6.44 (2.96)	6.82 (2.93)	5.95 (2.94)*	3.24 (1.80)	3.54 (1.73)	2.98 (1.85)
Environmental sit. phobia (5 items)	5.11 (2.19)	5.52 (2.04)	4.60 (2.28)**	2.31 (1.56)	2.73 (1.66)	1.93 (1.37)*
Post-traumatic stress disorder (4 items)	5.37 (2.05)	5.75 (1.98)	4.90 (2.06)**	1.94 (1.72)	2.14 (1.92)	1.76 (1.53)

Note.

All means of the entire high-anxious and median-anxious groups differed significantly, at $p < .01$,

* $p < .05$, ** $p < .01$, tested two-sided

Diagnoses of High- and Median-anxious Children

The characteristics of the participating children on the prevalence of all DSM-IV anxiety disorders, as well as the prevalence of dysthymia, depression and attention deficit hyperactivity disorder are depicted in Table 3. There was a slight to fair agreement between children and parents regarding the presence (present/not present) of the three most frequent diagnosed anxiety disorders and the presence of any anxiety disorder: Cohen's kappa specific phobia: 0.19; Cohen's kappa social phobia: 0.11; Cohen's kappa separation anxiety disorder: 0.30; Cohen's kappa any anxiety diagnosis: 0.16. Regarding the combined diagnoses, 60% of the high-anxious children ($n = 110$) had one or more anxiety disorders, in contrast to 23% ($n = 18$) of the median-anxious children, $\chi^2(1) = 30.28$, $p < 0.01$, $OR = 5.0$. This was also the case when only the child interview was taken into account, $\chi^2(1) = 26.60$, $p < 0.01$, $OR = 7.8$, or only the parent interview, $\chi^2(1) = 14.57$, $p < 0.01$, $OR = 3.6$. High-anxious children did not have significantly more dysthymia and depression, $\chi^2(1) = 1.59$, $p > 0.05$, $OR = 3.5$, and attention deficit disorder and hyperactivity disorder, $\chi^2(1) = 0.14$, $p > 0.05$, $OR = 1.2$.

When comparing high- and median-anxious children with one or more anxiety disorders to each other, it appeared that the severity of the primary anxiety diagnosis (range 4–8 in case of diagnosis) was significantly higher in high-anxious children ($M = 4.93$, $SD 0.96$) than in median-anxious children ($M = 4.5$, $SD 0.92$), $t(126) = 1.77$, $p < 0.05$. Additionally, in diagnosed high-anxious children, the average number of anxiety diagnoses was 2.03 ($SD 1.49$, range 1–9), compared to 1.11 ($SD 0.32$, range 1–2) in diagnosed median-anxious children, $t(117.93) = -5.692$, $p < 0.01$. The most frequent diagnoses in the high-anxious group were specific phobia ($n = 95$; 52%), social phobia ($n = 39$; 21%), separation anxiety disorder ($n = 29$; 16%) and generalized anxiety disorder ($n = 28$; 15%). Fear of the dark is the type of specific phobia that was diagnosed the most (27%; $n = 26$), followed by spider phobia (19%; $n = 18$), and medical phobias (17%; $n = 16$).

Discriminative Value of SCARED-71 Subscales

In order to measure whether the anxiety disorders were predicted by their corresponding subscale of the SCARED-71, hierarchic logistic regression analyses were performed. The diagnostic status (anxiety disorder present/anxiety disorder not present) for every specific DSM-IV anxiety disorder constituted the dependent variable, whereas all subscales of the child SCARED-71 were entered as independent variables. Only those disorders with prevalence rates above

5% and their corresponding SCARED-71 scales were taken into account (separation anxiety disorder, generalized anxiety disorder, social phobia, and specific phobia). Because of the low prevalence rates of disorders (all < 5%) in the median-anxious group, the logistic regression analyses were only performed with high-anxious children. The results of these analyses are depicted in Table 4.

Table 3
 Prevalence Rates on Child-report, Parent-report and Combined Report of Anxiety Disorders, Dysthymia, Depression and Attention Deficit Hyperactivity Disorder in High-anxious and Median-anxious Children, and Statistical Comparison
 (Chi-square) of Groups on Prevalence Rates of Combined Reports

Type of anxiety disorder	High-anxious, n = 183			Median-anxious, n = 80		
	C	P	Com	C	P	Com
Separation anxiety	19 (10%)	17 (9%)	29 (16%)**	0 (0%)	1 (1%)	1 (1%)
Social phobia	21 (11%)	22 (12%)	39 (21%)**	1 (1%)	4 (5%)	5 (6%)
Specific phobia	62 (34%)	48 (26%)	95 (52%)**	6 (8%)	4 (5%)	9 (11%)
Panic	3 (2%)	1 (1%)	3 (2%)	0 (0%)	1 (1%)	1 (1%)
Generalised anxiety	17 (9%)	14 (8%)	28 (15%)*	0 (0%)	4 (5%)	4 (5%)
Post traumatic stress	4 (2%)	1 (1%)	5 (3%)	0 (0%)	0 (0%)	0 (0%)
Obsessive compulsive	1 (1%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)
Any anxiety disorder	72 (39%)	72 (39%)	110 (60%)**	6 (8%)	12 (15%)	18 (23%)
Other disorders						
Dysthymia/Depression	5 (3%)	5 (3%)	8 (4%)	1 (1%)	0 (0%)	1 (1%)
Attention deficit hyperactivity disorder	5 (3%)	11 (6%)	14 (8%)	0 (0%)	5 (6%)	5 (6%)

Note.
 C: Child report; P: Parent report; Com: Combined report (child + parent)
 p* < .05, *p* < .01, tested two-sided

Table 4
 Logistic Regression Analyses with the SCARED
 Subscales as Independent
 Variables and the (Combined Child-parent)
 Anxiety Diagnosis as the Dependent Variable

	Separation anxiety diagnosis1	Social phobia diagnosis2	Specific phobia diagnosis3	Generalised anxiety diagnosis4
	<i>B (SE B)</i>	<i>Exp B. B (SE B)</i>	<i>Exp B. B (SE B)</i>	<i>Exp B. B (SE B)</i>
Constant	-4.47 (1.00)**	.01	-4.14 (.89)**	.02
Separation anxiety disorder, screening	.17 (.07)**	1.19	.02 (.06)	1.02
Social phobia, screening	-.07 (.07)	.93	.30 (.07)**	1.35
Sum specific phobia, screening	.06 (.05)	1.06	-.01 (.04)	.99
Generalised anxiety disorder, screening	.05 (.07)	1.06	.00 (.07)	1.00

Note.

¹ Separation anxiety disorder, $R^2 = .12$. (Nagelkerke). Model $\chi^2 (13.21) = p < .05$;

² Social phobia, $R^2 = .22$. (Nagelkerke). Model $\chi^2 (28.57) = p < .01$;

³ Specific phobia, $R^2 = .08$. (Nagelkerke). Model $\chi^2 (11.24) = p < .05$;

⁴ Generalized anxiety disorder, $R^2 = .06$. (Nagelkerke). Model $\chi^2 (5.93) ,$

** $p < 0.01$, tested two-sided

It appeared that the disorders separation anxiety disorder, social phobia, and specific phobia were predicted by their corresponding subscale on the SCARED-71. That is, other subscales did not contribute significantly to the prediction of separation anxiety disorder, social phobia and specific phobia than their matching SCARED-71 subscales. The full model of the diagnoses separation anxiety disorder, social phobia, and specific phobia accounted, respectively, for 12, 22, and 8% of the variance. The diagnosis generalized anxiety disorder was not predicted significantly by any of the included subscales of the SCARED-71.

DISCUSSION

This study investigated the usefulness of screening for anxiety disorders in primary school children via children's self-report of anxiety symptoms on a questionnaire. Children that had a total score in the top-15% (high-anxious) were compared to children with a total score from 2 points below to 2 points above the median (median-anxious) with respect to their total scores and subscale scores on the screening questionnaire. Both groups received a diagnostic interview (separate child and parent interviews) to check for the presence of

anxiety disorders. The predictive value of the screening questionnaire's subscales separation anxiety disorder, social phobia, specific phobia, and generalized anxiety disorder on their matching diagnosis of the interview was analyzed. With respect to the tested hypotheses, it was found that: (1) high-anxious children had more often, and more severe anxiety diagnoses compared to median-anxious children; (2) high-anxious children and median-anxious children did not differ with respect to dysthymia, depression, and attention deficit hyperactivity disorder; (3) the diagnoses separation anxiety disorder, social phobia, and specific phobia were specifically predicted by their matching subscales on the screening questionnaire; (4) the diagnosis generalized anxiety disorder was not predicted by any of the included subscales the SCARED-71.

The screening instrument discriminates between children with severe anxiety difficulties and children with "normal anxiety". However, the prevalence numbers of anxiety disorders in both groups are fairly high. They exceed the general lifetime prevalence estimation of 9.9% in children 16 years of age (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), as well as the prevalence rates of Muris and colleagues (Muris et al., 2001). They reported that 27% of those children (age 8–13) labelled as high-anxious had an anxiety disorder. Two methodological explanations can be offered for the high prevalence rates of anxiety disorders in both groups. First, we used a combined parent-child diagnosis, whereas most studies (e.g. Muris et al., 2001) on prevalence rates use either parent or child reports. Because of the low correspondence between the children and their parents with regard to the type of anxiety disorder, the combination of the parent and child scores is likely to yield higher prevalences of anxiety diagnoses. Second, we compared high-anxious children to median-anxious children, whereas low-anxious children were excluded from participation. Despite these methodological explanations, prevalence rates remain high in both groups, especially in the median-anxious group. In her meta-analysis on birth cohort change in anxiety, Twenge (2000) reported that children ($N = 12,056$, age range: 9–17) increased one standard deviation on self-reported anxiety between 1952 and 1993. In fact, children considered as normal anxious in the 1980s, scored higher on self-reported anxiety compared to child psychiatric patients in the 1950s. Anxiety has thus been found to increase over time. However, it would be too premature to draw conclusions on whether the methodological or time-related aspects caused the fairly high prevalence rates of anxiety disorders in the current study.

Even though studies that selected children via clinical settings showed high comorbidity between anxiety and other mental health

problems (Strauss, Last, Hersen, & Kazdin, 1988), in this study high-anxious and median-anxious children did not differ with respect to the number of the disorders dysthymia, depression, and attention deficit hyperactivity disorder. The low comorbidity of anxiety disorders with dysthymia, depression, and attention deficit hyperactivity disorder is likely to result from two characteristics of our sample, being a community sample and a young sample, aged 8–12. As mentioned before, anxiety disorders are chronic if untreated and, as a consequence, can lead to other mental health disorders (Barlow, DiNardo, Vermilyea, & Blanchard, 1986; Brady & Kendall, 1992; Lipsitz et al., 1994; Otto, Pollock, Rosenbaum, Sachs, & Asher, 1994; Strauss, Last, Hersen, & Kazdin, 1988; Wittchen & Essau, 1994).

The odds ratio reflecting higher relative risk of high-anxious children having an anxiety disorder compared to median-anxious children ($OR = 5.0$, combined parent-child report) increased in case the diagnosis was based only on the child interview, $OR = 7.8$, and decreased when based only on the parent interview, $OR = 3.6$. Multiple investigators pointed out that child's self-report scores on internalizing symptoms, like anxiety and depression measures, exceed parent reports (Edelbrock, Costello, Dulcan, Conover, & Kala, 1986; Hodges, Gordon, & Lennon, 1990; Verhulst, Althaus, & Berden, 1987). Children are thought to have better perceptions of their anxiety than parents. Horowitz, for example, noted that parents are less likely to be aware of internalizing problems compared to externalizing problems (Horowitz, Leaf, & Leventhal, 1998). This is supported by the low referral in the high-anxious groups, which is, at this age, usually instigated by the parents or school. However, even though correspondence between the parent and the child on the interview was found to be low, parents did not report less anxiety disorders compared to the children. Another explanation that could be offered to clarify the differences in odds ratio's is that the children were selected based on the child version of the screening questionnaire.

The most frequent diagnoses in the high-anxious group were specific phobia (52%), social phobia (21%), separation anxiety disorder (16%) and generalized anxiety disorder (15%). We employed logistic regression analyses to test the expectation that the diagnoses specific phobia, social phobia, separation anxiety disorder and generalized anxiety disorder were specifically predicted by their corresponding subscale of the screening instrument in the high-anxious group. The expectation was partly supported. It appeared that the three of the most prevalent disorders separation anxiety disorder, social phobia and specific phobia were only predicted by their cor-

responding subscales on the screening questionnaire. The finding of the specific correspondence between the social phobia and separation anxiety disorder subscales of the screening questionnaire with their matching diagnoses is in accord with the study of Muris and colleagues (2004) using clinically anxious children. However, an earlier study of Muris (2001) with elementary school children found that the diagnosis social phobia was predicted by the subscale separation anxiety disorder. Possibly, the elaboration of the social phobia subscale with 5 items, lead to a better predictive value of that SCARED-71 subscale.

The diagnosis generalized anxiety disorder was not predicted significantly by any of the included subscales of the SCARED-71. Perhaps children of this age have difficulty understanding the concept of worrying (e.g. "I worry about the future"), or items on worrying are so general that they apply to some extent to all children with anxiety disorders. Generalized anxiety disorder generally has higher comorbidity rates than other anxiety disorder and is highly comorbid with major depression (Costello et al., 2002). Note that "depressive symptoms" does not constitute a subscale on the SCARED-71 and was thus not included in the prediction of generalized anxiety disorder. According to Pine and Klein (2008), the high comorbidity of generalized anxiety disorder with other disorders and depression in children "raises questions about whether the diagnosis identifies a unique syndrome as opposed to a complication of other associated disorders". More research is clearly necessary on how to detect generalized anxiety disorder in children aged 8–12.

Limitations

The pre-selection of groups in high- and median-anxious was based on child report on an anxiety symptoms questionnaire. Although it is generally assumed that children are the most reliable reporters of internalizing symptoms, children who underestimate their anxiety have not been selected in the high-risk group. Further studies are needed to investigate to what extent combining child report with that of knowledgeable others (e.g. parents, teachers, siblings, friends) could improve the selection of children suffering from anxiety disorders.

Approximately half of the children that were approached for the screening completed the screening questionnaire and approximately half of those identified as high- or median-anxious participated in the diagnostic interview. Results of this study that are based on this sample should, therefore, be generalized to the entire population with care. The possibility that motivation or elevated anxiety levels

are related to participation rate should be considered. However, comparable and even lower participation rates are found in other anxiety prevention studies. For example, in an indicated prevention trial of Rapee and colleagues (2005), 29.4% of the distributed screening packets were returned and 63.2% of those identified as at-risk for anxiety disorders (based on an elevated anxiety score) participated in further testing. Additionally, in an early intervention trial of Dadds and colleagues (1999), 41% of those identified as at-risk for anxiety disorders participated in further testing. The low participation rates should, therefore, be considered as a reflection of difficulties of programs aimed at prevention rather than as a limitation of the current study.

The cross-sectional nature of the study concerns another limitation. Even though the main aim was to investigate the usefulness of screening methods in anxiety, longitudinal studies are preferred in order to properly examine time related developments of prevalence rates and the predictive value of the screening questionnaire for the development of anxiety disorders.

Conclusion

Anxiety disorders are highly prevalent in children, and have negative effects on children's quality of life. In case anxiety disorders are not managed in an early stage, the anxious individual is less likely to seek professional help, whereas he or she is more likely to develop more severe anxiety disorders, or other disorders. It is, therefore, of importance to stimulate the identification of dysfunctional anxiety in an early stage. A screening instrument, such as the SCARED-71 can enhance this process. Results from this study point to the usefulness of screening procedure, as children with high total scores (high-anxious) had more and more severe anxiety disorders than children with total scores from 2 points below to 2 points above the median (median-anxious). In addition, separation anxiety disorder, social phobia, and specific phobia, all diagnoses known to be prevalent and debilitating, were predicted by their corresponding subscales of the SCARED-71. Future studies should investigate if high-anxious children are not only at risk for current anxiety disorders, but also for the development of future anxiety disorders and for a chronic course of anxiety disorders. In longitudinal studies, the effect of the employment of lower cut-off scores could be examined as well, in order to establish to what extent these children are at risk for developing anxiety disorders in the future.

Efficacy of Child-focused and Parent-focused Interventions in a Child Anxiety Prevention Study

This study examined anxiety development in median- ($n = 74$) and high-anxious children ($n = 183$) aged 8–13, the effect of parent- and child-focused preventive interventions on child/parental anxiety, and the effect of parental anxiety on child anxiety. High-anxious children were randomized into a parent-focused ($n = 69$), child-focused ($n = 58$) or non-intervention ($n = 56$) group. Families completed a pretest and 1- and 2-year follow-ups. Children selected as high-anxious or at risk were found to remain more susceptible to having anxiety problems and developing anxiety disorders than median-anxious children. Both intervention types showed favorable outcomes compared to no intervention on the number of 'ADIS improved' children. These findings underline the need for effective preventive interventions for child anxiety. General improvements over time were found for symptoms of child and parental anxiety, however, and parental anxiety did not predict improvement in child anxiety after controlling for intervention. Therefore, it may not be necessary to focus on parental anxiety in interventions aimed at preventing child anxiety.

Simon, E., Bögels, S. M., Voncken, M. J. (2011). Efficacy of child-focused and parent-focused interventions in a child anxiety prevention program. *Journal of Clinical Child and Adolescent Psychology*, 40, 1-16

INTRODUCTION

Estimations of lifetime prevalence of anxiety disorders in childhood and adolescence range between 8–27% (Costello, Egger, & Angold, 2005) and adulthood anxiety disorders are the most common psychiatric disorders with a 29% lifetime prevalence (Kessler et al., 2005). Consequences of anxiety disorders in children include problems at school and in social interactions (Dweck & Wortman, 1982; Essau, Conradt, & Petermann, 2000; Strauss, Lease, Kazdin, Dulcan, & Last, 1989; Turner, Beidel, & Costello, 1987), low self-esteem, high levels of family conflict (Ginsburg & Schlossberg, 2002; Siqueland, Kendall, & Steinberg, 1996) and physical problems (Livingston, Taylor, & Crawford, 1988). The indirect and direct costs of anxiety disorders are also a burden to society. A recent cost-of-illness study by Bodden, Dirksen and Bögels (2008) revealed that Dutch families with clinically anxious children incurred societal costs more than 20 times higher than families from the general population. The high prevalence, the negative consequences and societal costs of anxiety disorders are important arguments for preventing anxiety disorders.

Several studies into the prevention of anxiety disorders in children have been performed, classified as universal, selective and indicated/early intervention programs (Mzarek & Haggerty, 1994). In universal anxiety prevention programs (e.g. Dadds & Roth, 2008), all children of a certain community are selected to participate in an intervention, whereas in selective anxiety prevention programs (Short, 1998), children exposed to certain risk factors are approached through the community, and in indicated prevention/early intervention programs (e.g. Dadds et al., 1999), children with anxiety symptoms or diagnoses are selected from a community sample. Recently, Neil and Christensen (2007) performed a systematic review of Australian school-based prevention and early intervention programs for anxiety and depression. For the studies that measured anxiety development in response to an intervention, the reported effect sizes of both randomized controlled universal prevention programs (Barrett, Farrell, Ollendick, & Dadds, 2006; Barrett, Lock, & Farrell, 2005; Barrett, Sonderegger, & Sonderegger, 2001; Barrett & Turner, 2001; Lock & Barrett, 2003; Lowry-Webster, Barrett, & Dadds, 2003; Lowry-Webster, Barrett, & Lock, 2003; Pattison & Lynd-Stevenson, 2001; Sheffield et al., 2006) and indicated prevention programs (Mifsud & Rapee, 2005; Roberts, Kane, Bishop, Matthews, & Thomson, 2004; Roberts, Kane, Thomson, Bishop, & Hart, 2003; Sheffield et al., 2006) ranged between .04 and .63 (universal .07–.63, mean .37; selective/indicated .04–.57, mean .28). Although the overall average effect size derived from studies on treatment of

anxiety disorders is much higher (.86, In-Albon & Schneider, 2007), Rose (1993b) argues that a larger number of people can profit from prevention programs than from treatment. Moreover, intervening before the child's anxiety causes interference to such extent that parents decide to seek treatment for their child, can prevent the child and family from suffering and avoid societal costs in the long run (e.g. medication, school absence). Prevention strategies can, therefore, be cost-effective from a public health perspective.

Selective, indicated and early prevention programs in child anxiety commonly aim their intervention at parents, especially in relatively young children (e.g. Rapee, 2002; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). However, in older children, interventions frequently contain a parental component as well (Barrett & Turner, 2001; Dadds, Spence, Holland, Barrett, & Laurens, 1997). Parents learned how to coach their child's anxiety (Barrett & Turner, 2001), usually combined with techniques and information to manage their own anxiety (e.g. Dadds, Spence, Holland, Barrett, & Laurens, 1997; Rapee, 2002; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). Reasons for including a parental component are frequently related to the effect of parental anxiety on child anxiety. That is, parental anxiety has been implicated as a risk factor for anxiety disorders in children (Rosenbaum et al., 1988; Turner, Beidel, & Costello, 1987; Weissman, Leckmann, Merikangas, Gammon, & Prusoff, 1984). Multiple studies point to a large overlap between the anxiety levels of children and their parents (e.g. Cartwright-Hatton, McNicol, & Doubleday, 2006), and heritability for symptoms of anxiety has been estimated at 40–50% (Thapar & McGuffin, 1995). Children of anxious parents are seven times more likely to develop an anxiety disorder than children of non-anxious parents (Turner, Beidel, & Costello, 1987). Anxiety-enhancing parenting styles (e.g. overprotection) and family patterns are likely to form moderating or mediating mechanisms through which parental anxiety exerts its influence on child development (e.g. Bögels & Brechman-Toussaint, 2006; Dadds & Roth, 2008; Donovan & Spence, 2000; Ginsburg & Schlossberg, 2002; Manassis & Bradley, 1994). Aiming at parents in a preventive context has four important benefits. First, parental anxiety could decrease, thus reducing the chance of transmitting parental anxiety to the child. As parents in preventive contexts are less likely to be severely and chronically anxious, they may benefit more from the parent-focused intervention. Indeed, Bodden and colleagues (Bodden, Bögels et al., 2008) revealed that children (aged 8-12) profited more from treatment when parents had no anxiety disorders than when their parents did have an anxiety disorder. Second, focusing on parents is likely to have a positive effect on generalizing the cognitive-behavioral techniques outside the therapeutic setting

and over time. Especially in a preventive context, where the goal is not only to reduce anxiety, but also to prevent future anxiety, parents are more likely than children to remember the cognitive-behavioral skills to coach the child in overcoming new anxieties. Third, as children's anxieties in preventive contexts are less chronic and less resistant to change, parents' job as a coach and change agency is likely to be easier. Fourth, the feasibility of the intervention depends less on the child's cognitive capacities when aiming at parents, thus facilitating intervening early in child's development.

Based on these four benefits of focusing on parents in preventive contexts, one could argue that parent-focused interventions would be more effective in reducing child as well as parental anxiety than child-focused interventions alone. However, surprisingly little is known about the differential effects of intervening through either children or parents in the field of anxiety prevention, because no prevention program has actually compared these effects. Evidence from clinical studies is mixed, but generally, no differences between family- and child-focused therapy in treating child anxiety disorders have been found (see meta-analysis In-Albon & Schneider, 2007). However, these studies typically compare child-focused treatment with family treatment (including multiple family members) or with child treatment with parental involvement. Studying the effects of child-focused (only children) versus parent-focused (only parents) formats allows examination of the unique effect of the parents or child as a change agency. To our knowledge, only one treatment study has applied such a design. Mendlowitz and colleagues (1999) randomized clinically anxious (i.e. referred for treatment) participants to either a child-focused treatment, a parent-focused treatment or a combination of both, but included no control group. All treatment types effectively reduced child anxiety, but parents of the combined treatment type were found to rate their children as more improved than parents of the child- and parent-focused treatment types. The therapeutic investment in the combined treatment type was twice as high compared to the other two treatment types. The unique effect of intervening via the parents or child in a preventive context remains to be investigated and to be compared to a non-intervention group.

To our knowledge, no selective, indicated, or early intervention preventive program has included a control group with 'normal' anxious children. The necessity of offering high-anxious children an intervention can only be reliably established by comparing the anxiety development of high-anxious children receiving no intervention to the anxiety development of children with 'normal' anxiety levels. Specifically, this set-up offers the opportunity to examine the as-

sumption on which anxiety prevention studies are based: that the anxiety problems of non-referred children do not naturally decrease to normal anxiety levels.

The aims of this study are threefold: to compare the development of child anxiety in median-anxious children and high-anxious children receiving no intervention, to examine the effectiveness of a parent- and child-focused intervention on child and parental anxiety, and to study the role of parental anxiety in the development of child anxiety. The following hypotheses were tested. First, it was expected that child anxiety would be lower in the median-anxious group than in the high-anxious control group at all measurements. Second, child and parent's anxiety was expected to improve more in the parent-focused intervention than in the child-focused intervention and to improve the least in high-anxious participants receiving no intervention. Third, it was expected that parental anxiety would negatively affect child anxiety development, and this effect to be the least negative in high-anxious participants of the parent-focused intervention.

METHOD

Participants and Procedure

Children aged 8–13 were recruited through a screening procedure at primary schools (grades 5–8). Of all approached children (and parents), 52% ($N = 2494$) signed informed consent and completed our anxiety-screening tool (SCARED-71). The selection of children was based on child self-reporting. Children scoring in the top 15% (high-anxious) or scoring two points above and below the median (median-anxious) were asked to participate in this study. Using child self-reporting enables screening for child anxiety in group format, and avoids the problem of the environment being insufficiently aware of anxiety symptoms (Horowitz, Leaf, & Leventhal, 1998). Separate top 15% and median-anxious scores were calculated for boys and girls, because girls tend to score higher on anxiety symptoms than boys (e.g. Castellanos & Hunter, 1999; Craske, 1997). The numbers of participants in consecutive stages of the study are depicted in Figure 1 and the participant's demographic features in Table 1. In order to condense the article and avoid the risk of overloading readers with outcome measures, we refer to our previous article (Simon & Bögels, 2009) that includes all diagnostic details as well as data on comorbidity.

After screening, the high-anxious children and (both) their parents were randomized to one of three conditions, either child- or parent-

focused intervention, or no intervention. Consent to further participation was requested before participants were told which group they were in. A maximum of three months after screening, children and parents took part in the pretest. Interventions started maximally 6 weeks after pretest, and after the pretest the 1- and 2-year follow-ups took place one and two years later, respectively. All measurements involved the diagnostic Anxiety Disorders Interview Schedule (ADIS, Siebelink & Treffers, 2001; Silverman & Albano, 1996) and included several questionnaires (such as the 71-item Screen for Child Anxiety-Related Emotional Disorders-71 items, SCARED-71 (Bodden, Bögels, & Muris, 2009). Children were assessed at school and parents at home.

Figure 1.
Numbers of Participants in Consecutive Stages of the Study

Table 1
Demographic Features of High-anxious Participants
in Child-focused, Parent-focused, and Non-intervention Groups,
and Median-anxious Participants

	High-anxious			All high-anxious	Median-anxious
	CFI ^c	PFI ^d	NI ^e		
	<i>n</i> = 58	<i>n</i> = 69	<i>n</i> = 56	<i>n</i> = 183	<i>n</i> = 74
Boys (<i>n</i> , %)	25 (43%)	34 (49%)	24 (43%)	83 (45%)	40 (54%)
Age of child (<i>M</i> , <i>SD</i>)	9.98 (1.32)	9.71 (1.15)	10.13 (1.21)	9.92 (1.23)	10.18 (1.15)
Professional help for mental health children ^a (<i>n</i> , %)	4 (7%)	11 (16%)	3 (5%)	18 (10%)	3 (4%)
Children in family (<i>M</i> , <i>SD</i>)	2.34 (.97)	2.17 (.77)	2.23 (1.03)	2.27 (.94)	2.19 (.79)
First-born children (<i>n</i> , %)	28 (48%)	33 (48%)	38 (68%)	99 (54%)	45 (61%)
Parents divorced/separated (<i>n</i> , %)	12 (21%)	18 (26%)	8 (14%)	38 (21%) ^f	7 (10%)* ^g
Ethnicity Dutch					
Father (<i>n</i> , %)	57 (98%)	68 (99%)	56 (100%)	181 (99%)	74 (100%)
Mother (<i>n</i> , %)	56 (97%)	67 (97%)	55 (98%)	178 (97%)	72 (97%)
Parental age					
Father (<i>M</i> , <i>SD</i>)	41.57 (3.87)	42.43 (4.79)	41.21 (4.56)	41.84 (4.43)	42.11 (3.74)
Mother (<i>M</i> , <i>SD</i>)	39.14 (6.63)	40.35 (4.20)	38.91 (3.90)	39.59 (5.00)	39.78 (4.31)
Parental educational level ^b					
Father (<i>M</i> , <i>SD</i>)	5.40 (1.85)	5.19 (1.99)	4.63 (1.92)	5.11 (1.96)	5.24 (2.07)
Mother (<i>M</i> , <i>SD</i>)	4.91 (2.18)	5.22 (1.88)	4.55 (1.93)	4.94 (1.98)	4.95 (2.02)
Current unemployment					
Father (<i>n</i> , %)	4 (7%)	4 (6%)	4 (7%)	12 (7%)	3 (4%)
Mother (<i>n</i> , %)	20 (35%) ^{hi}	15 (22%) ^h	24 (43%)* ⁱ	59 (32%)	25 (34%)

Note.

^aProfessional help from psychologist, psychiatrist for any mental difficulty, as indicated by parents at pretest; ^bOn a scale from 0 (no education) to 8 (university degree); ^cCFI: Child-focused intervention; ^dPFI: Parent-focused intervention; ^eNo intervention; ^f^gParents in the high-anxious group were divorced significantly more often than parents in the median-anxious group; ^{hi}Mothers in the parent-focused intervention were unemployed significantly more often than mothers in the no-intervention group

* $p < .05$, tested two-sided

Assessment of Child and Parental Anxiety

To measure child anxiety, the ADIS (Siebelink & Treffers, 2001; Silverman & Albano, 1996) and the SCARED-71 (Bodden, Bögels, & Muris, 2009) were used. To measure parental anxiety, a modified version of the SCARED-71 was applied (SCARED-A, Bögels & Van Melick, 2004).

ADIS. This study used both child and parent versions of the Dutch ADIS to assess the presence of anxiety diagnoses and the severity of anxiety diagnoses. The ADIS is a well-validated semi-structured diagnostic interview (Silverman, Saavedra, & Pina, 2001), suitable for measuring all DSM-IV anxiety disorders in 7–17 year olds. Children and both parents were interviewed separately. Conform standard ADIS procedure, a child received a diagnosis if the child or parental couple reported substantial interference, with scores ranging from 4–8. More than 10% ($n = 29$) of the interviews were videotaped and rated by two trained research assistants. Regarding the presence of anxiety disorders, the research assistants reached perfect agreement on the child interview, $\kappa = 1.00$, $p < .01$, and substantial agreement on the parent interview, $\kappa = .73$, $p < .01$. With respect to the number of anxiety diagnoses, agreement was high on both the child, $ICC = .84$, $p < .01$, and the parent interview, $ICC = .95$, $p < .01$. Finally, high agreement was found regarding the severity of the primary diagnosis on the child interview, $ICC = .99$, $p < .01$ and the parent interview, $ICC = .86$, $p < .01$.

SCARED-71. The Screen for Child Anxiety Related Emotional Disorders (SCARED, Birmaher et al., 1997), Dutch revision by Muris, Merkelbach, Schmidt and Mayer (SCARED-R, 1999), is a questionnaire suitable for screening childhood anxiety disorders, also in community populations. It assesses a range of DSM-IV-based anxiety symptoms (panic disorder, generalized anxiety disorder, social phobia, separation anxiety disorder, obsessive compulsive disorder, post-traumatic stress disorder, and specific phobia). The SCARED-R possesses good internal consistency for total and subscales scores (Muris, Dreesen, Bögels, Weckx, & Van Melick, 2004; Muris, Mayer, Bartelds, Tierney, & Bogie, 2001; Muris, Merkelbach, Van Brakel, & Mayer, 1999), satisfactory test–retest reliability (Muris, Merkelbach, Van Brakel, & Mayer, 1999) and discriminates well between anxiety problems and other behavioral problems (Muris, Dreesen, Bögels, Weckx, & Van Melick, 2004; Muris, Mayer, Bartelds, Tierney, & Bogie, 2001). All items were rated on a three-point scale (0 = almost never, 1 = sometimes, 2 = often), and a total score (ranging 0–142) was obtained by adding the items. This study used the 71-item SCARED-R (Bodden, Bögels, & Muris, 2009; Simon & Bögels, 2009) which adds an extra five items to the social phobia scale. The homogeneity of the SCARED-71 was high, $\alpha = .94$.

SCARED-A. This study used the adult version of the SCARED-71 to measure parental anxiety (SCARED-A, Bögels & Van Melick, 2004). The adult version contains the same questions, and concerns and upward extension of the child version, which enables comparability between child and parental anxiety. Another benefit of the SCARED-A is that it taps into all DSM-IV anxiety disorders, unlike any other questionnaire measuring adult anxiety. In this study, the homogeneities of the parents' SCARED-A (mother and father version) were high, both $\alpha = .94$.

Interventions and Therapists

The child-focused intervention entailed eight sessions (90 minutes) of 6–8 children in group. The parent-focused intervention also entailed eight sessions, but consisted of three group sessions (90 minutes) of 6–8 parental couples and five telephone sessions (15 minutes) with each parent (couple). This way, parents could more easily fit in the interventions in their daily life.

The intended duration of the telephone sessions was calculated by dividing the duration of the group sessions by six (number of couples in the group) to enhance comparability of the child- and parent-focused interventions in terms of the therapist's time. The five telephone sessions concerned instruction and feedback on personal homework assignments, which is easier to deliver individually than in a group. Interventions were guided by age-appropriate, illustrated workbooks for both the child and parent intervention and were based on existing cognitive-behavioral treatment procedures (Bodden, Bögels et al., 2008; Bögels & Siqueland, 2006). In the parent-focused intervention, parents were trained as lay therapists to help their child overcome his/her anxieties by applying the principles of step-wise exposure-in-vivo, cognitive restructuring, modeling, task-concentration training and relaxation, and reinforcement. Parents worked on their own anxieties and anxiety-enhancing parenting as well, and on their co-parenting relationship. The father's role was also highlighted. In the child-focused intervention, children developed their own fear hierarchy, and exposure-in-vivo, cognitive restructuring, task-concentration training and relaxation all took place in-session and as homework assignments. Children were each other's lay therapists during the in-session exposures. For example, a child with a fear of spiders was guided through the in-vivo exposure with a real spider by another child who was not frightened of spiders. The training was organized playfully, with warming-up exercises, video feedback, and unexpected individual exposure exercises during a 'quest'. Text box 1 summarizes the elements of both interventions per session. In the case of single-parent homes, aspects concerning the 'parental team' were modified to apply to other

supportive parental figures such as a grandparents. Two therapists per group led the sessions, both psychology graduates, and at least one with experience in providing cognitive behavioral treatment to anxious children. The therapists were trained and supervised by Bögels (second author), and followed detailed session protocols. Group sessions were videotaped and telephone sessions recorded. Two video/audiotapes per group were randomly selected and rated for treatment integrity by trained psychology students.

Parent-focused intervention		Child-focused intervention	
Session		Session	Content of session
1. M ^a	Psycho-education (bodily signs, (dys)functional anxiety), rationale	1. M	Psycho-education (bodily signs, (dys)functional anxiety), goals
2. T ^b	Observing and non-directive attention for child, communication with child about fears, goal-setting for both child and parents	2. M	Relationship of cognitions-feelings-behavior, identifying dysfunctional cognitions
3. M	Learning cognitive behavioral strategies: relationship of cognitions-feelings-behavior, challenging dysfunctional cognitions, creating step-wise exposure plans, exposure, reward, task-concentration training, relaxation. Parents may also apply all techniques to own anxieties	3. M	Challenging dysfunctional cognitions, formulating functional cognitions
4. T	Guiding the child's exposure	4. M	Exposure, reward, creating step-wise exposure plans
5. T	Guiding the child's exposure, parental team, father's role	5. M	Task concentration training, relaxation, brave behavior
6. M	Guiding the child's exposure, modeling parental bravery, encouraging the child's autonomy, working on parental fears	6. M	Exposure, communicating about fears, social support
7. T	Guiding the child's exposure	7. M	Exposure, boundary-setting
8. T	Relapse prevention, evaluation	8. M	Relapse prevention, evaluation

Text box 1

Treatment Goals per Session for Child-focused and Parent-focused Interventions

Note.

^aM: Group meeting; ^bT: Individual session by telephone

Variables and Data Preparation

Child anxiety improvement was measured by the number of 'ADIS-improved' children (ADIS) and by their anxiety symptoms (total SCARED-71 scores). The ADIS provided information on the presence and severity of anxiety disorders. Based on changes over time (pretest 1-year follow-up; pretest 2-year follow-up) in the ADIS sum of severities, pooled effect sizes (Cohen's *d*) were deducted. This outcome measure captures both the presence and severity of anxiety disorders. The use of effect size is a preferred method for estimating an intervention's magnitude of effect (Hirschfeld-Becker et al., 2004), and Cohen's *d* is one of the most commonly used measures. Children were considered 'ADIS improved' if the effect size of change was .50 or higher, a medium effect size according to Cohen's original guidelines (1977;1988). This cut-off seems reasonable in a preventive context. Parental anxiety was measured by the parents' own total SCARED-A scores, and for some analyses, a binary measure (parental anxiety present versus parental anxiety absent) was created from both parents' anxiety symptoms scores. More specifically, parents were labeled 'anxious' if the mother, father or both had an anxiety symptom score (SCARED-71) at pretest within the 75th percentile.

If less than 10% of the items on both child and parent's SCARED-71s were missing, they were replaced through regression-based estimation of the standard missing value analysis provided by the Statistical Package for Social Sciences (SPSS). A small number of either parent or child ADIS interviews were missing (3%), and these data were replaced by regression-based estimation of both available ADIS data and the child SCARED-71. A substantial number of parents (mother: $n = 24$, 13%; father: $n = 47$, 26%) failed to complete their SCARED-A at pretest. In those cases, the binary variable 'parental anxiety' was based on either mother's or father's anxiety if only one of the SCARED-As was missing. If both parent's SCARED-A were missing, these families were excluded from the parental anxiety analyses. The last assessment carried forward procedure was applied to impute data from dropouts at follow-up. That is, if both 1- and 2- year follow-up data were missing, pretest data was carried forward, and if only 2-year follow-up data were missing, 1-year follow-up data were carried forward. All statistical analyses are specified in the results, and were performed with SPSS 15.0.

RESULTS

Participation Rates and Demographic Features

The participation rates and demographic features of the high- and median-anxious groups are depicted in Figure 1 and Table 1. These data were compared by using ANOVAs, independent t-tests, and chi-squares. Participation and dropout rates did not differ between the high- and median-anxious groups, both $p > .10$. More parents in the high-anxious group ($n = 38$, 21%) were separated or living apart than in the median-anxious group ($n = 7$, 10%), $\chi^2(2) = 4.66$, $p < .05$. No other significant differences in demographic features were found between the high- and median-anxious group, all $p > .10$. In the high-anxious group, no differences between the child-focused, parent-focused, and non-intervention group were found on participation and dropout rates, both $p > .10$. Also, the participating children in the study did not differ from non-participating children on the child's SCARED-71 score at screening, $t(410) = 1.31$, $p > .10$. Additionally, some participants in the intervention groups did not show up at all (no-shows), but numbers of no-shows did not differ between the child- and parent-focused intervention groups, $\chi^2(1) = 1.03$, $p > .10$. Additionally, no-shows did not differ from participants that did show up on the presence of anxiety diagnoses, $\chi^2(1) = .88$, $p > .10$, or SCARED-71 scores at pretest, $t(125) = .18$, $p > .10$. Regarding comparisons between the three high-anxious groups on demographic features, it appeared that more mothers of the non-intervention group were unemployed than mothers of the parent-focused intervention, $\chi^2(1) = 6.51$, $p < .05$. No other differences between the three groups were detected in demographic features, all $p > .05$. Finally, analyses were performed to investigate whether high-anxious participants with missing SCARED-A data differed from participants without missing data on child's age, child's sex, parents' separation, and parents' educational level (possible scores ranged from 0-8, ranging from no education to university degree). Participants whose mother's or father's SCARED-A questionnaires were missing did not differ on any of the demographic variables from participants whose ratings were not missing, all $p > .05$, except for one variable. That is, fathers whose SCARED-A ratings at pretest were missing had lower educational levels ($M = 4.60$, $SD = 1.10$), $t(2.69) = 1.75$, $p < .01$, than fathers for whom these ratings were present ($M = 5.52$, $SD = 2.14$).

Treatment Integrity

In line with Bodden and colleagues (2008), a treatment integrity scale was used covering four general therapist goals (quality of therapist-participant relationship, empathy, giving feedback, providing structure and efficient use of intervention time) and two to six ses-

sion-specific intervention goals. All goals were rated by two college students who were not involved in the research in another manner. On a 3-point Likert scale, they scored the degree to which the goal was achieved (0 = not at all; 1 = a bit; 2 = satisfactory; 3 = good). Inter-rater agreement was high, $ICC = .94$. Treatment integrity goals of both child-focused intervention, $M = 2.72$, $SD = .23$, and parent-focused intervention, $M = 2.83$, $SD = .15$, were largely achieved and no differences between the two types of intervention were found, $t(26) = -1.17$, $p > .10$.

Child Anxiety in Median- versus High-anxious Control Groups

To test whether the median-anxious group would have lower anxiety levels than the high-anxious non-intervention group at the 1- and 2-year follow-ups, these groups were compared on child SCARED-71 scores by the application of 3 (time; pretest, 1-year follow-up, 2-year follow-up) $\times$ 2 (condition; high-anxious control group, median-anxious group) repeated measures ANOVAs. The groups were not compared on the measure 'ADIS improvement' as none of the median-anxious children received an intervention. Moreover, the median-anxious group was disadvantaged by being 'ADIS improved' compared to the high-anxious group, because the median-anxious group had fewer anxiety disorders at pretest. Specifics of the high- and median-anxious group regarding diagnostic data are further described in Simon and Bögels (2009).

Child SCARED-71 scores were found to decrease over time, $F(1.79, 143.51) = 17.49$, $p < .01$ ¹. There was a main effect of condition, $F(1, 80) = 36.09$, $p < .01$, and a significant interaction effect between SCARED-71 scores and condition, $F(1.79, 143.51) = 4.00$, $p < .05$. That is, SCARED-71 scores of the high-anxious non-intervention group decreased over time (pretest: $M = 54.43$, $SD = 22.33$, 1-year follow-up: $M = 41.18$, $SD = 21.99$, 2-year follow-up: $M = 36.16$, $SD = 19.98$), whereas SCARED-71 scores of the median-anxious group remained relatively stable over time (pretest: $M = 26.82$, $SD = 14.50$, 1-year follow-up: $M = 22.49$, $SD = 14.17$, 2-year follow-up: $M = 21.53$, $SD = 15.71$). Post-hoc t-tests showed that mean SCARED-71 scores of the high-anxious control group remained consistently higher for all measurements than those of the median-anxious group, all $p < .01$ (Cohen's d : 1.47; 1.01; and .81, respectively).

¹Mauchly's test indicated the assumption of sphericity had been violated, $\chi^2(2) = 9.65$, $p < .01$. Therefore, Greenhouse-Geisser estimates of sphericity were used to correct degrees of freedom, $\epsilon = .89$.

Child Anxiety in High-anxious Child-focused, Parent-focused and Non-Intervention Groups

Table 2 provides descriptions of the high-anxious groups on all variables representing child and parental anxiety. The child-focused, parent-focused and non-intervention groups did not differ on child SCARED-71 scores at screening and pretest, and not on child ADIS sum of severities and on mother and father SCARED-A scores at pretest, all $p > .10$. The groups were compared on the percentage of 'ADIS improved' children and on SCARED-71 scores at 1- and 2-year follow-up by performing Chi-squares and repeated measures ANOVAs. In order to examine whether there were group effects in intervention groups and schools, ANOVA and Chi-square tests were performed. This was done, separately for the child- and parent-focused intervention, by entering the intervention group as an independent variable, and child SCARED-71 scores or 'ADIS improved' at 1- and 2-year follow-up as dependent variables. No group effects were found, all $p > .10$. Possible clustering effects for schools were reduced because children were not randomized per school and interventions were also not organized per school. Thus there was no need to control for group effects in the analyses.

The percentage of 'ADIS improved' children at 1- and 2-year follow-up in the child-focused, parent-focused and non-intervention groups are depicted in Table 3. The three high-anxious groups did not differ on the percentage of 'ADIS improved' children at 1-year follow-up, $\chi^2(2) = 1.94$, $p > .10$. However, after two years, the three groups differed significantly, $\chi^2(2) = 11.48$, $p < .01$. More specific tests showed that the percentage of 'ADIS improved' children was higher in the child-focused intervention than in the non-intervention group, $\chi^2(1) = 10.99$, $p < .01$, and in the parent-focused intervention than in the non-intervention group, $\chi^2(1) = 6.39$, $p < .05$. No significant difference between the parent- and child-focused intervention group occurred, $\chi^2(1) = .92$, $p > .10$. The mean Cohen's d at 1-year follow-up were .18, .22, .22 for the child-focused, parent-focused and non-intervention group respectively, and the mean Cohen's d for these groups at 2-year follow-up were .36, .48 and .39. More children in the child- and parent-focused interventions had a Cohen's d above .50 than in the non-intervention group at 2-year follow-up.

Table 2

Means and Standard Deviations of Sum of Severities of Anxiety Disorders, Participants' Anxiety at Pretest, Follow-up 1, and Follow-up 2, Specified for All High-anxious Children, and Separately for Child-focused, Parent-focused and Control (Non-intervention) Groups

Variable	All high-anxious children <i>N</i> = 183			Child-focused intervention <i>n</i> = 58			Parent-focused intervention <i>n</i> = 69			Control group <i>n</i> = 56		
	Pretest	FU-1 ^a	FU-2 ^b	Pretest	FU-1	FU-2	Pretest	FU-1	FU-2	Pretest	FU-1	FU-2
(<i>M, SD</i>)												
ADIS sum of severities	5.62 (7.43)	3.95 (7.25)	2.92 (5.78)	5.86 (5.63)	4.59 (8.68)	3.57 (6.92)	4.99 (5.67)	3.09 (5.37)	2.35 (5.31)	6.16 (10.45)	4.36 (7.68)	2.96 (5.01)
Child SCARED scores	50.34 (21.04)	38.88 (24.07)	31.86 (22.31)	49.21 (21.63)	37.68 (30.28)	31.11 (26.62)	47.99 (19.19)	38.00 (20.21)	29.20 (19.45)	54.43 (22.33)	41.18 (21.99)	36.16 (19.98)
Mother SCARED scores	29.70 (18.50)	26.02 (20.68)	23.70 (20.48)	29.02 (20.91)	24.86 (19.68)	23.78 (20.16)	29.74 (17.87)	24.11 (22.33)	22.81 (20.55)	30.30 (17.17)	29.19 (22.30)	24.68 (21.05)
Father SCARED scores	22.17 (15.50)	19.83 (16.54)	19.94 (16.76)	21.70 (18.89)	20.29 (21.08)	21.16 (21.25)	22.73 (14.44)	20.72 (19.43)	19.51 (16.50)	21.98 (13.09)	17.89 (10.33)	17.04 (11.30)

Note.

^aFU-1: 1-year follow-up, ^b FU-2: 2-year follow-up

Changes in child SCARED-71 scores over two years were examined by three (time; pretest, 1-year follow-up, 2-year follow-up) times three (condition; child-focused, parent-focused, or non-intervention group) repeated measures ANOVA². SCARED-71 scores were found to decrease over time, $F(1.83, 226.54) = 48.83$, $p < .01$, but the interaction effect between time and condition for SCARED-71 scores was non-significant, $F(3.65, 226.54) = .10$, $p = .98$, indicating that condition did not affect changes of child's SCARED-71 scores. At 1-year follow-up, the mean Cohen's d were .44, .51, and .60 for the child-focused, parent-focused and non-intervention groups respectively, and groups had mean Cohen's d of .75, .97, and .86 at 2-year follow-up.

²For child's, mother's, and father's SCARED scores, Mauchly's test indicated the assumption of sphericity had been violated (Child: $\chi^2(2) = 12.24$, $p < .01$; Mother: $\chi^2(2) = 45.83$, $p < .01$; Father: $\chi^2(2) = 44.13$, $p < .01$). Therefore, Greenhouse-Geisser estimates of sphericity were used to correct degrees of freedom (respectively: Child: $\epsilon = .91$; Mother: $\epsilon = .80$; Father: $\epsilon = .78$).

Table 3

‘ADIS improved’ Children (*n*, %) after 1 and 2 Years in Child-focused Intervention (*n* = 58), Parent-focused Intervention (*n* = 69) and Non-intervention Groups (*n* = 56)

Condition	‘ADIS improved’ children after 1 year	‘ADIS improved’ children after 2 years
Child-focused intervention	14 (24 %)	31 (53 %)** ^b
Parent-focused intervention	22 (32 %)	31 (45 %)* ^b
No intervention	12 (21 %)	13 (23 %) ^a

Note.

^{ab}The child- and parent-focused interventions have significantly more relevantly improved children than the non-intervention group.

* $p < .05$, ** $p < .01$, tested two-sided.

Parental Anxiety in (High-anxious) Child-focused, Parent-focused and Non-Intervention Groups

To examine differences between the child-focused, parent-focused and non-intervention groups on changes from pretest to follow-up in mother’s and father’s own SCARED-A scores, three (time; pretest, 1-year follow-up, 2-year follow-up) times three (condition; child-focused, parent-focused, or non-intervention group) repeated ANOVA measures were applied (see Table 2). Mother’s and father’s SCARED-A scores decreased over time (Mother: $F(1.59, 248.41) = 15.79$, $p < .01$; Father: $F(1.67, 226.82) = 6.82$, $p < .01$). However, no significant interaction effects were found between time and condition for mother’s and father’s anxiety, both $p > .10$, indicating that condition did not affect the decrease of father’s, or mother’s SCARED-A scores.

Influence of Parental Anxiety on Child Anxiety

The possible effect of parental anxiety on the development of child anxiety after 1 and 2 years was studied by applying logistic and linear regression analyses. Two dummy variables for conditions were created: a dummy variable for the condition child-focused intervention and a dummy variable for the condition parent-focused intervention. In the logistic regression analyses, parental anxiety at pretest (present or not), dummy child-focused intervention, dummy parent-focused intervention, parental anxiety*dummy child-focused intervention, and parental anxiety* dummy parent-focused intervention were entered as predictors for 'ADIS improved' at 1- and 2-year follow-up. The same predictors were entered in the linear regression analyses for child SCARED scores at 1- and 2-year follow-up. The analyses were repeated with parental anxiety at 1-year follow-up as predictors to study the effect of parental anxiety after parents or their children followed an intervention on child anxiety. In the case of interaction variables appearing to be non-significant predictors, the models were run again without the interaction variables. Table 4 and Table 5 show the outcomes of the logistic and linear regression analyses. In the logistic regression analyses, both child- and parent-focused intervention dummies were significant predictors of 'ADIS improved' at 2-year follow-up, but all other predictors were found to be non-significant. With child SCARED-71 scores at 1- and 2-year follow-up as outcome measure, not one of the entered variables was found to be a significant predictor in the linear regression analyses.

Table 4

Logistic Regression Analysis: 'ADIS improved' at 1- and 2-year Follow-up

	'ADIS improved' at FU-1 ^a		'ADIS improved' at FU-2 ^b	
	<i>B (SE B)</i>	β	<i>B (SE B)</i>	β
Model 1^c				
Dummy CFI ^c	.10 (.48)	1.10	-	-
Dummy PFI ^d	.53 (.44)	1.69	-	-
Parental anxiety at pretest	.48 (.36)	1.61	-	-
Dummy CFI* parental anxiety at pretest	.67 (.96)	1.95	-	-
Dummy PFI* parental anxiety at pretest	.24 (.88)	1.28	-	-
Model 2^f				
Dummy CFI	-	-	1.35 (.44)	3.89**
Dummy PFI	-	-	.95 (.42)	2.60*
Parental anxiety at pretest	-	-	.41 (.34)	1.50
Dummy CFI * parental anxiety at pretest	-	-	.03 (.89)	1.03
Dummy PFI * parental anxiety at pretest	-	-	-.07 (.85)	.94
Model 3^g				
Dummy CFI	.14 (.47)	1.15	-	-
Dummy PFI	.56 (.43)	1.75	-	-
Parental anxiety at FU-1	.17 (.36)	1.19	-	-
Dummy CFI * parental anxiety at FU-1	-.14 (.95)	.87	-	-
Dummy PFI * parental anxiety at FU-1	.25 (.87)	1.29	-	-
Model 4^h				
Dummy CFI	-	-	1.40 (.43)	4.03**
Dummy PFI	-	-	1.00 (.42)	2.71*
Parental anxiety at FU-1	-	-	.33 (.33)	1.39
Dummy CFI * parental anxiety at FU-1	-	-	.02 (.87)	1.02
Dummy PFI * parental anxiety at FU-1	-	-	-.06 (.84)	.94

Note.

^aFU-1: 1-year follow-up; ^bFU-2: 2-year follow-up; ^cCFI: Child-focused intervention; ^dPFI: Parent-focused intervention; ^eModel 1: $R^2 = .04$ (Nagelkerke), $\chi^2(5) = 3.94$, $p > .10$; ^fModel 2: $R^2 = .09$ (Nagelkerke), $\chi^2(5) = 11.65$, $p < .05$; ^gModel 3: $R^2 = .02$ (Nagelkerke), $\chi^2(5) = 2.34$, $p > .10$; ^hModel 4: $R^2 = .10$ (Nagelkerke), $\chi^2(5) = 12.60$, $p < .05$

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

Table 5

Regression Analysis of Child SCARED Scores at 1- and 2-year Follow-up

	Child SCARED at FU-1 ^a		Child SCARED at FU-2 ^b	
	<i>B (SE B)</i>	β	<i>B (SE B)</i>	β
Model 5^e				
Dummy CFI ^c	-1.22 (5.00)	-.02	-	-
Dummy PFI ^d	-2.38 (4.63)	-.05	-	-
Parental anxiety at pretest	3.90 (3.98)	.08	-	-
Dummy CFI*parental anxiety at pretest	-1.50 (10.42)	-.02	-	-
Dummy PFI*parental anxiety at pretest	4.10 (9.54)	.06	-	-
Model 6^f				
Dummy CFI	-	-	-3.10 (4.99)	-.07
Dummy PFI	-	-	-6.69 (4.87)	-.15
Parental anxiety at pretest	-	-	-2.87 (4.08)	-.06
Dummy CFI*parental anxiety at pretest	-	-	-8.72 (10.50)	-.13
Dummy PFI*parental anxiety at pretest	-	-	-4.75 (10.10)	-.08
Model 7^g				
Dummy CFI	-1.36 (4.91)	-.03	-	-
Dummy PFI	-1.65 (4.53)	-.03	-	-
Parental anxiety at FU-1	7.15 (3.87)*	.15	-	-
Dummy CFI*parental anxiety at FU-1	7.48 (10.01)	.10	-	-
Dummy PFI*parental anxiety at FU-1	-1.39 (9.26)	-.02	-	-
Model 8^h				
Dummy CFI	-	-	-3.66 (5.02)	-.08
Dummy PFI	-	-	-6.46 (4.87)	-.14
Parental anxiety at FU-1	-	-	3.22 (4.02)	.07
Dummy CFI*parental anxiety at FU-1	-	-	-1.48 (10.41)	-.02
Dummy PFI*parental anxiety at FU-1	-	-	-5.04 (10.09)	-.08

Note.

^aFU-1: 1-year follow-up; ^bFU-2: 2-year follow-up; ^cCFI: Child-focused intervention; ^dPFI: Parent-focused intervention; ^eModel 5: $R^2 = .01$, $F(3) = .42$, $p > .10$; ^fModel 6: $R^2 = .02$, $F(3) = .87$, $p > .10$; ^gModel 7: $R^2 = .02$, $F(3) = 1.20$, $p > .10$; ^hModel 8: $R^2 = .02$, $F(3) = .82$, $p > .10$

* $p < .05$

DISCUSSION

This study aimed to compare the natural course of anxiety in median-anxious to high-anxious children who received no intervention, to examine the effectiveness of two interventions for high-anxious children, focused either on parent or child, and to study the role of parental anxiety in the development of child anxiety, in interaction with the type of intervention. The main results can be summarized as follows: (1) child anxiety improved in the high-anxious non-intervention group, but remained higher at all measurements than in the median-anxious group; (2a) child anxiety improved in all high-anxious groups, but after two years, the number of 'ADIS improved' children was higher in the child-focused intervention and in the parent-focused intervention than in the non-intervention group; (2b) mother's and father's anxiety improved in all high-anxious groups; (3a) parental anxiety at pretest and 1-year follow-up did not predict child anxiety at 1- and 2-year follow-up; (3b) parental anxiety did not interact with type of intervention (child- versus parent-focused) to predict child anxiety outcome.

Vulnerability of High-Anxious Children to Anxiety Disorders

To our knowledge, this is the first preventive study to include a median-anxious group, enabling to examine whether high-anxious children (top 15% on anxiety questionnaire) are indeed more vulnerable to having or developing anxiety disorders. Child anxiety decreased over two years in the high-anxious group that received no intervention, whereas anxiety remained stable in the median-anxious group. Nevertheless, the anxiety levels of the high-anxious children remained higher than the anxiety levels of the median-anxious children at 1- and 2-year follow-up. Therefore, over time children selected as high-anxious do remain more vulnerable to anxiety problems than median-anxious children. An earlier study on the same sample (Simon & Bögels, 2009), showed that the most frequent anxiety diagnoses were specifically predicted by the corresponding subscales of the child version of the SCARED-71. Thus one could argue that over time higher SCARED-71 scores would implicate a higher risk for having and developing anxiety disorders. This finding supports the screening procedure applied to select high-anxious children and may underline the necessity of preventive interventions on child anxiety – if they are more effective than no intervention.

Effectiveness of Preventive Intervention on Child Anxiety

After two years, both intervention groups showed superior results compared to the non-intervention group on the measure 'ADIS improved'. The expectation that offering no intervention would have the least favorable effect was thus partly confirmed. On the other

hand, the hypothesis that the parent-focused intervention would yield more favorable outcomes compared to the child-focused intervention was not supported. Offering either the child- or parent-focused intervention to high-anxious children seems to be better than offering no intervention. Both parents and children can thus be effective change agencies for child anxiety in a preventive context. Initially, one of the arguments was that the parent-focused intervention depended less on the child's cognitive capacities and would, therefore, be superior to the child-focused intervention. However, a recent study (Birmaher et al., 1999) managed to treat even younger clinically anxious children effectively with cognitive behavioral therapy, suggesting that child's cognitive development does not necessarily hinder child-focused treatment gains. Another explanation for the lack of superiority of the parent-focused intervention could be that children were recruited through their own responses on an anxiety screening instead of by parental referral. Parents might, therefore, be less inclined to actively apply the cognitive behavioral strategies for their child's anxiety. However, most treatment studies comparing the effects of family versus child-focused therapies do not show differences in effectiveness even though children were referred by parents (In-Albon & Schneider, 2007). In addition, therapists may be better in delivering cognitive-behavioral interventions to children than parents are. Furthermore, although anxiety-enhancing parenting styles can be addressed in the parent-focused intervention, and this is likely to heighten parents' granting autonomy to their children, the child-focused intervention may as well encourage children's autonomy, because the child can relate obtained successes to his/her own coping skills (Bodden, Bögels et al., 2008). A final explanation for the lack of superiority of the parent-focused intervention concerns the fact that parental anxiety reduced as much as it did in the child-focused intervention. It might be that the relationship between child and parental anxiety is bidirectional (also see Silverman, Kurtines, Jaccard, & Pina, 2009), and that improvement in child anxiety positively influences parental anxiety.

Possibly, parent-focused prevention of anxiety may be more beneficial to children in a younger age group than in the current study, as younger children usually depend more on their parents. Indeed, internalizing symptoms were successfully reduced in the study by Rapee and colleagues (2005) and in the study by Cartwright-Hatton, McNally, White & Verduyn (2005) focusing on children aged 36–62 months and 24–56 months, respectively. Note, however, that the success of these parent-focused interventions has not yet been compared to child-focused interventions.

Although the intervention groups yielded more 'ADIS improved' children, all high-anxious groups improved over time. That is, in all groups (including the non-intervention group), more than 20% of the children were 'ADIS improved' and comparable decreases in child anxiety symptoms were revealed across the groups. Even though childhood anxiety disorders at clinical levels do not wane naturally (see review: Hudson, Kendall, Coles, Robin, & Webb, 2002), it could be possible that anxiety problems of non-clinical severity subside naturally to some degree. Indeed, other anxiety prevention studies also report a general improvement in all groups of child anxiety over time (e.g. Dadds et al., 1999; Lowry-Webster, Barrett, & Dadds, 2003; Roberts et al., in press). This could be explained by regression to the mean, because of the selection of extreme scores (top 15%). Additionally, Ollendick (2002) reports that as children grow up, their anxiety decreases because of an increasing understanding of potentially dangerous situations and their ability to control these situations. Dadds and colleagues (1999) argue that child anxiety may peak at around the final grades of primary school and subsides naturally in a proportion of children when they become adolescents. In addition, the attention given to the child's (and the parent's) anxiety during assessments could have created more openness to and awareness of anxiety and its consequences, and this, in turn, could reduce child anxiety.

The differences between the intervention and non-intervention groups are likely to become more pronounced over time, as is stipulated in the review by Greenberg, Domitrovich and Bumbarger (2001). Indeed, in the current study the superior results of the intervention versus non-intervention groups did not become prominent before the 2-year follow-up. Anxiety prevention studies that extend beyond a time horizon of two years are scarce, and, to our knowledge, only two such studies exist (Barrett, Farrell, Ollendick, & Dadds, 2006; Roberts, Kane, Bishop, Matthews, & Thomson, 2004). Roberts and colleagues (2004) report lower levels of anxiety symptoms for the intervention group than for the control group at 30 months and Barrett and colleagues (2006) reveal lower anxiety scores at 36 months in intervention children compared to controls (only in children aged 9–10 years at the start of the program, not in children aged 14–16 years at start). Moreover, Lock and Barrett (2003) reported that 31% of the children in the control group were at high-risk (i.e. elevated scores on questionnaire) compared to only 12% of the intervention group at 36 months. However, even longer follow-up periods are needed in order to establish the (long-term) benefits of anxiety prevention studies.

Effectiveness of Preventive Interventions (Aiming to Reduce Child Anxiety) on Parental Anxiety

Parental anxiety did not improve more in parents who participated in the parent-focused intervention. Instead, the study revealed a general decrease across all three conditions of parental anxiety. Thus parental anxiety seemed unaffected by either type of intervention. Accordingly, Cobham, Dadds and Spence (1998) found that mothers with high anxiety levels before the intervention showed reduction in anxiety, but revealed no differences between high-anxious mothers randomized to child-focused cognitive therapy with or without parental anxiety management. Silverman, Kurtines, Jaccard & Pina (2009) recently found significant improvements in parental anxiety in parents who followed either a child anxiety treatment type with or without active parental involvement. To our knowledge, no other study has examined the natural course (no intervention) of parental anxiety.

Impact of Parental Anxiety on Child Anxiety

Parental anxiety was expected to lead to lower percentages of 'ADIS improved' children on the one hand and higher SCARED-71 scores on the other, as other studies (e.g. Berman, Weems, Silverman, & Kurtines, 2000; Bodden, Bögels et al., 2008; Cobham, Dadds, & Spence, 1998) have reported that parental anxiety negatively affected child's treatment outcome. Unexpectedly, parental anxiety at pretest and at 1-year follow-up did not predict both variables of child anxiety at 1- and 2-year follow-up.

Even though the children of this study could have inherited their parent's anxious predisposition, parental anxiety does not seem to have a long-term effect on child anxiety. Especially in preventive contexts, protective factors (e.g. good peer relationships) could shield the child from the effect of parental anxiety. However, no clear conclusions can be drawn yet because of contradictory findings between the current and earlier studies (Berman, Weems, Silverman, & Kurtines, 2000; Bodden, Bögels et al., 2008; Cobham, Dadds, & Spence, 1998).

Limitations

First, attrition of participants took place at consecutive stages of the study and only 30% of the children or parents that were randomized to either child- or parent-focused group attended most sessions. Comparable participation rates were found in the study by Dadds and Roth (2008), with 34% of their invited participants eventually attending one or more sessions. Unfortunately, attrition of

participants is a common and seemingly unavoidable phenomenon in other anxiety and depression prevention studies (Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005; Sochet et al., 2001). Lipsitz and colleagues (1994) rightly conclude that an instant separation takes place of participants open and available to change and participants not open and available to change when they are asked to sign for informed consent and when they are offered an intervention. Therefore, conclusions about the effectiveness of screening and of interventions in this study are limited to those (likely motivated) participants who engaged in the study. In that sense, it could be argued that the effectiveness of both interventions and no intervention might have been lower had non-motivated participants also been included. On the other hand, we applied a conservative approach by using the last assessment carried forward procedure for those who dropped out during the course of the study, which is likely to reduce the effect of intervention as well as no intervention.

Second, follow-up measurements took place only one and two years after pretest, no earlier measurements were performed. More frequent measurements would have enabled more precise quantification of the course of anxiety disorders (Mzarek & Haggerty, 1994). However, we aimed to avoid participant's drop-out by not exposing them to (time-consuming and intrusive) assessments too frequently (Clark, 2002). Moreover, we sought to examine long-term effects instead of short-term effects, as Greenberg and colleagues (2001) have pointed out the importance of studying long-term effects in preventive contexts.

Third, anxiety symptoms were based only on children's self-reports, whereas diagnostic data was based on both child and parental reports. It would have been more valid to compare the different outcome measures of the study if both had included a child and parent report. In line, screening used only child self-report, because this method minimizes child's dependence on the environment, and it offers the possibility of classical employment (time-efficient, high response rates). However, some children do not acknowledge their anxiety, and these children risk not being selected for intervention purposes. The studies of Dadds and colleagues (1997) and Dadds, Perrin and Yule (1998) forwarded that asking teachers to identify anxious children is a valid method of selecting anxious children that "fake good".

Implications for Research, Policy and Practice

Two findings from this study stress the need for society to offer high-anxious children preventive interventions. First, such children seem to remain more vulnerable over time to anxiety problems,

which supports the outcome of an earlier study (Simon & Bögels, 2009) on this sample showing that high-anxious children are more likely to develop or maintain anxiety disorders than median-anxious children. Second, offering a child- or parent-focused intervention leads to more favorable outcomes with regard to the diagnostic data of child anxiety than offering no intervention. Results also show that, at least for now, it does not seem to matter which type of cognitive behavioral intervention is offered to the child. Nevertheless, our findings on parental anxiety could imply that parental anxiety does not necessarily need to be addressed in interventions that aim at parents or include a parental component to prevent the development of (more severe) anxiety disorders in already anxious children. The study also revealed contradictory findings, and more research is needed on the usefulness of offering child-focused versus or combined with parent-focused interventions. It would be interesting and useful for future studies to include even longer-term follow-up data than the current study to examine the long-term effects of preventive interventions more adequately. In addition, anxiety prevention studies only focus on the clinical efficacy of their interventions, whereas it is at least equally important for society to examine the cost-effectiveness of preventive interventions. We are currently conducting such a study (Simon, Dirksen, Bögels, & Boddien, submitted). Furthermore, additional research needs to be performed in order to draw firm conclusions regarding the effect of parental anxiety on child anxiety in treatment/intervention studies. Finally, collecting reasons for non-participation in the interventions is of importance.

Conclusions

The current study investigated the two-year development of child anxiety in high- and median-anxious children. High-anxious children either received a parent- or child-focused intervention or no intervention. Additionally, the effect of the interventions on parental anxiety as well the effect of parental anxiety on child anxiety was studied. Children selected as high-anxious or at risk were found to be more vulnerable to having and developing anxiety disorders than median-anxious children, a finding that underlines the necessity for developing and providing effective preventive interventions aimed at reducing child anxiety. Both types of intervention showed favorable outcomes compared to the non-intervention group regarding the number of 'ADIS improved' children (based on diagnostic data). However, general improvements over time were found for both interventions and no intervention on child and parental anxiety symptoms. Finally, parental anxiety did not affect the development of

child anxiety. Decisions about the usefulness of intervening versus not intervening, and which type of preventive intervention is most suitable for reducing child anxiety in preadolescent children, should be guided by even longer term follow-up data.

5

Cost-effectiveness of Child-focused and Parent-focused Interventions in a Child Anxiety Prevention Program

In this study, the cost-effectiveness of three indicated anxiety prevention strategies was examined from a societal perspective. Children (aged 8-12) were recruited via primary schools, selecting children scoring as high-anxious on an anxiety screening questionnaire. Participating children and their parents were randomized to a child- a parent-focused, or non-intervention group. All groups completed a diagnostic interview and standardized cost-diaries at pre-test, and 1- and 2-year follow-up. Incremental cost-effectiveness ratios per 'ADIS improved' child (based on diagnostic information) were calculated and cost-effectiveness acceptability curves and frontiers were plotted. The base-case and most secondary analyses showed it would be cost-effective to offer high-anxious children an intervention, and the parent-focused intervention to be the optimal strategy at lower threshold values than the child-focused intervention and when parents were anxious. The child-focused intervention was dominant when analyses were performed from a healthcare perspective, for boys, and for children of grades 7-8 of primary school.

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INTRODUCTION

Anxiety disorders are highly prevalent, with a lifetime prevalence of anxiety disorders in children and adolescents ranging between 8-27% (Costello, Egger, & Angold, 2005). Quality of life and functioning are negatively affected by anxiety disorders, with children showing lower self-esteem, difficulties at school and social problems (Essau, Conradt, & Petermann, 2000; Kendall, Safford, Flannery-Schroeder, & Webb, 2004; Langley, Bergman, McCracken, & Piacentini, 2004). The decrease in functioning and quality of life, burden society via direct and indirect costs. Indeed, in the Netherlands, child and adult anxiety disorders accounted for €2858000000 in 2005, 2% of the total expenditure on health related costs (Poos, Smit, Groen, Kommer, & Slobbe, 2008). Moreover, a cost-of-illness study of Bodden, Dirksen and Bögels (2008) revealed that families with clinically anxious children reached societal costs that were more than 20 times higher than families from the general population. These arguments underscore the importance of preventing childhood anxiety disorders.

Several anxiety prevention programs have been set up that were successful at reducing anxiety difficulties (e.g. Dadds, Spence, Holland, Barrett, & Laurens, 1997; Rapee, 2002). However, anxiety prevention interventions have never been economically evaluated, although outcomes are relevant for resource-allocation decisions by policy makers and insurers (Knapp, 1997). In an economic evaluation, the relative costs and effects of two or more types of intervention are quantitatively compared (Drummond, O'Brien, Stoddart, & Torrance, 1997), and results guide objective decision making between competing interventions.

The majority of anxiety prevention studies only target parents in their intervention (e.g. Rapee, 2002; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005), typically because of the high overlap between parent and child anxiety (Dadds & Roth, 2008). The question whether an anxiety prevention intervention should be aimed at the parent or the anxious child, has only recently been investigated in an RCT of Simon, Bögels & Voncken (2011). A parent-focused intervention (PI) was compared to a child-focused intervention (CI) and non-intervention group (NI). It appeared that both types of intervention showed favorable outcomes compared to the non-intervention group regarding the number of 'ADIS improved' children (based on diagnostic data).

The present study's aim was to perform an economic evaluation alongside the RCT, comparing the relative costs and outcomes of CI, PI, and NI. A cost-effectiveness analysis was carried out from a societal perspective, with a time horizon of 24 months. An incremental Cost-Effectiveness Ratios (ICER) was calculated, reflecting the ratio of change in costs to the change in effectiveness. Effectiveness was expressed as the proportion of 'ADIS improved' children.

METHOD

Design and Participants

Children, aged 8-12, and their parents were recruited for an RCT on the prevention of anxiety disorders via primary schools (grades 5-8) in the Netherlands. Children completed the Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71, Bodden, Bögels, & Muris, 2009) at school and if they scored in the top-15% (i.e. high-anxious), children and their parents were asked to enroll in the RCT. They were consequently randomized to either CI, PI, or NI.

At pretest (maximum 3 months after screening), a diagnostic interview (Anxiety Disorder Interview Schedule, Siebelink & Treffers, 2001; Silverman & Albano, 1996) with the child and parents took place. Two weeks prior to pretest, parents received standardized cost-diaries enquiring for all health-related costs (Bodden, Dirksen, & Bögels, 2008; Bodden, Dirksen et al., 2008). The cost-diaries were completed prospectively for two consecutive weeks and were collected together with the questionnaires at pretest. Interventions started maximum 6 weeks after the pretest, and the 1- and 2-year follow-ups also entailed the cost-diary and ADIS. Only those participants completing the ADIS and the cost-diary at pretest were included in the economic evaluation ($N = 139$, 76% of the participants in the RCT). Participation rates through all stages of the study are depicted in Figure 1.

Interventions

Both interventions took place at primary schools, after school/work hours. Two therapists per group led the sessions, both psychology graduates, and at least one with experience in providing cognitive behavioral treatment to anxious children. The therapists were trained and supervised by Bögels (third author), and followed detailed session protocols.

CI entailed eight sessions (90 minutes) of 6–8 children in group. PI also entailed eight sessions, but consisted of three group sessions (90 minutes) of 6–8 parental couples and five telephone sessions (15 minutes) with each parent (couple). This way, parents could more easily fit in the interventions in their daily life. The intended duration of the telephone sessions was calculated by dividing the duration of the group sessions by six (number of couples in the group) to enhance comparability of the child- and parent-focused interventions in terms of the therapist's time. The five telephone sessions concerned instruction and feedback on personal homework assignments, which is easier to deliver individually than in a group.

Interventions were guided by age-appropriate, illustrated workbooks for both the child and parent intervention and were based on existing cognitive-behavioral treatment procedures (Bögels & Siqueland, 2006). In the parent-focused intervention, parents were trained as lay therapists to help their child overcome his/her anxieties by applying the principles of step-wise exposure-in-vivo, cognitive restructuring, modeling, task-concentration training and relaxation, and reinforcement. Parents worked on their own anxieties and anxiety-enhancing parenting as well, and on their co-parenting relationship. The father's role was also highlighted. In the child-focused intervention, children developed their own fear hierarchy, and exposure-in-vivo, cognitive restructuring, task-concentration training and relaxation all took place in-session and as homework assignments. Children could also act as each other's lay therapists during the in-session exposures. The training was organized playfully, with warming-up exercises, video feedback, and unexpected individual exposure exercises during a 'quest'.

Figure 1. Numbers of Participants in Consecutive Stages of the Study

Cost Measures and Valuation

The cost analysis was performed from the societal perspective and followed the methodology used by Bodden and colleagues (2008). The cost analysis included direct healthcare (e.g. visits to a psychologist), direct non-healthcare (e.g. professional help at home), indirect (child's school absence), and out-of-pocket costs (e.g. over-the-counter medication). Resource usage was assessed via standardized cost-diaries (Bodden, Dirksen, & Bögels, 2008; Bodden, Dirksen et al., 2008). A cost diary is an accepted and valid way for discontinuous cost measurement in health care economic evaluations (Freer, 1980; Goossens, Rutten-Van Mölken, Vlaeyen, & Van der Linden, 2000). The cost-diaries were administered at pre-test, and at the 1- and 2-years follow-up. The cost analysis entailed resource use related to child's anxiety, psychological problems, physical problems and other reasons of the child. Parents completed the cost-diaries and recorded which family member used which resource, and the reason of usage. For example, if a mother stayed home from work all day because of an anxiety attack of the child, the mother recorded the time she was absent from work (eight hours) and why she was home from work (child's anxiety).

The calculation of costs was based on the multiplication of resource usage with cost price per resource unit. Standard Dutch guidelines (Oostenbrink, Koopmanschap, & Rutten, 2004) were used to determine most cost prices (e.g. €8.40 per hour for parent's absence from work). Not all cost prices were included in the Standard Dutch guidelines and, therefore, separate cost prices were determined for cost prices of medication, school absence, day nursery, over-the-counter medication, alternative care, and the current study's intervention. These separate calculations were performed in line with the study of Bodden and colleagues (2008). Cost prices for medication were derived from the Medication and Aid Information Project database ("Board of Health Insurances, Medication and Aid Information Project ", 2007) were calculated for medication for psychological and for physical problems, and included claw-back and taxes. Costs associated with reduced parental productivity were calculated according to the friction cost method. Shadow prices were applied to informal care and loss of unpaid activities (Oostenbrink, Koopmanschap, & Rutten, 2004). For child's loss of leisure time, the cost price of parent's loss of leisure time per minute was divided by 2. Cost prices of school absence were derived by dividing the sum of the state's and parents' contribution ("National Institute of Budget Information", 1995) by the total annual school hours. Tariffs were used to determine cost prices for day nursery, over-the-counter medication, and alternative care. Finally, as the cost-diary did not cover the period of the intervention, costs of the intervention were

added to the direct healthcare costs. The cost-price calculation of the interventions entailed the costs of the psychologists, participants' traveling and time-related expenses, and telephone expenses (only PI). The cost prices of CI and PI were calculated at €483.78 and €388.67 per participant respectively. Costs were presented in 2008 Euros (€1 = \$1.40), and were indexed to the year 2008 via consumer price indexes of the Dutch Central Bureau of Statistics, if necessary. The cost data between pretest, 1-year follow-up, and 2-year follow-up (12 and 24 months after pretest respectively) were interpolated in line with Bodden and colleagues (2008) using the cost diaries of pretest, 1-year follow-up and 2-year follow-up. Costs made between 1- and 2-year follow-up were discounted at 4% (Oostenbrink & Al, 2005).

Outcome Measure

This study used the child and parent version of the Dutch version of the Anxiety Disorder Interview Schedule (ADIS, Siebelink & Treffers, 2001; Silverman & Albano, 1996) to assess the presence and severity of anxiety diagnoses. The ADIS is a well-validated (Silverman, Saavedra, & Pina, 2001), semi-structured interview suitable for measuring all DSM-IV anxiety disorders, in 7-17 year olds. Conform standard ADIS procedure, a child received a diagnosis if the child or parent reported substantial interference at school/home/social contacts, and the clinician rated each diagnosis with a severity score. This study used the outcome measure 'ADIS improved' child. Based on changes over time (pretest 1-year follow-up; pretest 2-year follow-up) in the ADIS sum of severities, pooled effect sizes (Cohen's *d*) were deducted. This outcome measure captures both the presence and severity of anxiety disorders. The use of effect size is a preferred method for estimating an intervention's magnitude of effect (Hirschfeld-Becker et al., 2004), and Cohen's *d* is one of the most commonly used measures. Children were considered 'ADIS improved' if the effect size of change was .50 or higher, a medium effect size according to Cohen's original guidelines (1977;1988). This cut-off seems reasonable in a preventive context.

Parental Anxiety

To measure parental anxiety, the adult version of the Screen for Child Anxiety Related Emotional Disorders-71 was used (2004). The SCARED-A taps into all DSM-IV anxiety disorders, unlike any other questionnaire measuring adult anxiety. The homogeneities of the parents' SCARED-A (mother and father version) were high, both $\alpha = .94$ (Simon & Bögels, 2009). A binary measure (parental anxiety present versus parental anxiety absent) was created from both parents' anxiety symptoms scores. More specifically, parents were labeled 'anxious' if the mother, father or both had an anxiety symptom score (SCARED-71) at pretest within the 75th percentile.

Data Analyses

Missing data were replaced by the Last Assessment Carried Forward method, and data were analyzed according to the intention-to-treat principle. In case data were missing at 1- but not at 2-year follow-up, pretest data were only carried forward to 1-year follow-up, and original 2-year follow-up data were used. Regression corrections for costs at 1- and 2-year follow-up and at the level of subtotal costs were applied to correct for pretest differences between groups, taking regression to the mean and systematic changes in generating costs into consideration. The following formula was used, conform Van Asselt and colleagues (2009):

$\text{costs_adjusted}_j = \text{costs}_j - \beta_{\text{pretest}} \times (\text{pretest}_j - \text{pretest}_{\text{mean}})$, where costs_j represents the observed total costs at 1- and 2-year follow-up respectively for participant j (in €), β_{pretest} is the beta coefficient for pretest, pretest_j is the observed pretest costs for participant j (in €), and $\text{pretest}_{\text{mean}}$ is the mean pretest costs for all participants. Negative subtotal costs after regression corrections were set at 0. For interpolation, subtotal cost data at pretest were multiplied by 7 (each cost-diary representing 2 weeks) to cover the period between pretest and the end of the intervention, corrected cost data of 1-year follow-up were multiplied by 18 to cover the period between the end of the intervention and 1-year follow-up, and corrected cost data between 1- and 2-year follow-up were averaged and multiplied by 26 to cover the intermittent period. The corrected costs were used for the base-case and secondary cost-effectiveness analyses.

Regarding the comparison of cost data between the three groups, nonparametric bootstrapping with 95% confidence intervals were used. By bootstrapping, the distribution of data can be derived through simulations of sampling with replacement from original data. To derive the distribution of the subtotal and total costs, 5000 simulations of sampling with replacement from original cost data were carried out. With respect to the comparison of the proportion of 'ADIS improved' children between the three groups until 2 years, Chi-squares were utilized.

Regarding the comparison of costs and effects between strategies, incremental cost-effectiveness ratios (ICER) were calculated by dividing incremental regression corrected costs by incremental effects. Additionally, bootstrap analyses with 1000 replications on the costs and effects were performed. Results of the bootstrap analyses were graphically depicted in a cost-effectiveness acceptability curve (CEAC). A CEAC reflects the probability that CI, PI or NI would be cost-effective, given a certain threshold value (i.e. maximum value that society is willing to invest for an extra 'ADIS improved' child). The threshold value of the CEAC ranged from €0 to €7500. Based on the individual CEACs, a cost-effectiveness frontier can be defi-

ned, representing the probability that a certain strategy is the most cost-effective (i.e. highest expected net health benefit) for a particular threshold value (Fenwick, Claxton, & Sculpher, 2001).

To study the robustness of the outcomes of the base-case analysis, 4 secondary analyses and 6 explorative subgroup analyses were carried out. In the first secondary analysis, intervention non-completers (i.e. maximum 1 session missed) were excluded. The second secondary analysis included study completers only (i.e. completed ADIS and/or cost-diary at pretest, and at 1- and 2-year follow-up or completed ADIS and/or cost-diary at pretest and 2-year follow-up only). Third, the economic evaluation was performed from the healthcare perspective instead of the societal perspective, thus including only direct healthcare costs. Fourth, a secondary analysis was performed with reduced trainer costs, as trainers with lower education than psychologists (e.g. social workers, teachers) could also perform the preventive intervention. In the first subgroup analysis, a division was made between boys and girls (n_{boys} : CI: 27; PI: 27; NI: 22; n_{girls} : CI: 20; PI: 22, NI: 21). Second, a division of anxious versus non-anxious parents was made ($n_{\text{anxiousparents}}$: CI: 15; PI: 22; NI: 17; $n_{\text{non-anxiousparent}}$: CI: 32; PI: 27; NI: 26). Third, a division in the participating grades of primary schools were made, dividing in subgroups of grades 5-6 ($M_{\text{age}} = 9.16$, $SD_{\text{age}} = .86$) and grades 7-8 ($M_{\text{age}} = 10.96$, $SD_{\text{age}} = .75$), ($n_{\text{grades 5-6}}$: CI: 26; PI: 37; NI: 25; $n_{\text{grades 7-8}}$: CI: 21; PI: 12; NI: 18). For all secondary and subgroup analyses, ICERs were calculated, and bootstrap analyses were performed (with resulting CEAC curves and cost-effectiveness frontiers). Bootstrap analyses were performed utilizing Excel 2000 and other analyses by Statistical Package for Social Sciences 15.0.

RESULTS

Participants

To test whether participants of the economic evaluation (i.e. those that completed both the ADIS and cost-diary at pretest) differed from participants of the entire RCT, these participants were compared on anxiety difficulties (ADIS sum of severities) at pretest and on child's age, child's sex, Dutch ethnicity, parental educational level, and parental current unemployment. Pretest's anxiety disorders' sum of severity scores was not significantly different between participants that completed the cost-diary at pretest and those who did not (resp. $M = 5.14$, $SD = 6.80$; $M = 7.16$, $SD = 8.84$), $t(186) = -1.65$, $p = .10$.

Regarding demographic features, it appeared the children of parents that did not complete the ADIS and cost-diary had less educated mothers than children of parents that did fill in both instruments (resp. $M = 4.43$, $SD = 1.85$; $M = 5.12$, $SD = 2.00$), $(186) = 2.11$, $p < .05$. No other differences on any of the tested demographic features were revealed, all p 's $> .10$.

Comparing CI, PI, and NI within the economic evaluation sample on the same variables, revealed that father's educational level (scale 0-8) differed almost significantly between groups (CI: $M = 5.51$, $SD = 1.98$; PI: $M = 5.24$, $SD = 2.04$; NI: $M = 4.56$, $SD = 2.13$), $F(2) = 2.93$, $p = .06$. Post-hoc tests showed that fathers of NI had lower educational levels than fathers of CI, $t(87) = 2.39$, $p < .05$. No other differences between the groups were found (Boys: CI: 20 (43%), PI: 22 (45%), NI: 21 (49%); Child's age: CI: $M = 9.94$, $SD = 1.28$, PI: $M = 9.59$, $SD = 1.17$, NI: $M = 9.96$, $SD = 1.11$; Father's Dutch ethnicity: CI: 46 (98%), PI: 49 (100%), NI: 43 (100%); Mother's Dutch ethnicity: CI: 45 (96%), PI: 47 (96%), NI: 43 (100%); Father's current unemployment: CI: 4 (9%), PI: 4 (8%), NI: 3 (7%); Mother's current unemployment: 16 (34%), 10 (20%), 17 (40%)), all p 's $> .10$. Moreover, no differences between the three groups were found on number of study completers, $\chi^2(2) = .03$, $p > .10$.

Cost Analysis

Table 1 shows the uncorrected costs per resource use, and uncorrected (sub)total costs until 2 years. At pretest, there were imbalances between groups on total costs. That is, PI had somewhat higher costs ($M = 53.97$, $SD = 132.17$) than CI ($M = 46.54$, $SD = 107.63$) and NI ($M = 41.78$, $SD = 99.42$). The costs at pretest substantially influenced costs made at 1- and 2-year follow-up. More specifically, participants reporting costs at pretest ($n = 50$, 36%), generally reported costs 1 and 2 year later, whereas those participants not reporting costs at pretest ($n = 89$, 64%), generally reported low costs 1 and 2 years later. Because of the cost imbalances at pretest, the effect of pretest cost on costs 1 and 2 years later, a regression correction was applied. Logically, the corrected costs were higher than non-corrected costs, because most participants had lower pretest costs than the overall pretest costs. Additionally, the costs of the group with the lowest pretest cost (NI) were corrected the strongest.

The corrected (sub)total societal costs until 2 years are depicted in Table 2. Total societal costs were highest for CI and lowest for PI. The higher total costs of CI were largely explained by higher direct non-healthcare costs. Direct healthcare costs, however, were remarkably lower in CI than in the other two groups. Nevertheless, as indicated by the confidence intervals, none of the before mentioned cost differences between groups were significant.

Table 1

Uncorrected Mean Costs per Cost Item, (Bootstrapped) (Sub)total Societal Costs for Child-Focused Intervention (CI, $n = 47$), Parent-Focused Intervention (PI, $n = 49$), and Non-intervention Group (NI, $n = 43$) Until 2 Years

	Costs per unit ^a	Mean costs (<i>SD</i>)			Incremental costs (95% Confidence interval)			
		CI costs	PI costs	NI costs	CI-NI	PI-NI	CI-PI	
Direct healthcare costs								
Intervention	CI: 483.78/participant; PI: 388.67/participant ^b	483.78 0	388.67 0	0 0	438.78	388.67	95.11	
Psychologist	134.90/contact ^c	20 (137.74)	264.18 (1203.12)	0 0	20	264.18	-244.18	
Psychiatrist	82.44/contact ^c	12.28 (84.18)	0 0	146.13 (816.09)	-133.85	-146.13	12.28	
Youth consultant	71.57/contact ^d	0 0	0 0	11.65 (76.40)	-11.65	-11.65	0	
Social worker	51.64/contact ^e	0 0	26.30 (184.13)	76.86 (504.00)	-76.86	-50.56	-26.30	
GP practice	21.98/contact ^c	69.64 (211.90)	38.79 (133.44)	52.65 (181.83)	16.99	-13.86	30.85	
GP Telephone/assistant	11.21/contact ^c	11.10 (49.70)	17.49 (102.41)	16.36 (107.26)	-5.26	1.13	-6.39	
Medication psychological problems	0.85/ddd ^f	57.71 (278.18)	19.89 (139.26)	142.05 (499.36)	-84.34	-122.16	37.82	
Medication physical problems	1.96/ddd ^f	189.99 (626.02)	658.03 (1855.49)	383.76 (1107.76)	-193.77	274.27	-468.04	

Emergency room	151.21/contact ^c	0	0	156.41 (1025.68)	-156.41	0
Hospital	84.85/contact ^c	105.58 (451.59)	135.00 (568.82)	140.10 (582.55)	-5.10	-29.42
Other	Unspecified	30.84 (164.16)	21.77 (127.43)	20.35 (133.47)	1.42	9.07
	Subtotal	1393.87 (2160.89)	2297.09 (4213.51)	1832.50 (3462.03)	464.59	-903.22
	Bootstrapped subtotal	1404 (311)	2291 (594)	1843 (521)	448.21 [-1677, 689.77]	-886.53 [-2281.46, 330.55]
Direct non-healthcare costs						
Day nursery	6.15/hour ^h	749.52 (3587.65)	96.16 (505.79)	0	749.52	653.36
Informal care	9.00/hour ^c	289.59 (1985.35)	67.94 (415.08)	104.94 (502.83)	-37	221.65
Professional help at home	13.80/hour ^c	15.36 (105.33)	0	0	15.36	0
	Subtotal	1054.47 (4043.24)	164.11 (664.81)	104.94 (502.83)	59.17	890.36
	Bootstrapped subtotal	1041 (589)	164 (93)	106 (76)	57.09 [-29.54, 2269.74]	877.03 [-87.07, 2225.76]
Indirect costs						
Paid work	37.80/hour ^c	143.09 (981)	0	36.92 (242.11)	-36.92	143.09
School absence	4.80/hour ⁱ	236.26 (848.77)	280.39 (768.39)	283.07 (714.90)	-2.68	-44.13

Loss leisure time parent	8.40/hour ^c	0	6.88 (48.14)	0	0	6.88	-6.88
Loss leisure time child	4.80/hour ^c	25.54 (156.25)	21.97 (103.24)	150.05 (679.74)	-124.51	-128.08	3.57
Subtotal		404.90 (1758.11)	309.24 (771.41)	470.03 (1131.28)	-65.13	-160.79	95.66
Bootstrapped subtotal		401 -251	310 -109	471 -172	-69.86 [-624.22, 586.45]	-151.89 [-574.27, 221.63]	91.08 [-365.29, 703.60]
Out-of-pocket costs							
Over-the-counter medication	Tariff/medication ^g	45.16 (218.97)	33.92 (110.91)	50.87 (128.38)	-5.71	-16.95	11.24
Transportation	0.17/km ^c	16.45 (60.62)	17.41 (57.08)	15.44 (57.55)	1.01	1.97	-0.96
Alternative care	65.20/contact ^g	88.78 (608.67)	9.31 (65.20)	74.30 (421.72)	14.48	-64.99	79.47
Subtotal		150.39 (642.63)	60.65 (174.13)	140.61 (525.94)	9.78	-79.96	89.74
Bootstrapped subtotal		150 -93	61 -25	138 -179	11.70 [-226.56, 263.79]	-77.12 [-263.08, 47.25]	88.82 [-55.57, 308.47]
Total costs		3003.64 (6316.57)	2831.08 (4620.05)	2548.07 (4299.98)	455.57	283.01	172.56
Bootstrapped Total costs		3004 -889	2821 -649	2548 -644	455.91 [-1585.55, 2710.65]	272.25 [-1539.59, 2093.27]	183.67 [-1877.60, 2423.92]

Note.

^aExpressed in 2008 Euros (€1 = \$1.40), ^bcost prices included psychologists, telephone, and participants' time and traveling costs, ^cOostenbrink (2004), ^dBureau Jeugdzorg (2009), ^eAnnual report social workers (2007), ^fGip databank (2007), ^gMean tariffs, www.nationaleapotheek.nl (2009), ^hTariffs, www.schoolenopvang.nl (2007), ⁱINIBUD (2003)

Table 2

Regression Corrected Subtotal and Total Societal Cost for Child-focused Intervention (CI, $n = 47$), Parent-focused intervention (PI, $n = 49$), and Non-intervention (NI, $n = 43$) Until 2 Years

Cost category	Mean costs (SD)		Incremental costs [95 % Confidence Interval]			
	CI costs	PI costs	NI	CI- NI	PI- NI	CI-PI
Direct healthcare	1687.96 (1485.30)	2887.70 (2879.31)	2148.70 (2887.32)	-460.74	739	-1199.74
Bootstrapped 1690		2289	2143	-452.27	146.23	-598.49
-213		-410	-436	[-1452.59,467.28]	[-1023.28,1310.41]	[-1561.48,227.93]
Direct non-healthcare	990.52 (3375.74)	314.35 (650.13)	227.86 (351.57)	762.66	86.49	676.17
Bootstrapped 991		314	227	764.42	86.65	677.77
-494		-91	-53	[-16.16,1873.42]	[-111.79,309.23]	[-131.65,1785.93]
Indirect	404.90 (1758.11)	309.24 (771.41)	470.03 (1131.28)	-65.13	-160.79	95.66
Bootstrapped 411		308	468	-57.91	-160.65	102.74
-256		-110	-170	[-628.15,596.01]	[-574.99,224.26]	[-351.07,736.12]
Out-of-pocket	150.39 (642.63)	60.65 (174.13)	140.61 (525.94)	9.78	-79.96	89.74
Bootstrapped 150		60	140	9.98	-80.09	90.07
-92		-25	-79	[-216.48,257.88]	[-264.86,47.65]	[-58.37,305.22]
Total costs	3233.78 (5422.06)	2971.94 (3265.97)	2987.20 (3653.90)	246.58	-15.26	261.84
Bootstrapped 3219		2977	2981	238.01	-4.49	242.50
-777		-458	-555	[-1482.13,2216.00]	[-1414.27,1369.46]	[-1404.81,2140.40]

Note.

Expressed in 2008 Euros (€1 = \$1.40)

Effectiveness

The proportion of ‘ADIS improved’ children differed between the three groups, $\chi^2(2) = 5.27, p < .05$, and was higher in CI (.51) than in NI (.28), $\chi^2(2) = 5.02, p < .05$, and borderline significantly higher in PI (.45) than in NI, $\chi^2(2) = 2.84, p = .07$. CI and PI did not differ significantly, $p > .10$.

Cost-effectiveness

Regarding the base-case analysis of the societal costs per ‘ADIS improved’ child, NI had higher costs and lower effects than PI and was thus dominated by PI. Therefore, only the ICER of CI versus PI was calculated, resulting in an incremental cost of €4364 per ‘ADIS improved’ child. The CEAC (Figure 2) illustrated it would be most cost-effective to offer high-anxious children a PI at threshold values up to €3000, whereas it would be most cost-effective to offer a CI at higher threshold values. However, as visible in Figure 2, the probabilities of being cost-effective of CI and PI did not diverge strongly, and, therefore, the choice between both interventions remains uncertain.

Figure 2
Cost-effectiveness Acceptability Curve Base-case

Secondary and Subgroup Analyses

Table 3 shows the ICER calculations of the secondary and subgroup analyses, and results regarding the cost-effectiveness acceptability frontiers (CEAFs). In accord with the base-case analysis, all secondary analyses showed it would not be cost-effective to offer no intervention. In addition, the analysis on intervention completers showed comparable results to the base-case, whereas the cost-effectiveness results of the two intervention types of the base-case analysis were non-robust. For the secondary analysis that was performed from a healthcare perspective instead of a societal perspective and for the analysis including only study completers, CI was found to be dominant and to be the optimal strategy at any threshold, with constant probabilities of being cost-effective around 80%. In case of reduced trainer costs, the incremental costs per 'ADIS improved' child for CI versus PI decreased to approximately €2600 compared to the base-case, and CI was already the most cost-effective strategy at a threshold of €250. However, the probabilities of being cost-effective of the two intervention types diverged little in case of reduced trainer costs.

The subgroup analyses showed heterogeneity within the entire sample, thus revealing specific subgroups. If parents were anxious at pretest, PI yielded both higher effects and lower costs, and dominated the other two strategies. Accordingly, the CEAC showed that PI would be the most cost-effective strategy, with constant probabilities of being cost-effective of approximately 90%. However, if parents were non-anxious, CI dominated PI and already became the most cost-effective strategy at a threshold value of €350. For children of grades 5-8, not intervening was the most cost-effective strategy with thresholds up to €3250, and PI was most cost-effective at higher thresholds. For children of grades 7-8 and for boys, CI was the optimal strategy at any threshold. For girls, CI had the highest effect, but the incremental costs per 'ADIS improved' child of CI versus PI were over €5500. Not intervening was most cost-effective at the lowest threshold values (below €750), whereas PI was the most cost-effective approach at higher thresholds and CI became the most cost-effective strategy at threshold values above €5900.

Table 3

Results of Base-case, Secondary and Subgroup Analyses for Child-focused Intervention (CI), Parent-focused intervention (PI) and Non-Intervention (NI): Costs and Effects, Incremental Cost-effectiveness Ratios (ICERs), and Cost-effectiveness Acceptability Frontiers (CEAF)

	CI n = 47		PI n = 49		NI n = 43		
	Costs ^a (M, SD)	Relevantly improved	Costs (M, SD)	Relevantly improved	Costs (M, SD)	Relevantly improved	
Base-case	3233.78 (5422.06)	.51	2971.94 (3265.97)	.45	2987.20 (3653.90)	.28	ICER ^c 4364 (CI vs PI)
Healthcare perspective	1687.96 (1485.30)	.51	2287.70 (2879.31)	.45	2148.70 (2887.32)	.28	CI dominant
Intervention completers ^b	3155.74 (5316.37)	.53	2665.53 (2468.50)	.41	2987.20 (3653.90)	.28	< 3570: PI > 3570: CI
Study completers ^c	2361.06 (2311.76)	.50	3250.48 (3516.57)	.43	3025.77 (3903.84)	.31	CI at any threshold
Reduced trainer costs	3079.99 (5422.06)	.51	2922.59 (3265.99)	.45	2987.20 (3653.90)	.28	< 250: PI (35 – 41 %) > 250: CI (35 – 57 %)
Anxious parents	4361.05 (7912.60)	.53	2689.06 (2291.88)	.55	3596.08 (4607.48)	.41	PI at any threshold
Non-anxious parents	2705.37 (3900.75)	.50	3202.43 (3914.93)	.37	2589.09 (2902.79)	.19	< 350: NI > 350: CI
Grades 5-6	4294.93 (6995.81)	.58	3239.04 (3635.24)	.46	2508.89 (2789.29)	.24	< 3250: NI > 3250: PI
Grades 7-8	1919.96 (1778.80)	.43	2148.39 (1521.88)	.42	3651.52 (4609.17)	.33	CI at any threshold
Boys	2529.45 (2501.80)	.35	3107.35 (4136.24)	.41	3208.34 (2887.75)	.24	CI at any threshold
Girls		.63	2861.60 (2417.76)	.48	2776.12 (4320.23)	.32	< 750: NI 750-5900: PI > 5900: CI

Note.

^aExpressed in 2008 Euros (€1 = \$1.40) ^battended 7 or 8 intervention sessions: CI: n = 38, PI: n = 37; ^cCompleted cost-diary and ADIS at all measurements; ^dnot calculated for dominated strategies; ^eprobability ranges specified at threshold values from €0-€7500 cost-effectiveness probabilities diverged not strongly

Discussion

Main Results

The uncorrected costs differed between groups at pretest and pretest costs were predictive of costs at 1- and 2-year follow-up. To correct for overestimation of pretest differences, regression corrections were applied and the base-case and secondary analyses were based on the corrected costs. The total corrected societal costs were somewhat higher in CI than in PI and NI, mainly due to higher direct non-healthcare costs. Nevertheless, groups did not differ significantly on (sub)total societal costs. Regarding the effects, the proportion of 'ADIS improved' children was highest in CI and lowest in NI. CI had a significantly higher proportion of 'ADIS improved' children than NI, whereas PI did not differ significantly on this measure from the other 2 groups.

The base-case cost-effectiveness analysis revealed it would not be cost-effective to offer high-anxious children no intervention. PI was the most cost-effective strategy at lower threshold values (below €3000) than CI, but the choice between both interventions remains uncertain due to little divergence of probabilities of being most cost-effective. Given the fact that the maximum threshold value that society would be willing to pay for an 'ADIS improved' child is unknown, no clear guidelines can be provided about which type of intervention would be most cost-effective. However, assuming an 'ADIS improved' child does not develop clinical levels of anxiety and does not need to receive clinical treatment, investing in an 'ADIS improved' child can be beneficial for society. That is, annual cost of families with clinically anxious children amount up to €2700 per year per family (Bodden, Dirksen, & Bögels, 2008), which can possibly be prevented by offering an intervention to high-anxious children. However, more research is needed to provide more insight into the maximum acceptable investment per 'ADIS improved' child. For this, a longer follow-up period is needed in order to determine the relation between the current - intermediate - measure of effect and the long term - ultimate - effect in terms of preventing a clinical anxiety disorder.

Secondary Analyses

Results of the base-case analysis were robust, meaning secondary analyses revealed that it would not be cost-effective to offer high-anxious children no intervention. However, the choice of CI versus PI depended heavily on the specific secondary analysis. Additionally, in 3 of 6 subgroup analyses (non-anxious parents, grades 5-6, girls), not intervening was found to be the most cost-effective strategy.

The analysis with intervention completers showed comparable results to the base-case analysis. The threshold value above which CI became more cost-effective than PI dropped drastically if trainer costs were reduced, but probabilities of being the most cost-effective strategy diverged only marginally. Additionally, CI appeared to be the most cost-effective strategy at any threshold value when the analyses were carried out from the healthcare instead of the societal perspective, and when analyses were performed on study completers only. Furthermore, subgroups were revealed within the high-anxious sample. Most remarkably, PI appeared to be the most cost-effective strategy if parents were anxious, whereas CI was the most cost-effective strategy at low threshold values in case of non-anxious parents. Accordingly, Cobham and colleagues (1998) revealed the clinical efficacy of a child-focused CBT increased when adding parental anxiety management, but only for children with at least one anxious parent. Possibly, anxious parents are more likely to allocate their money to child-related resources when they have an anxious child, and PI could positively affect parental spending behavior in anxious parents. This notion is supported by data of the current study, only showing a reduction of total costs compared to the base-case for families whose anxious parents participated in PI. Dividing children into grades 5-6 and 7-8, learned that CI is the most cost-effective strategy for children in the final grades of primary school, whereas the incremental costs per 'ADIS improved' child were higher and approximated €9000 for the child- versus PI in children of grades 5-6. Rather, at lower thresholds, it would not be cost-effective to offer high-anxious children from grades 5-6 an intervention, and at higher thresholds it would be most cost-effective to offer these children a PI. Although cognitive behavior therapeutic approaches are suitable for children of grades 5-6, possibly younger children could have difficulties fully grasping the cognitive-behavioral strategies in a child group training format. An alternative explanation is that children of grades 5-6 are more influenced by their parents than children of grades 7-8, making PI more suitable for these children. Finally, comparing the cost-effectiveness for boys and girls revealed CI as the optimal approach for boys, whereas for girls not intervening was the most cost-effective at lower threshold values, PI at higher threshold values and CI and the highest threshold values.

Previous Studies

To our knowledge, this is the first study performing an economic evaluation on cognitive-behavioral interventions aimed at reducing anxiety within a preventive context. Moreover, most non-preventive economic evaluations on anxiety disorders do not include children

(e.g. Heuzenroeder et al., 2004; Roberge, Marchand, Reinhartz, & Savard, 2008), focus only on one type of anxiety disorder (Guest, Russ, & Lenox-Smith, 2005; Katon et al., 2006), or study treatments other than cognitive behavioral therapy (e.g. Jörgensen et al., 2006; Kolbasovsky, Reich, Futterman, & Meyerkopf, 2007). Although performed outside the preventive context, the economic evaluation of Bodden and colleagues (2008) is the most comparable to the current study, as they included children, considered a variety of anxiety disorders and their treatment types had a cognitive behavioral character. They showed individual cognitive behavioral therapy ($n = 59$) to be more cost-effective than family cognitive behavioral therapy ($n = 57$) for a sample of children that were somewhat older than children of the current study ($M_{\text{age}} = 12.3$, $SD_{\text{age}} = 2.6$). In accord with their study, the current study revealed that including other members of the family outside the child would not be the optimal strategy in the older children.

Limitations

This study had some limitations. First, a relatively short time horizon was used, and economic evaluations on child anxiety prevention with longer time horizons would be valuable. Greenberg and colleagues (2001) pointed out that preventive effects generally become stronger with longer time spans. Second, even though the measure 'ADIS improved' child captures both the presence and severity of anxiety disorders, children without an anxiety diagnosis at pretest could not make an improvement (i.e. could not become an 'ADIS improved' child). This measure might thus be less suitable in preventive contexts, where undiagnosed children often constitute a substantial part of the sample. On the other hand, indicated prevention and early intervention programs such as the current study, include mostly children with anxiety disorders (see for prevalence rates of current study: Simon & Bögels, 2009). Third, the inclusion of all child-related costs might have lead to an overestimation of the costs associated with child anxiety. The choice of this broad scope of costs stemmed from the fact that anxiety can impact a child's life on multiple aspects. Especially in preventive contexts, where anxiety difficulties and its impact are less pronounced than in clinical contexts, parents might be less inclined to link child-related costs to child anxiety. Fourth, as participants of the economic evaluation had lower maternal education than non-participants, results should be generalized with caution, as it is difficult to speculate how this variable would affect costs and effects.

Conclusion

From a societal perspective, it would not be cost-effective to offer high-anxious children no anxiety prevention intervention. Furthermore, depending on the chosen threshold and on the specific subgroup of high-anxious children, either the CI or PI was found to be the most cost-effective type of preventive intervention. That is, PI was the most optimal approach at lower thresholds, and when parents were anxious, whereas CI was the most optimal approach at higher thresholds, when analyses were performed from a healthcare perspective, for boys, and when children were in the final 2 grades of primary school. As the current study was the first to economically evaluate anxiety preventive interventions, more economic evaluations are needed to offer more insight into the economic merits of preventive child anxiety interventions. Future evaluations are recommended to use longer time horizons and to include more participants. Additionally, not only the cost-effectiveness of the indicated prevention interventions, but also the cost-effectiveness of the screening procedure to select high-anxious children needs to be addressed.

An Explorative Cost-effectiveness Analysis of School-based Screening for Child Anxiety Using a Decision Analytic Model

Objective: Child anxiety is highly frequent and causes severe dysfunction. Various studies apply screening procedures to identify high-anxious children, but the cost-effectiveness of these screening procedures has never been examined. This study aimed to compare four potential strategies in relation to the prevention of child anxiety: 1) apply a one-time school-based screening and offering a child-focused intervention; 2) apply screening and offering parent-focused intervention; 3) apply screening and differentially offer child-or parent-focused intervention depending on parental anxiety; 4) doing nothing. **Method:** An economic evaluation from a societal perspective, using a comprehensive decision-analytic model. The model was based on real-world 2-year participation rates of the screening and intervention, and real-world cost and effects of high- and median-anxious children (aged 8-12) from regular primary schools. Incremental cost-effectiveness ratios were calculated and several secondary and one-way sensitivity analyses were performed. **Results:** The strategy doing nothing and the strategy screening and differentially offer the child-or parent-focused intervention depending on parental anxiety were both worthwhile, with the latter strategy having relatively low incremental costs compared to doing nothing. **Conclusion:** Careful evidence for the cost-effectiveness of screening and differentially offer a child-or parent-focused intervention was found, and the study's explorative character warrants further research.

INTRODUCTION

Anxiety disorders are highly prevalent, with the lifetime prevalence of anxiety disorders in children and adolescents ranging between 8-27% (Costello, Egger, & Angold, 2005). Anxiety disorders have a negative impact on functioning and quality of life (e.g. Essau, Conradt, & Petermann, 2000; Ginsburg & Schlossberg, 2002; Livingston, Taylor, & Crawford, 1988; Siqueland, Kendall, & Steinberg, 1996). Additionally, society is burdened by anxiety disorders via indirect and direct costs. Indeed, families with clinically anxious children reached societal costs that were 20 times higher than families without clinically anxious children (Bodden, Dirksen, & Bögels, 2008). Anxiety disorders of clinical severity do not naturally wane (see review: Hudson, Kendall, Coles, Robin, & Webb, 2002), and anxiety disorders with early onsets tend to be chronic (P. Cohen et al., 1993; Feehan, McGee, & Williams, 1993; Keller et al., 1992). Also, 60% of anxiety disordered individuals seek help with a mean delay of 8 years. Moreover, help seeking for anxiety disorders has been found to be inversely associated to time since onset and age at onset (Christiana et al., 2000). In children, help seeking is most frequently initiated by their caretakers. However, childhood anxiety disorders often are not recognized by the environment because of their internalized nature (Horowitz, Leaf, & Leventhal, 1998), and this can delay help-seeking for children.

Implementing a screening procedure at primary schools could improve early and rapid recognition of anxiety difficulties, thereby positively affecting help-seeking. Earlier, applying an anxiety screening tool has been argued to be a cost-effective strategy (e.g. Kenardy, Spence, & Macleod, 2006; Nauta et al., 2004), to enhance detecting dysfunctional levels of anxiety within a few minutes and to be administrable by lay-persons (Essau & Barrett, 2001). Moreover, it decreases the child's dependence on the parents, given the fact that a child can report on his/her own anxiety.

Screening is currently mainly used within indicated anxiety prevention or early anxiety intervention studies to identify high-anxious children, although such a program could also be applicable within treatment contexts. Indicated prevention/early intervention studies focus on children with anxiety symptomatology or mild disorders within a certain community (Mzarek & Haggerty, 1994) and aim to prevent clinical levels of anxiety. Several effective preventive interventions exist that prevent unwanted levels (clinical severity) of anxiety (e.g. Dadds, Spence, Holland, Barrett, & Laurens, 1997; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). Simon, Bögels and Voncken (Simon, Bögels, & Voncken, 2011) recently

studied the clinical efficacy of a child-focused early intervention (i.e. including only high-anxious children), a parent-focused early intervention (i.e. including only parents of high-anxious children) or no intervention. Results pointed to more improved children in both intervention types compared to the non-intervention group. Subsequently, an economic evaluation comparing these three early interventions was carried out (Simon, Dirksen, Bögels, & Bodden, submitted), revealing that it would be cost-effective to offer high-anxious children an early intervention. Which intervention in particular depended on the chosen monetary threshold and on specific subgroup. A notable finding, for example, was that the parent-focused intervention appeared to be the most cost-effective strategy in case parents were anxious also. However, in the former analysis, the costs and effects of the screening procedure itself were not considered. Information regarding the cost-effectiveness of screening and early intervention of child anxiety is useful for clinicians and policymakers in deciding whether national implementation of, and investment in a screening procedure for child anxiety is warranted. To our knowledge, no studies have yet been performed on this subject.

Therefore, an economic evaluation was performed to investigate the cost-effectiveness of applying a one-time school-based screening followed by an early intervention for child anxiety versus doing nothing (i.e. current situation in the Netherlands). Because not all necessary data could be collected, a decision analytic model was applied. Models represent the current state of knowledge of a specific subject based on observations and theory (Gold, Siegel, Russell, & Weinstein, 1996), and enable broadening available experimental data and finding substitutes for unavailable experimental data (Luce, 1995). Cost-effectiveness models can guide decision making on healthcare resource allocations and clinical practices (Gold, Siegel, Russell, & Weinstein, 1996). In the model of the current study, data of the earlier economic evaluation (submitted) and the larger anxiety prevention study was used as well as modeling data that were not empirically collected. The model depicts society's decision problem whether a one-time school-based child anxiety screening procedure should be applied in primary school settings to detect dysfunctional levels of child anxiety (high-anxious children) early and to enable early intervention, or to do nothing and thus rely on clinical referral in case of exacerbation of the anxiety complaints to a clinical level. The economic evaluation was carried out from a societal perspective with a time horizon of 24 months, taking account of 'real-world' participation rates both for the school-based screening procedure and the early intervention. Cost-effectiveness was expressed as the incremental costs per "ADIS improved" child.

METHOD

Decision Analytic Model

In this study, four strategies were compared. The first potential strategy reflected “applying the screening procedure and offering the child-focused intervention”. The second potential strategy reflected “applying the screening procedure and offering the parent-focused intervention”. The third potential strategy was based on the earlier finding (Simon, Dirksen, Bögels, & Bodden, submitted) that the parent-focused intervention was the most cost-effective in case parents were anxious, and reflected “applying the screening procedure and differentially offering the parent- or child-focused intervention depending on parental anxiety”. The fourth potential strategy reflected the current situation in The Netherlands “not applying the screening procedure (i.e. do nothing)”.

The decision analytic model, shown in Figure 1, took the form of a decision tree (the simplest form of a decision analytic model). It started off at the left node and entailed 4 main branches (the 4 strategies for comparison). The routing within the model was as follows. In case of applying the screening procedure (main branch 1 and 2), participants either take part in the screening procedure or not. Participants of the screening score either as high-anxious or not. High-anxious children or their parents subsequently participate in an intervention or not. After following an intervention or not, children will either be “ADIS improved” or “not ADIS improved”, a clinical diagnostic outcome measure (see below), which served as the measure of effectiveness in the model.

Figure 1. Decision Analytic Model

Note.

CI: Child-focused intervention; PI: Parent-focused intervention; AI: "Adis improved"

Data Input

The data that were used for the decision analytic model were partly based on the earlier performed economic evaluation of the early interventions (Simon, Dirksen, Bögels, & Bodden, submitted), that was embedded within a larger anxiety prevention study. The economic evaluation of the interventions was based on data of high-anxious children, whereas the current model also included data of children scoring 2 points below/above the median (i.e. median-anxious children). These data were distilled from the larger anxiety prevention study and were only used if the participants completed all measures relevant to the economic evaluation (pretest cost-diary and diagnostic interview, see below and Figure 2).

The empirical study population was recruited via a one-time screening procedure organized at primary schools in the Netherlands (the final grades in the Netherlands, grades 5-8, ages 8-12), by the use of the child version of the 71-item Screen for Child Anxiety Related Emotional Disorders (SCARED-71, Bodden, Bögels, & Muris, 2009) during regular classes. Children scoring in the top-15% were selected as “high-anxious” children and those scoring 2 point below/above the median were selected as “median-anxious”. High-anxious participants subsequently enrolled in an RCT comparing a child-focused intervention, a parent-focused intervention and no intervention, whereas median-anxious participants were not randomized and received no intervention. Both high- and median-anxious participants took part in a pretest, and a 1- and 2-year follow-up, providing both cost and diagnostic data. Demographic features of the participants are depicted in Table 1.

In case no empirical data was available, data input was based on a number of assumptions. First, it was assumed that the empirically collected data of high-anxious children that were randomized to the “non- intervention” group were representative of all high-anxious children that would not participate in an intervention. Second, median-anxious children were assumed to represent all children that were not high-anxious, including low-anxious children. Third, the proportion of high- versus not high-anxious children that actually participated in the screening procedure was assumed to represent the proportion of high- versus not high-anxious children that did not take part in the screening. Fourth, it was assumed that the costs and effects of children that participated in the screening procedure would be representative for children that did not participate in the screening procedure. Under this assumption, the data of the high-anxious non- intervention children and median-anxious children were used for high-anxious children and not high-anxious children that did not participate in the screening. Finally, the screening tool was assumed to be a perfect tool and did not include any false positives in, or exclude false negatives from the top-15% (high-anxious). Table 2 depicts the parameters of the decision model’s branches.

Figure 1.
Numbers of Participants in Consecutive Stages of the Study

Table 1

Baseline Demographic Features of Participant of the (High-anxious)
Child-focused Intervention,
Parent-focused Intervention, and No Intervention Group, the Total
High-anxious Group and the Median-anxious Group at Pretest

	High-anxious			Total high-anxious	Median-anxious
	CI ^a	PI ^b	NI ^c		
	<i>n</i> = 47	<i>n</i> = 49	<i>n</i> = 43	<i>n</i> = 139	<i>n</i> = 63
Boys (<i>n</i> , %)	20 (43 %)	22 (45 %)	21 (49 %)	63 (45 %)	35 (56 %)
Age child (<i>M</i> , <i>SD</i>)	9.94 (1.28)	9.59 (1.17)	9.96 (1.11)	9.82 (1.19)	10.31 (1.15)**
Children in family (<i>M</i> , <i>SD</i>)	2.39 (1.04)	2.16 (.77)	2.19 (.85)	2.25 (.89)	2.20 (.81)
Parents divorced/living apart (<i>n</i> , %)	10 (21 %)	14 (29 %)	6 (14 %)	30 (22 %)	5 (8 %)*
Ethnicity Dutch					
Father (<i>n</i> , %) 46 (98 %)		49 (100 %)	43 (100 %)	138 (99 %)	61 (100 %)
Mother (<i>n</i> , %) 45 (96 %)		47 (96 %)	43 (100 %)	135 (97 %)	60 (98 %)
Parental age					
Father (<i>M</i> , <i>SD</i>) 41.96 (3.75)		43.08 (4.89)	40.91 (4.35)#	42.03 (4.42)	42.24
39.66 (6.95)		40.67 (4.40)	39.12 (3.33)	39.85 (5.16)	(4.29)
Mother (<i>M</i> , <i>SD</i>)					40.11
					(3.83)
Parental educational level ^d					
Father (<i>M</i> , <i>SD</i>) 5.51 (1.98)		5.24	4.56 (2.13)#	5.12	5.21
5.15 (1.98)		(2.05)	4.74	(2.07)	(2.14)
Mother (<i>M</i> , <i>SD</i>)		5.41	(1.97)	5.12	5.16
		(1.93)		(2.00)	(2.02)
Currently no paid job					
Father (<i>n</i> , %) 4 (9 %)		4 (8 %)	3 (7 %)	11 (8 %)	3 (5 %)
Mother (<i>n</i> , %) 16 (34 %)		10 (20 %)	17 (40 %)	43 (31 %)	22(35 %)

Note.

^aCI: Child-focused intervention; ^bPI: Parent-focused intervention; ^cNI: Non- intervention; ^dOn a scale from 0 (no education) to 8 (university).

#.05 < *p* < .10, * *p* < .05, ** *p* < .01

Table 2
Parameters of the Decision Analytic Model and Explorative Sensitivity Ranges

	Base-case	Sensitivity range	Source
Probabilities (%)		-+0,25	
Participate screening	.52	.39-.65	EEI ^a
Screened as high-anxious	.17	.13-.21	EEI ^b
Participate intervention (CI/PI ^d)	.29/.24	.22-36/ .18-.30	EEI
Anxious parent	.39	.29-.49	EEI
AI ^e after CI	.51	.38-.64	EEI
AI after PI	.45	.34-.56	EEI
AI after CI when parent is non-anxious	.50	.37-.63	EEI
AI after PI when parent is anxious	.55	.41-.69	EEI
AI after no intervention, high-anxious	.28	.21-.35	EEI ^b
AI after no intervention, median-anxious	.16	.12-.20	EEI ^b
Mean costs (€)		-+0,25	
Screened as high-anxious, participate CI, AI	3575.23	2681.42-4469.04	EEI
Screened as high-anxious, participate CI, not AI	2893.62	2169.59-3616.41	EEI
Screened as high-anxious, participate PI, AI	2316.54	1737.14-2895.68	EEI
Screened as high-anxious, participate PI, not AI	3520.31	2640.23-4400.39	EEI
Screened as high-anxious, anxious parent, participate PI, AI	2647.08	1985.31-3308.85	EEI
Screened as high-anxious, anxious parent, participate PI, not AI	2765.81	2074.36-3457.26	EEI
Screened as high-anxious, non-anxious parent, participate CI, AI	2665.20	1998.90-3331.5	EEI
Screened as high-anxious, non-anxious parent, participate CI, not AI	2761.34	2071-3451.68	EEI
Screened as high-anxious, not participate intervention (CI/PI), AI/ Do nothing, high-anxious, AI	3470.34/ 3462.44	2602.75-4337.93/ 2596.83-4328.05	EEI ^f / Ass ^g
Screened as high-anxious, not participate intervention (CI/PI), not AI/ Do nothing, high-anxious, not AI	2811.14/ 2803.24	2108.35-3513.93/ 2102.43-3504.05	EEI ^f / Ass ^g
Screened as not high-anxious, AI/ Do nothing, not high-anxious, AI	800.43/ 792.53	600.32-1000.54/ 594.40-990.66	EEI ^f / Ass ^g
Screened as not high-anxious, not AI/ Do nothing, not high-anxious, not AI	874.74/ 866.84	656.05-1093.43/ 650.13-1083.55	EEI ^f / Ass ^g

Note.

^aEEI: Economic evaluation of interventions; ^bAssumption for branch “do nothing” and for non-participants of the screening; ^cCI: Child-focused intervention; ^dPI: Parent-focused intervention; ^eAI: Adis improved; ^fassumption for non-participants of screening; ^gAss: Assumption (costs of screening subtracted)

Cost Calculation

For all four strategies, the cost analysis was performed from the societal perspective and included direct healthcare costs (e.g. psychologist, physician), direct non-healthcare costs (e.g. professional help at home), indirect costs (e.g. school absence), and out-of-pocket costs (e.g. over-the-counter medication). The cost-analysis entailed resource use related to anxiety, psychological problems, physical problems and other reasons of the child. Resource usage was assessed via the use of prospective 2 week cost-diaries (Freer, 1980; Goossens, Rutten-Van Mölken, Vlaeyen, & Van der Linden, 2000) at pretest, and 1 and 2 years after pretest. Parents completed these cost-diaries and recorded which member of the family used which resource, as well as the reason of usage. The calculation of costs was based on the multiplication of resource usage with cost price per resource unit. Standard Dutch guidelines (Oostenbrink, Koopmanschap, & Rutten, 2004) were used to determine most cost prices and for the calculation of other cost prices (interventions, medication, reduced parental productivity, informal care, unpaid activities, school absence), see Simon and colleagues (submitted). Costs were presented in 2008 Euros, and were indexed to the year 2008 via price indexes of the Dutch Central Bureau of Statistics, if necessary. The cost data between pretest, 1-year follow-up (12 months after pretest), and 2-year follow-up (24 months after pretest) were interpolated using the cost diaries of pretest, and 1- and 2-year follow-up. Costs made between follow-up 1 and follow-up 2 were discounted at 4%. In the earlier economic evaluation (Simon, Dirksen, Bögels, & Bodden, submitted), the costs of the child- and parent-focused interventions had been calculated at €483.78 and €388.67 per child. The total societal costs over 24 months (including intervention costs) for the child-focused intervention, parent-focused intervention and non- intervention group had been calculated at € 3233.78, € 2971.94 and € 2987.20 respectively. For the purpose of this study, costs of the median anxious non- intervention group over 24 months were calculated at €855.05. No standard cost price of a school-based child-anxiety screening procedure was available. The cost price of the screening entailed material expenses, traveling expenses of the psychological assistants, and time related expenses of the psychological assistants, parents, teachers and children, and was calculated at €7.90 per child approached for screening. For those strategies that included the screening procedure (strategy 1, 2, and 3), the costs of screening were added to the total societal costs reported above.

Outcome Measure

This study used the child and parent version of the Dutch version of The Anxiety Disorder Interview Schedule (ADIS, Siebelink & Treffers, 2001; Silverman & Albano, 1996) to assess the presence of anxiety diagnoses and the severity of anxiety diagnoses in the children. The ADIS is a well-validated and reliable (Silverman, Saavedra, & Pina, 2001), semi-structured diagnostic interview suitable for measuring all DSM-IV anxiety disorders, in 7-17 year olds. Conform standard ADIS procedure, a child received a diagnosis if the child or parent reports substantial interference at school, at home or in social contacts, and the clinician rated each diagnosis with a severity score. The diagnoses resulting from the child and parent interview were added, also conform standard ADIS procedures. To examine improvements over time, the severity scores were added at pretest and 2-year follow-up and change scores were calculated. In line with Simon, Bögels and Voncken (Simon, Bögels, & Voncken, 2011) and Simon, Dirksen, Bögels and Bodden (submitted), this study used the diagnostic outcome measure "ADIS improved" child for child anxiety, referring to children that made improvements (change score of sum of severities) over 24 months that were considered as relevant in a preventive context (Cohen's $d > .50$).

Parental Anxiety

Parental anxiety was measured with the adult version of the questionnaire Screen for Child Anxiety Related Emotional Disorders (SCARED-A, Bögels & Van Melick, 2004). In correspondence to the earlier efficacy study (Simon, Bögels, & Voncken, 2011), a dichotomous measure of parental anxiety was used (top -25% anxious parent(s), non-top-25% non-anxious parent(s)).

Model Analysis

The base-case values of the probabilities and costs were incorporated into the decision tree by using the software program DATA version 3.5 (TreeAge software, Williamstown, MA). Expected costs and expected effects were calculated for each strategy, followed by an incremental analysis for the four strategies. For the incremental cost-effectiveness analysis, the strategies were ordered according to increasing effectiveness and (extended) dominated strategies were eliminated. A strategy was considered to be dominated by another strategy if the latter yielded more or equal effects at lower costs. A strategy was considered extended dominated if another strategy yielded more effects and had a lower cost-effectiveness ratio. Incremental Cost Effectiveness Ratios (ICERs) of the remaining strategies were then calculated as the difference in costs divided by the difference in effects for one particular strategy compared

to the next best strategy. The ICERs were expressed as the incremental costs per extra “ADIS improved” child. Several secondary analyses were performed to obtain insight into the robustness of the results. First, a scenario analysis was performed, where the screening procedure would be organized during the annual visit of the school physician (costs screening procedure per child approached for screening: €9.05). Second, a scenario analysis was performed with optimal participation rates for both the screening and the intervention. Third, the analysis was carried out from the (mental) healthcare perspective instead of the societal perspective, thus including only direct healthcare costs. Furthermore, explorative one-way sensitivity analyses were carried out, in – and decreasing the probabilities and costs with 25%.

RESULTS

Results of the Model

Table 3 shows the expected costs and expected effectiveness for each possible strategy, as well as the ICERs. Regarding the base-case analysis, the expected effects were .19 for strategies 1 and 3 (i.e. “applying the screening and offering the child-focused intervention”, and “applying the screening and differentially offering the child- or parent-focused intervention depending on parental anxiety”, respectively) and .18 for strategies 2 and 4 (i.e. “applying the screening and offering the parent-focused intervention”, and “do nothing”, respectively). The expected costs were lowest for strategy 4 (€ 1217.54) and highest for strategy 1 (€ 1231.73). Therefore, strategies 1 and 2 were dominated by strategies 3 and 4 respectively, and the incremental costs of strategy 4 versus 3 were €100 per “ADIS improved” child. This means that strategies 1 and 2 are not worthwhile and that implementation of strategy 3 compared to “do nothing”, i.e. the current situation in the Netherlands requires an investment of €100 for each additional “ADIS improved” child.

Secondary and Sensitivity Analyses

Table 3 also summarizes the results of the secondary and the explorative one-way sensitivity analyses. Results were fairly robust for performing secondary or sensitivity analyses, with most analyses showing low ICERs of strategy 3 versus 4 or showing either strategy 3 or strategy 4 to dominate the other strategies. Remarkably, if participation rates of the screening and/or intervention were increased, strategy 3 (differentially applying either parent- or child-focused intervention based on parental anxiety) always dominated the other strategies, whereas strategy 4 (do nothing) was dominant if these

participation rates were reduced. Additionally, when the probability of being screened as high-anxious was reduced with 25%, strategy 4 (do nothing) was dominant, and strategy 3 dominated the other strategies in case the probability was increased with 25%. Screening via the school physician slightly increased the ICER of strategy 3 versus 4. When analyses were performed from the healthcare perspective instead of the societal perspective, strategy 1 (screening + child intervention) appeared to be dominant, a result consistent with our earlier economic evaluation. Varying with the proportion of anxious parents barely changed the outcomes. The ICER of strategy 3 versus 4 increased when the costs of children screened as high-anxious that did not participate in an intervention and were not “ADIS improved” were reduced with 25%. All other sensitivity analyses on the costs showed low ICERs of strategy 3 versus 4 or showed either strategy 3 or strategy 4 to dominate all other strategies.

Table 3

Expected costs, expected effects, and Incremental Cost-effectiveness Acceptability Ratio's (ICERs) from Decision Analytic Model of Apply Screening Procedure and offer the Child-focused Intervention (Strategy 1) versus Apply Screening and Offer the Parent-focused Intervention (Strategy 2), versus Apply Screening and Offer CI or PI Depending on Parental Anxiety (Strategy 3) versus Doing Nothing (Strategy 4): Base-case, Secondary and Explorative One-way Analyses

	Strategy 1		Strategy 2		Strategy 3		Strategy 4		ICER ^a	
	Exp. costs	Exp. effects	Exp. costs	Exp. effects	Exp. costs	Exp. effects	Exp. costs	Exp. Effects		
Base-case	1231.73	.19	1225.07	.18	1218.54	.19	1217.54	.18	€100 (Strategy 3 versus 4)	
Secondary analyses										
Optimal participation	1267.18	.22	1222.53	.21	1176.31	.22	1217.54	.18	Strategy 3 dominant	
Screening via school physician	1232.88	.19	1226.22	.18	1219.69	.19	1217.54	.18	€215 (Strategy 3 versus 4)	
(Mental) healthcare perspective	977.36	.19	991.96	.18	979.61	.19	985.44	.18	Strategy 1 dominant	
Explorative one-way sensitivity analyses of probabilities (-/+25 %)										
Participate screening	-25%	1230.16	.18	1225.17	.18	1220.27	.18	1217.54	.18	Strategy 4 dominant
	+25%	1233.31	.19	1224.98	.18	1216.82	.19	1217.54	.18	Strategy 3 dominant
Scr. ^b as HA ^c	-25 %	1144.94	.18	1139.85	.18	1134.85	.18	1132.22	.18	Strategy 4 dominant
	+25%	1318.53	.19	1310.30	.19	1302.24	.19	1302.85	.19	Strategy 3 dominant
Participate intervention	-25%	1230.21	.18	1225.17	.18	1220.23	.18	1217.54	.18	Strategy 4 dominant
	+25%	1233.25	.19	1224.98	.18	1216.86	.19	1217.54	.18	Strategy 3 dominant
Anxious parent	-25 %	1231.73	.19	1225.07	.18	1218.46	.19	1217.54	.18	€92 (Strategy 3 versus 4)
	+25%	1231.73	.19	1225.07	.18	1218.63	.19	1217.54	.18	€109 (Strategy 3 versus 4)
AI ^d after CI ^e	-25 %	1229.46	.18	1225.07	.18	1218.54	.19	1217.54	.18	€100 (Strategy 3 versus 4)
	+25%	1234.00	.19	1225.00	.18	1218.54	.19	1217.54	.18	€100 (Strategy 3 versus 4)
AI after PI ^f	-25 %	1231.73	.19	1227.88	.18	1218.54	.19	1217.54	.18	€100 (Strategy 3 versus 4)
	+25%	1231.73	.19	1222.27	.19	1218.51	.19	1217.54	.18	€100 (Strategy 3 versus 4)
AI after CI when parent is non-anxious	-25 %	1231.73	.19	1225.07	.18	1218.74	.18	1217.54	.18	€1419 (Strategy 1 versus 4)
	+25%	1231.73	.19	1225.07	.18	1218.35	.19	1217.54	.18	€81 (Strategy 3 versus 4)

AI after PI when parent is anxious	-25 % +25%	1231.73 1231.73	.19 .19	1225.07 1225.07	.18 .18	1218.67 1218.42	.18 .19	1217.54 1217.54	.18 .18	€1419 (Strategy 1 versus 4) €681 (Strategy 3 versus 4)
AI after no intervention, high-anxious	-25 % +25%	1225.07 1238.39	.18 .20	1218.21 1231.94	.17 .19	1211.80 1225.29	.18 .20	1209.69 1225.38	.17 .19	€211 (Strategy 3 versus 4) Strategy 3 dominant
AI after no intervention, median-anxious	-25 % +25%	1234.20 1229.26	.15 .22	1227.54 1222.61	.15 .22	1221.01 1216.08	.15 .22	1220.00 1215.07	.15 .21	Strategy 4 dominant €101 (Strategy 3 versus 4)
Explorative one-way sensitivity analyses of cost (-/+25 %)										
Scr. as HA, participate CI, AI	-25 % +25%	1220.05 1243.42	.19 .19	1225.07 1225.07	.18 .18	1218.54 1218.54	.19 .19	1217.54 1217.54	.18 .18	€100 (Strategy 3 versus 4) €100 (Strategy 3 versus 4)
Scr. as HA, participate CI, not AI	-25 % +25%	1222.64 1240.81	.19 .19	1225.07 1225.07	.18 .18	1218.54 1218.54	.19 .19	1217.54 1217.54	.18 .18	€100 (Strategy 3 versus 4) €100 (Strategy 3 versus 4)
Scr. as HA, participate PI, AI	-25 % +25%	1231.73 1231.73	.19 .19	1219.54 1230.60	.18 .18	1218.54 1218.54	.19 .19	1217.54 1217.54	.18 .18	€100 (Strategy 3 versus 4) €100 (Strategy 3 versus 4)
Scr. as HA, participate AI, not AI	-25 % +25%	1231.73 1231.73	.19 .19	1214.81 1235.34	.18 .18	1218.54 1218.54	.19 .19	1217.54 1217.54	.18 .18	€373 (Strategy 3 versus 4) €100 (Strategy 3 versus 4)
Scr. as HA, anxious parent, participate PI, AI	-25 % +25%	1231.73 1231.73	.19 .19	1225.07 1225.07	.18 .18	1215.53 1221.56	.19 .19	1217.54 1217.54	.18 .18	Strategy 3 dominant €402 (Strategy 3 versus 4)
Scr. as HA, anx. parent, participate PI, not AI	-25 % +25%	1231.73 1231.73	.19 .19	1225.07 1225.07	.18 .18	1216.00 1221.15	.19 .19	1217.54 1217.54	.18 .18	Strategy 3 dominant €361 (Strategy 3 versus 4)
Scr. as HA, non-anx. parent, participate CI, AI	-25 % +25%	1231.73 1231.73	.19 .19	1225.07 1225.07	.18 .18	1213.37 1223.79	.19 .19	1217.54 1217.54	.18 .18	Strategy 3 dominant €625 (Strategy 3 versus 4)
Scr. as HA, non-anx. parent, participate CI, not AI	-25% +25%	1231.73 1231.73	.19 .19	1225.07 1225.07	.18 .18	1213.18 1223.98	.19 .19	1217.54 1217.54	.18 .18	Strategy 3 dominant €644 (Strategy 3 versus 4)
Scr. as HA, not participate intervention, AI/Do nothing, HA, AI	-25% +25%	1196.66 1266.80	.19 .19	1188.93 1261.22	.18 .18	1183.06 1254.03	.19 .19	1176.33 1258.74	.18 .18	€673 (Strategy 3 versus 4) Strategy 3 dominant
Scr. as HA, not participate intervention, not AI/Do nothing, HA, not AI	-25% +25%	1158.68 1304.78	.19 .19	1149.79 1300.36	.18 .18	1146.62 1292.47	.18 .18	1131.62 1292.47	.18 .18	€1484 (Strategy 3 versus 4) Strategy 3 dominant

Scr. as not HA, AI/Do nothing, not HA, AI	-25%	1205.16	.19	1198.50	.18	1191.97	.19	1191.23	.18	€74 (Strategy 3 versus 4)
	+25%	1258.31	.19	1251.65	.18	1245.12	.19	1243.85	.18	€127 (Strategy versus 4)
Scr. as not HA, not AI/Do nothing, not HA, not AI -25%		1079.26	.19	1072.60	.18	1066.07	.19	1066.45	.18	Strategy 3 dominant
	+25%	1384.20	.19	1377.55	.18	1371.02	.19	1368.63	.18	€492 (Strategy 3 versus 4)

Note.

^aOnly relevant ICERs were calculated; ^bScr : Screened; ^cHA: High-anxious; ^dAI: ADIS improved ^eCI: Child-focused intervention; ^fPI: Parent-focused intervention

DISCUSSION

Main Results

To our knowledge, this is the first study to economically evaluate screening and early intervention of child anxiety. A decision tree was used to explore the cost-effectiveness of a one-time screening, taking into consideration “real world” participation rates of both screening and intervening. The model entailed four possible strategies: apply the screening and offer the child-focused intervention, apply the screening and offer the parent-focused intervention, apply the screening and differentially offer the child- or parent-focused intervention depending on parental anxiety, and, finally, do nothing. The model showed that doing nothing would be the most cost-effective strategy for society at low monetary thresholds (i.e. below €100), but the strategy “apply screening and differentially offer the child- or parent-focused intervention depending on parental anxiety” to have a higher expected effectiveness at relatively low incremental costs. That is, the incremental costs of the latter strategy compared to doing nothing were found to be €100 per “ADIS improved” child. These incremental costs seem minimal, and suggest that implementing the strategy of offering either type of intervention depending on parental anxiety over the other strategies is worthwhile. Nevertheless, the difference between the costs and effects of the different strategies is only small, and the strategy “do nothing” should not be discarded merely based on these results. Moreover, no guidelines exist yet as to the maximum monetary value society is willing to pay for one “ADIS improved” child. However, screening for children with anxiety difficulties and offering them an intervention is beneficial for society if it would prevent “ADIS improved” children from developing clinical levels of anxiety and needing clinical treatment. That is, referred families with clinically anxious children reach annual costs of €2700 per family (Bodden, Dirksen, & Bögels, 2008). Moreover, treating a clinically anxious child costs approximately €1200 per child (Bodden, Dirksen et al., 2008), whereas early intervention costs were only €483.78 and €388.67 per child (child- and parent-focused respectively) in this study. However, this study is based on an intermediate outcome measure (i.e. being “ADIS improved” after 2 years), and the development of “ADIS improved” children over longer time spans (final outcome) is currently unknown.

Secondary Analyses

Results were fairly robust for performing secondary analyses, with most analyses showing either the strategy “apply the screening and offer the child-or parent-focused intervention depending on parental anxiety” or the strategy “do nothing” to be the optimal approach in terms of costs and effects. Most of the times, low incremental costs of the strategy “apply the screening and offer the child-or parent-focused intervention depending on parental anxiety” versus the strategy “do nothing” were revealed. In addition, increasing probabilities of participation in the screening procedure and intervention, lead to a more favorable cost-effectiveness of offering either type of intervention based on parental anxiety, whereas decreasing these probabilities lead to a more favorable cost-effectiveness of doing nothing. This is an interesting outcome, given the fact that society could stimulate participation rates, for example by standardizing the screening procedure in school practice. Furthermore, the scenario analysis in which the screening procedure was organized during the annual visit of the school physician did result in somewhat higher incremental costs of the optimal strategy compared to the base-case analysis, but can be considered an attractive and easy to implement method of performing the screening. Moreover, it provides the opportunity of direct referral between the school physician and other (mental) healthcare professionals.

Methodological Considerations

Inherent to modeling, several assumptions were made because not all data were empirically collected. First and second, high-anxious children randomized to the non- intervention group were assumed to represent children of whom families would refuse an intervention after having been selected as high-anxious, and all non-anxious children were assumed to be represented by the group of recruited median-anxious children. However, it could be argued that these groups differ on important variables, such as the total costs made up until 2 years. Future studies could, therefore, strengthen the model by including data of intervention refusing families and by selecting non-anxious children at a broader varying of anxiety scores (e.g. low-anxious children). Third, it was assumed that the proportion of high- versus not high-anxious children that actually took part in the screening procedure represented the proportion of high- versus not high-anxious children that did not participate in the screening. Children that did not complete the screening were not assessed on other variables, and, therefore, screening completers and non-completers could not be compared to each other to examine the validity of this assumption. Fourth, costs and effects of children that completed the screening procedure would be represen-

tative for children that did not complete the screening procedure. Screening, however, could be argued to be a form of psycho-education, leading to optimal estimations of the outcomes of non-participants of the screening. Fifth, the screening tool was assumed to yield no false negatives or false positives. In order to assess the extent to which the sensitivity and specificity of the screening tool affected the outcomes, the probability of being high-anxious was varied with. "Do nothing" was found to be dominant in case the probability of being high-anxious was decreased, whereas differentially offering the child- or parent-focused intervention depending on parental anxiety dominated the other strategies if this probability was increased.

The following limitations can be addressed by future studies. First, in this study a cohort model with deterministic data input was used. The model did thus not take uncertainty into account by specifying the estimates of input parameters as full probability distributions. Instead, point estimates were used and several separate deterministic one-way sensitivity analyses were performed. This carries the risk of not capturing interactions between parameters, and provides no comprehensive guidelines as to which variables and alternative values should be included, nor to what degree of variation one can conclude the analysis to be robust (Claxton et al., 2005; Drummond, O'Brien, Stoddart, & Torrance, 1997). Second, even though this study's model already included four potential strategies, the model is not exhaustive as other plausible strategies for screening and intervening at primary schools are possible. For example, all four strategies were based on one-time screening, although it could be fruitful to screen children annually. Third, a relatively short time horizon was used, whereas it would valuable to perform economic evaluations with longer time horizons. In the study of Gillies and colleagues (2008), for example, the cost-effectiveness of screening and preventing diabetes was examined at a 50 year time horizon. It could be speculated that the current study's preventive effects will become stronger over time, as was reported in the review of Greenberg, Domitrovich and Bumbarger (2001) on prevention studies.

Nevertheless, it remains of importance to know whether "ADIS improved" children indeed further improve, or stabilize, or become clinically anxious after all. Finally, even though most studies based on cognitive behavioral therapy prefer to work with children aged 8 and higher because of their cognitive capacities, a growing number of cognitive behavioral treatment studies with young anxious children are performed (e.g. Birmaher et al., 1999). Therefore, it would also be useful to examine the cost-effectiveness of anxiety screening in younger children (taking into consideration the possibility of different prevalence rates and cut-offs for being high-anxious in younger age group).

The study's assumptions and limitations result in uncertainty of the outcomes. The outcomes of this model should, therefore, be considered as explorative, and only provide first inputs to decision-makers regarding the potential cost-effectiveness of screening and early intervention of child anxiety.

Conclusions

Although screening procedures are commonly applied in selective and indicated anxiety prevention studies and could be implemented in society to detect dysfunctional anxiety in children for several purposes, the cost-effectiveness of these screening procedures has never been assessed before. The current study examined the cost-effectiveness of an anxiety screening procedure organized at primary schools, as part of a larger anxiety prevention study that entailed two types of interventions: a child-focused intervention and a parent-focused intervention. A decision analytic model was used because not all data were empirically collected. Screening followed by differentially offering the child-or parent focused intervention depending on parental anxiety (i.e. children of anxious parents were offered the parent-focused intervention, and other children the child-focused intervention) had the highest expected incremental effects at low incremental costs compared to doing nothing (i.e. no screening and no intervention). When the probabilities of participation were increased, the cost-effectiveness of this strategy became more favorable. Nevertheless, the difference between the effects and costs of the comparative strategies was only small, and the study's explorative character offers only careful evidence of the potential cost-effectiveness of a school-based screening procedure followed by early intervention for child anxiety.

7

Summary and Discussion

This section combines summaries of the various studies' aims and results, as well as a discussion of the studies' results and characteristics.

This thesis describes a series of studies aimed at examining the efficacy, the cost-effectiveness and other aspects related to the prevention of childhood anxiety. Children (aged 8-12) and their parents were recruited via primary schools by the use of a screening questionnaire. Based on the screening questionnaire's scores, high- and median-anxious children and their parents were selected (i.e. indicated prevention) and followed for 2 years in their anxiety development and related aspects. High-anxious children or their parents either took part in a child-focused intervention (including only children), a parent-focused intervention (including only parents) or neither parents nor children received intervention (non-intervention, i.e. examining only their natural course). Median-anxious children and their parents were not offered any intervention, but their natural course over 2 years was examined.

The thesis encompasses five articles, one focused on pre- and perinatal risk factors of anxiety, two on the efficacy and cost-effectiveness of the child-and parent-focused interventions, and two focused on the usefulness of the screening procedure applied to select high-anxious ('at risk') children from the community setting as well as the cost-effectiveness of the screening procedure followed by a child- or parent-focused intervention or no intervention. The general discussion is structured accordingly, first summarizing and discussing the effect of pre-and perinatal complications on anxiety (7.1), second summarizing and discussing the efficacy and cost-effectiveness of the preventive interventions (7.2), third summarizing and discussing the efficacy and cost-effectiveness of applying the screening procedure and offering an intervention (7.3). Finally, some study limitations, design considerations, and ideas for future research are presented (7.4).

Pre- and Perinatal Risk Factors in Relation to Child Anxiety

Various factors have been proposed as risk factors for anxiety disorders (e.g. parental anxiety, behavioral inhibition) and anxiety disorders have been forwarded to stem from a complex interplay of several nature-nurture interactions (Vasey & Dadds, 2001). Most risk factor studies that have been performed focus on postnatal environmental risk factors (e.g. dysfunctional parenting style, insecure attachment). Surprisingly little attention has been paid to the earliest environmental risk factors for child anxiety (disorders); those occurring during pregnancy and birth (pre- and perinatal risk factors).

Chapter 2 aimed to investigate the effect of the most objective pre-natal risk factors (e.g. mother smoking during pregnancy) and perinatal risk factors (e.g. lack of oxygen during birth) for child anxiety. Additionally, children completed a visuospatial copying task to measure whether pre- and perinatal risk factors exerted their effect via child's non-specific cerebral dysfunctioning. It appeared that high-anxious children experienced more pre- but not perinatal risk factors than median-anxious children, and that high-anxious children deviated more on the visuospatial copying task. Prenatal risk factors, deviation on visuospatial copying and their interaction were found to predict child anxiety, together explaining almost 14% of the variance of child anxiety symptoms. Given the fact that these types of risk factors have rarely been studied and the fact that anxiety results from a multitude of risk factors, the percentage of explained variance is impressive. It can be concluded that it is worthwhile to further study the earliest risk factors, and their effect on non-specific brain functioning in high-anxious children. Moreover, this information may be a useful indicator of the risk for developing anxiety disorders when clinicians are confronted with a child exposed to prenatal risk factors, particularly if the child is already high-anxious. Focusing on these factors by physicians or clinicians could speed up the process of selecting high-anxious children and offering them preventive interventions or treatment. Furthermore, it could be worthwhile to pay more attention to the prevention of risk factors occurring during pregnancy, even more so because these events have also been related to other forms of psychopathology. The finding that high-anxious children deviated more on the visuospatial copying task than median-anxious children could indicate that these children have an executive/planning problem (Gurvits et al., 2002). It would be interesting for future scientist to examine in detail to what extent anxious children exhibit executive/planning problems, whether and how these difficulties affect intervention/treatment sensitivity, and whether helping children with executive/planning problems leads to decreases in their anxiety.

Prevention of Child Anxiety: Offering an Intervention

The efficacy of treating clinically anxious children with cognitive behavioral therapy is high, with a mean pre-post treatment effect size of .86 and a mean pre-follow-up effect size of 1.36 (In-Albon & Schneider, 2007). Moreover, results of three long-term follow-up studies (Barrett, Duffy, Dadds, & Rapee, 2001; Kendall, Safford, Flannery-Schroeder, & Webb, 2004; Siqueland, Kendall, & Steinberg, 1996) indicate the treatment outcomes to be fairly stable and long-lasting. However, the majority of individuals with anxiety disorders initiate help-seeking with a mean delay of 8 years. Moreover, help-seeking has been found to be inversely related to time since onset and age at onset (Christiana et al., 2000). These findings, together with the negative consequences of anxiety disorders on an individual and societal level, underscore the need for prevention of anxiety disorders.

Various earlier anxiety prevention studies aim their interventions at parents or include a parental component (e.g. Barrett & Turner, 2001; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). Focusing an intervention at parents (i.e. parents are trained as lay-therapists to coach their anxious children through cognitive-behavioral strategies, parental anxiety and anxiety-enhancing parenting styles are reduced) could reduce the chance that parental anxiety is transmitted to the child, decreases dependency on the child's cognitive capacities, and could increase chances of generalizing the learned techniques outside the therapeutic setting. However, in an anxiety prevention context, it has never been systematically examined whether it would be better to focus the intervention on the parents or on the child.

An indicated prevention/early intervention study was organized, randomizing high-anxious children to a child-focused, a parent-focused, or to a non-intervention group. Both types of intervention were based on the principles of cognitive behavioral treatment, and both types were group formats. In the child-focused intervention, only high-anxious children participated, whereas only the parents of high-anxious children participated in the parent-focused intervention. This set-up enabled studying the unique aspects of intervening via children or parents. Child anxiety was measured before the intervention (pretest), and one and two years after the pretest (1- and 2-year follow-up), and was based on anxiety symptoms and on anxiety disorder information ('ADIS improved'). Being ADIS improved entailed having at least a mean effect size (.05) of improvement from pretest to 2-year follow-up on the sum of ADIS severity scores (e.g. having social phobia with a severity of 6 and a specific phobia with a severity of 5, adds up to a total sum of severity of 11). Both

an efficacy study and an economic evaluation were performed to study the usefulness of these interventions. The next two paragraphs summarize the findings of the efficacy study and the economic evaluation, followed by a discussion on the findings of both studies.

Results of Chapter 4, on the usefulness of the interventions, demonstrated that all groups improved on both measures. Moreover, the three groups did not differ in their improvement in child anxiety symptoms over time, regardless of whether children received an intervention or not. However, comparing the level of anxiety symptoms between the high-anxious non-intervention group and the median-anxious group, learned that the high-anxious children had more severe anxiety symptoms at all measurements. In addition, more children were 'ADIS improved' after participating in either type of intervention than when being part of the non-intervention group. To summarize, child anxiety symptoms decreased evenly well in the two intervention groups as well as in the control group, but when anxiety disorder information was taken into consideration and a dichotomous outcome measure was used, children profited the most from either the child- or parent-focused intervention.

In addition the usefulness of different preventive approaches and doing nothing, it is of importance to examine the cost-effectiveness as well. Therefore, in Chapter 5, an economic evaluation of the child-focused, parent-focused and non-intervention group was performed. The economic evaluation took the form of a cost-effectiveness analysis, calculating and comparing the relative costs and effects ('ADIS improved' child) up till 2 years of the three strategies. The cost analysis was performed from the societal perspective and included direct healthcare costs (e.g. psychologist, physician), direct non-healthcare costs (e.g. professional help at home), indirect costs (e.g. school absence), and out-of-pocket costs (e.g. over-the-counter medication). The cost-analysis entailed resource use related to anxiety, psychological problems, physical problems and other reasons of the child. Resource usage was assessed via the use of prospective 2 week cost-diaries (Freer, 1980; Goossens, Rutten-Van Mölken, Vlaeyen, & Van der Linden, 2000). Most cost-effectiveness analyses showed that it would not be cost-effective to offer high-anxious children no intervention. Either the parent- or the child-focused intervention appeared to be the most cost-effective strategy, depending on the maximum monetary value that society is willing to pay for one 'ADIS improved' child (i.e. cost-effectiveness threshold). More specifically, in most analyses it was shown that the parent-focused intervention was the optimal strategy at lower monetary thresholds than the child-focused intervention. Two impor-

tant differentiations were that the child-focused intervention dominated the parent-focused intervention in terms of costs and effects if the analysis was performed from a healthcare perspective (i.e. only taking direct healthcare costs into account, such as medication) and when only study completers were analyzed. However, if parents were anxious, the parent-focused intervention dominated the child-focused intervention.

Based on the outcome measure 'ADIS improved' both the efficacy study and the main analyses of the economic evaluation showed that offering either the child- or parent-focused intervention was better than offering no intervention. Both parents and children can thus be effective change agencies for child anxiety in a preventive context. The following explanations can be offered for the lack of expected superiority of the parent-focused intervention. First, children were recruited through their own responses on an anxiety screening instead of by parental referral. Parents might, therefore, be less inclined to actively apply the cognitive behavioral strategies for their child's anxiety. However, most treatment studies comparing the effects of family versus child-focused therapies do not show differences in effectiveness even though children were referred by parents (In-Albon & Schneider, 2007). Second, therapists may be better in delivering cognitive-behavioral interventions to children than parents are. Third, although anxiety-enhancing parenting styles can be addressed in the parent-focused intervention, and this is likely to heighten parents' granting autonomy to their children, the child-focused intervention may as well encourage children's autonomy, because the child can relate obtained successes to his/her own coping skills (Bodden, Bögels et al., 2008). Finally, although it was expected that the parent-focused intervention would create more opportunities to reduce parental anxiety, the efficacy study (Chapter 4) showed that parental anxiety reduced as much in the parent-focused intervention as it did in the child-focused intervention. It might be that the relationship between child and parental anxiety is bidirectional (also see Silverman, Kurtines, Jaccard, & Pina, 2009), and that improvement in child anxiety positively influences parental anxiety. However, the parent-focused intervention did show superiority when parents were anxious if costs were also taken into consideration (economic evaluation). Possibly, anxious parents are more likely to allocate their money to child related resources when they have an anxious child, and the parent-focused intervention could positively affect parental spending behavior in anxious parents. This notion is supported by data of the current study, showing a reduction of total costs for families whose anxious parents participated in the parent-focused intervention.

Other than the finding that the parent-focused intervention is more cost-effective if at least one of the parents is anxious, no clear efficacy and effectiveness differences between the two types of interventions were revealed. Based on the experiences during the study, the feasibility of implementing the child-focused intervention in a school-based context is higher than implementing the parent-focused intervention. That is, we experienced difficulties motivating the parents for participation in the parent-focused interventions, if they believed their children's anxiety was not severe enough. Also, child intervention was organized at school, immediately after school hours, so that children did not have to travel extra, whereas parent intervention was organized in the evenings, which involved travel time and costs for parents. In addition, as we encouraged both parents to come, they also had to arrange babysit for their child where necessary. Moreover, the parent-focused interventions taking place in the evenings required the alarm systems to be turned off, and schools to invest more in electricity. We reduced these practical difficulties with the parent-focused intervention by offering five of eight sessions by individual telephone calls. A discussion on improving feasibility of interventions is provided in the section 'Study Limitations, Design Considerations, and Ideas for Future Research'. Focusing the discussion on the dichotomous variable of clinical significant improvement in terms of child anxiety disorders, both the efficacy (Chapter 4) and the cost-effectiveness study (Chapter 5) showed stronger efficacy of the child- and parent-focused intervention than the non- intervention group if child anxiety was expressed dichotomously at the level of child disorders ('ADIS improved'). Moreover, the economic evaluation with ADIS improved child as outcome measure showed that it would not to be cost-effective to offer high-anxious children no intervention. However, in a preventive context, one would expect that outcome measures at the level of symptoms are more sensitive for differences between groups than measures at the level of diagnoses. On the other hand, the majority of the current sample had an anxiety diagnosis already at pretest, and most of these children had more than one anxiety diagnosis. It is possible that outcome measures at the level of anxiety diagnoses are more sensitive for differences between groups in indicated anxiety prevention and early intervention studies, because these are types of prevention that lean toward treatment of clinical problems (anxiety disorders rather than anxiety sensitivity).

Although results were different for the two measures of child anxiety, all three groups improved on both outcome measures. That is, children even made meaningful improvements if they did not receive an intervention. Our finding that following natural course was as effective as either following a parent- or child-focused intervention on

a dimensional measure of anxiety symptoms, weakens an overall conclusion that a preventive intervention is worthwhile. Even though childhood anxiety disorders at clinical levels do not wane naturally (see review: Hudson, Kendall, Coles, Robin, & Webb, 2002), it could be possible that anxiety problems of non-clinical severity subside naturally to some degree. Indeed, the current study is not unique in revealing natural improvement in children with subclinical levels of anxiety as other prevention studies also showed general improvements in intervention as well as non-intervention groups (Dadds et al., 1999; Lowry-Webster, Barrett, & Dadds, 2003; Roberts et al., in press). Also, child anxiety decreases as children grow older, because of a growing understanding and coping with anxious situations (Ollendick, King, & Muris, 2002). Finally, the attention given to the child's (and the parent's) anxiety during assessments could have created more openness to and awareness of anxiety and its consequences, and this, in turn, could reduce child anxiety. Future scientists could study the effect of measuring by comparing two types of control groups, where in the first group anxiety is measured as unobtrusive as possible (e.g. by a computer-administered questionnaire that assesses anxiety in a few items next to completely unrelated issues), whereas the second groups receives the full battery of assessments of the current thesis (i.e. ADIS interviews with both parents and with the child, all questionnaires for the child and parents on both parental and child anxiety and anxiety-enhancing parenting at multiple points in time). The two groups can be compared in their anxiety development by the computer-administered items on anxiety at the final (two-years) assessment.

Screening for Child Anxiety Within Community Settings

This anxiety prevention study used the Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71, Borden, Bögels, & Muris, 2009) to screen for high-anxious children. The SCARED-71 is a modified version of the original SCARED, and it entails 71 questions on symptoms of all DSM-IV anxiety diagnoses (separation anxiety disorder, social phobia, specific phobia, generalized anxiety disorder, obsessive compulsive disorder, post traumatic stress disorder, panic disorder). Children (8-12 years of age) completed the SCARED-71 questionnaire during regular classes, inquiring for the presence of anxiety symptoms. If children scored in the top-15% on this questionnaire, they were labeled high-anxious, whereas children were labeled median-anxious if they scored around the median. In this thesis, it was assumed that children scoring around the median can be considered "normal" anxious. Both high-and median-anxious children were consequently diagnostically interviewed with the Anxiety Disorder Interview Schedule (ADIS, Siebelink & Treffers, 2001; Silverman & Albano, 1996).

Results of Chapter 3 indicate that children with top-15% scores on the SCARED-71 had more anxiety disorders (60%) than children that scored around the median (23%). Moreover, the three most frequently diagnosed anxiety disorders of this sample were specific phobia, social phobia and separation anxiety disorder and these disorders were found to be specifically predicted by their matching subscales of the SCARED-71. These results support the usefulness of using anxiety questionnaires as screening instruments in general, and, more specifically, of using the SCARED-71 as a screening instrument in an indicated prevention trial.

Unexpectedly, high prevalence rates of anxiety disorders were found in the high-anxious group, with 60% of the children receiving one or more diagnoses of anxiety. However, in the indicated prevention/early intervention study of Dadds, Spence, Holland, Barrett & Laurens (1997), a comparable selection method was applied, and they also found that a high number of the high-anxious children had an anxiety disorder at pretest (+75%). In line, 23% of the current's study median-anxious (i.e. "normal" anxious) children were diagnosed with an anxiety disorder. Anxiety difficulties are only diagnosable in case of significant interference of the anxiety difficulties in daily life. One in four children scoring around the median thus have diagnosable anxiety difficulties, which is surprising in a group that is considered to be normal and non-disordered. A statistical explanation for this finding is that the median reflects the most frequent anxiety score, and this does not necessarily reflect normal anxiety scores. On the other hand, the high prevalence rates possibly indicate that the current lifetime prevalence rates (8-27%, Costello, Egger, & Angold, 2005) of child anxiety disorders in the general population are in fact an underestimation. Many children may remain unidentified because of anxiety's internalized nature and parental difficulty to notice and identify internalizing symptoms. Additionally, the high prevalence rates could indicate that children have become more anxious in recent times. Twenge (2000) performed a meta-analysis on birth cohort studies from the 1950s to the 1980s on children aged 9-17 from the United States. The study revealed an increase of approximately 1 standard deviation over time in children's self-reported anxiety. Furthermore, normal children from 1980s' birth cohorts scored higher than 1950s child psychiatric patients. Additionally, Tick, Van der Ende and Verhulst (2007) performed a birth cohort study in the Netherlands, including samples from 1983, 1993, and 2003 of children aged 6-16. Parent-reported internalizing problems, especially Anxious/Depressed and Somatic Problems were found to increase over time. Finally, the high percentage of child anxiety disorders in median- and high-anxious children may reflect too low cutoff scores for child anxiety disorder

in either the DSM-IV or the Anxiety Diagnostic Interview Schedule for parents and children.

In Chapter 6, an economic evaluation of screening and intervening was performed. Four possible strategies were compared by the use of a decision analytic model, because not all data were empirically collected. In this study, four strategies were compared. The first potential strategy reflected “applying the screening procedure and offering the child-focused intervention”. The second potential strategy reflected “applying the screening procedure and offering the parent-focused intervention”. The third potential strategy was based on the earlier finding (Chapter 5) that the parent-focused intervention was the most cost-effective in case parents were anxious, and reflected “applying the screening procedure and offering the parent- or child-focused intervention depending on parental anxiety (i.e. children of anxious parents were offered the parent-focused intervention, and other children the child-focused intervention)”. The fourth potential strategy reflected the current situation in the Netherlands “doing nothing”, that is, not offering preventive intervention but rather refer children for anxiety treatment only when the anxiety problems become so severe that treatment is warranted (e.g. school refusal, depression). The model showed that doing nothing would be the most cost-effective strategy for society at low monetary thresholds (i.e. below €100), but the strategy “apply the screening procedure and offer the child- or parent-focused intervention depending on parental anxiety” to have a higher expected effectiveness at relatively low incremental costs. However, the difference in effects (i.e. the proportion of ADIS improved children) between these two competing strategies were minimal (i.e. .19 versus .18).

On the one hand, results point to the efficacy and cost-effectiveness of screening and intervening versus not screening and not intervening. On the other hand, differences in effects between screening and intervening versus not screening and not intervening were very small. Given the fact that this study was the first Dutch child anxiety prevention study and the first to consider both the efficacy and cost-effectiveness of anxiety prevention, it would be too premature to draw stringent “pro- or contra anxiety prevention” conclusions. It is of high importance that preventive effects on child anxiety are studied at longer time spans and that other methodological considerations are taken into account (see below). Society should not promote prevention of anxiety only based on theoretical grounds or on clinical efficacy studies of other countries, but also on evidence from Dutch anxiety prevention studies and on economic evaluations. Thus far, this evidence seems not convincing enough, whereas anxiety treatment studies do show convincing data. Until anxiety pre-

vention has a more evidence based character, clinical treatment of anxiety should remain promoted. Preferably, cognitive behavioral treatment (e.g. Bögels, 2008) should be applied, as this type of treatment has the highest proven efficacy for anxiety disorders. The majority of children with clinical anxiety disorders never receive adequate treatment, because of lack of familiarity of mental health-care professionals with manualized cognitive-behavioral treatment, lack of therapists trained in these manualized treatments, and wait-lists for mental health care in the Netherlands. These aspects should be addressed adequately in order to diminish delays in help-seeking for clinical treatment. To conclude, the debate between the predicates “prevention is better than cure” and “if it ain’t broke, don’t fix it”, can only be resolved by performing more and longitudinal anxiety prevention studies.

Study Limitations, Design Considerations, and Ideas for Future Research

As mentioned before, more research is needed to offer more insight into the merits of anxiety prevention and into the optimal methods of screening/selecting, intervening, and measuring. The current study offers several clues to ameliorate future studies.

With respect to screening and selecting, it is of importance to select the “right” children to offer an intervention; those children that need an intervention and profit from it. Some children seem to bounce back naturally, showing considerable improvement without any intervention, which can be related to anxiety’s natural waxing and waning. One could argue that these children need not be offered an intervention, especially in times of monetary scarcity. Unnecessary selection of children that seem to do fine in the longer term without any intervention can be easily avoided by screening children twice (e.g. screening again after 3 months), and only selecting those that are at-risk (that is, display a high level of anxiety symptoms, i.e. highest 15% as was used in the current study) at both screening moments.

The external validity of this study was threatened due to low inclusion, and high drop-out rates, especially after the screening procedure. Separate consents were asked for participation in the screening procedure and for participation in the consecutive stages of the prevention study (i.e. pretest, intervention, 1-year follow-up, 2-year follow-up). Only 44% of those children that were indicated as being high-anxious after completion of the screening questionnaire agreed to further participation. In the study of Dadds and colleagues (Dadds, Spence, Holland, Barrett, & Laurens, 1997) and the study of LaFreniere and Capuano (Lafreniere & Capuano, 1997) com-

parable screening procedures were applied and they also encountered low participation rates in selected children (41% and 31% respectively). Even though attrition of participants may be inevitable and cannot be directly related to the format of the screening procedure, the drop-out of participants could lead to unrepresentative samples and pose a threat to external validity. For example, the current study included less than 5% non-Dutch families, whereas the percentage of non-Dutch inhabitants in Limburg and the Netherlands is estimated at 20% ("Centraal Bureau voor Statistiek", 2009). It is of importance to acquire representative samples. In relation to the small percentage of non-Dutch families, for example, it has been found that symptoms of anxiety disorders are interpreted in a culturally specific manner (Hinton & Polack, 2009). Participation rates may be increased and more representative samples may be achieved by using passive consent procedure to obtain parental consent instead of active consent procedures (current study). In active consent procedures, parents are required to signify in writing permission for the child's participation, whereas in passive consent procedures, parents are assumed to consent unless they undertake action (Pokorny, Jason, Schoeny, Townsend, & Curie, 2001). Indeed, with regard to demographic features, Anderman and colleagues (1995) showed that participants with active parental consent were more likely to be white and to live in a two-parent household than participants without written parental consent. However, the use of passive versus active consent procedures is controversial, and the choice for applying either procedure depends on the study's characteristics (e.g. the sensitivity of the study's subject, the risk the study carries for the participants). It could be argued that anxiety prevention is a relatively non-sensitive subject (in comparison to sexually transmitted diseases, for example) and participation carries relatively few risks. When using an active consent procedure, participation can be stimulated by performing additional efforts when parents do not respond, such as making telephone calls, organizing parent meetings, daily teacher requests for returning consent forms, visits to the classrooms, and class contests for prizes. However, these additional efforts lead to higher research costs (Ellickson & Hawes, 1989; Johnson et al., 1999). A specific and effective method of active consent, that is promoted by Pokorny and colleagues (2001) and costs relatively little, is to combine an active consent procedure with the requirement for a parent's signature on the child's report card. Participation of non-Dutch inhabitants could be specifically promoted by using translations of instruments, letters, flyers, and treatment manuals, and by employing trained bilingual mental health professionals (Barrett, Sonderegger, & Xenos, 2003). Another possibility is to have a child or family from a certain culture promote study participation to peers from the same cultural background. With respect to methodological issues related to the intervention,

aiming the preventive interventions specifically at those child- or parent-related (risk) factors that occur early in anxiety development, and not at factors that have been related to anxiety per sé, may help to improve the efficacy of the applied interventions. It could, for example, be possible that family interaction patterns do not become dysfunctional until children exhibit clinical anxiety disorders. In that case, it would be a waste of time to aim the preventive intervention at dysfunctional family patterns. Unfortunately, to our knowledge, no studies have been performed that offer insight into early and late factors related to child anxiety, and more studies on this subject are thus warranted. In line with the idea that interventions could be more effective if tailored to specific risk factors for child anxiety, results from the current study do show that it is most cost-effective to offer a parent-focused intervention if parents are anxious. It, therefore, seems worthwhile to measure parental anxiety before the intervention, and offer the parent-focused intervention particularly to high-anxious parents. Further amelioration of the interventions' longer-term effects could possibly be obtained by introducing booster sessions (i.e. one or more extra sessions that take place within a year after the intervention). In booster sessions, participants can refresh and refine the learned cognitive behavioral techniques (Neil & Christensen, 2009), and repetition is generally viewed as a key to success. However, the efficacy of booster sessions has not been established in the context of child anxiety prevention, because no studies have been performed yet that compare the efficacy of interventions with booster sessions to the efficacy of interventions without booster sessions.

Furthermore, society can profit strongly from investigations that study the effects of highly implementable interventions, because this minimizes friction between efficacy (i.e. outcomes under controlled circumstances) and effectiveness (i.e. real world outcomes). Even though it is important to methodologically control certain aspects (e.g. apply randomization to avoid differences between groups) to ensure that the study's outcomes stem from the intervention, other aspects of intervention studies could be adjusted to make the intervention more implementable. For example, higher feasibility could be reached by allowing more parent-therapist contact in the child-focused intervention and more child-therapist contact in the parent-focused intervention for psycho-educational purposes. Additionally, psychologists and psychology students offered the interventions in the current study, whereas it would be more feasible and cost-effective to work with teachers. Finally, via a multilevel method, Payne and Eckert (Payne & Eckert, 2010) uncovered that the most important predictor for high quality implementation of school-based prevention programs were characteristics of the

structure of the intervention. More specifically, implementation quality increases when a standardized and well supervised intervention program is used, when high quality training is frequently provided to the team members, and when the schools integrate the interventions into normal school operations.

With respect to measuring issues, both economic evaluations took the form of a cost-effectiveness study because of the selected outcome measure. Most economic evaluations in health care include both a cost-effectiveness (expressing the outcome as any unit of effect) and a cost-utility analysis (expressing the outcome as Quality Adjusted Life Years; QALYs). However, in the economic evaluations of the current thesis, the QALY was abandoned, although these data were available. The reason for not including the QALY measure came forth from relatively high mean utility values at pretest ($M = .93$, $SD = .12$). Utility values (minimum: 0, maximum: 1) express society's preference for a specific health state, and health states were based on the participants' scores on five health related dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) as measured with the EQ-5D. Based on the utility values obtained at each measurement, QALYs were calculated. Because of the high utility values at pretest, little or no room was left for improvement, resulting in non interpretable QALY differences between the study arms. The EQ-5D is known for its ceiling effect in relatively healthy populations (Brazier, Roberts, Tsuchiya, & Busschbach, 2004). The high utility values before intervention are not characteristic for children with anxiety difficulties, as the mean utility value for anxiety disordered children from the treatment study of Bodden and colleagues (2008) was .85. Rather, the high utility value in our study is likely to be related to the fact that children were recruited from a community sample instead of via clinical practice. Probably, anxiety in clinically anxious children affects more health related levels than anxiety in non-clinically anxious children.

One of the most important reasons for participants to withdraw from further participation was "too much work", most likely referring to an abundance of questionnaires/instruments in the study. Even though it is interesting and useful to measure psychosocial functioning in several manners and to measure a broad variety of risk factors, one should pay careful attention to the right balance between yielding scientific information and overloading participants, especially in a preventive context. If less questionnaires would be included at the measurements, more measurements could take place for the most important outcome variables. For the current study, these measurements would include only the ADIS, SCARED and the cost-diary. For example, it would have been useful if participants had comple-

ted more cost-diaries during the study, e.g. during the intervention period and at more occasions during the follow-up period. This was not done in the current study and costs over two years were calculated based on information from three cost-diaries, supplemented with a cost calculation for the interventions. Although research has shown that data obtained with cost diaries are representative for longer periods of time (Goossens, Rutten-Van Mölken, Vlaeyen, & Van der Linden, 2000), the few cost measurements in this study undoubtedly add to the uncertainty regarding the cost-effectiveness results. Finally, as mentioned before, preventive effects have been found to become stronger over time. Follow-up data should be extended over longer time spans in order to measure long-term costs and effects of preventive interventions.

Conclusion

Results of this study point to the usefulness of studying early risk factors of anxiety disorders, as prenatal risk factors were related to child anxiety, to the efficacy and cost-effectiveness of offering anxiety prevention interventions, and to the usefulness and cost-effectiveness of applying a screening procedure and offering an intervention. Also, if parents are anxious, applying the screening procedure and offering the parent-focused intervention appeared to most cost-effective. However, altogether, results in favor of screening and intervening were modest and need to be affirmed by future longitudinal anxiety prevention studies and an extended follow-up of the current study.

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Nederlandse Samenvatting en Discussie

Dit hoofdstuk biedt een overzicht van de doelen, resultaten en discussies van de verschillende studies die onderdeel uitmaken van het huidige proefschrift.

Het huidige proefschrift bevat een aantal studies waarin de werkzaamheid, de kosten-effectiviteit en andere aspecten die gerelateerd zijn aan de preventie van angststoornissen werd onderzocht. De kinderen (8-12 jaar) en hun ouders werden geworven via basisscholen middels het gebruik van een screeningsvragenlijst. Op basis van de scores die behaald werden op de screeningsvragenlijst werden hoog- en mediaan-angstige kinderen en hun ouders geselecteerd (d.i. geïndiceerde preventie). Vervolgens werd het verloop van hun angsten en daaraan gerelateerde aspecten gedurende 2 jaar in kaart gebracht. Hoog-angstige kinderen en hun ouders namen deel aan een kind-gerichte interventie (alleen kinderen geïnccludeerd), een ouder-gerichte interventie (alleen ouders geïnccludeerd) ofwel geen interventie (d.i. alleen het natuurlijk beloop van hun ontwikkeling werd bestudeerd). Mediaan-angstige kinderen en hun ouders kregen geen interventie, maar het natuurlijk beloop van hun ontwikkeling werd onderzocht.

Dit proefschrift bevat vijf artikelen. Hiervan is er één gericht op pre- en perinatale risicofactoren van angst. Twee artikelen hebben de werkzaamheid en kosten-effectiviteit van de kind- en ouder-gerichte interventies als onderwerp. De overige twee artikelen zijn gericht op het nut van de screeningsprocedure die toegepast werd om hoog-angstige kinderen uit een gemeente te selecteren, almede op de kosten-effectiviteit van de screeningsprocedure gevolgd door het aanbieden van de kind- of ouder-gerichte interventie of geen interventie. De algemene samenvatting en discussie is op dezelfde manier gestructureerd. Eerst worden de effecten van pre- en perinatale complicaties op angst samengevat en ter discussie gesteld (7.1). Vervolgens worden de werkzaamheid en de kosten-effectiviteit van preventieve interventies behandeld en ter discussie gesteld (7.2). Daarna worden de werkzaamheid en de kosten-effectiviteit van het toepassen van een screeningsprocedure, al dan niet gevolgd door een interventie, beschreven en ter discussie gesteld (7.3). Uiteindelijk worden de opzet van de studie, almede enkele beperkingen van de studie behandeld en worden ideeën voor toekomstig onderzoek gepresenteerd (7.4).

Pre- en Perinatale Risicofactoren die Gerelateerd Zijn aan Angst bij Kinderen.

Er zijn verschillende factoren voorgesteld als risicofactoren voor angststoornissen (bijv. ouderlijke angst, gedragsinhibitie) en er wordt gesteld dat angststoornissen ontstaan uit een complex samenspel van verschillende *nature-nurture* interacties (Vasey & Dadds, 2001). De meeste studies naar risicofactoren richten zich op postnatale risicofactoren uit de omgeving (bijv. dysfunctionele opvoedstijlen, onveilige hechting). Er is verbazingwekkend weinig aandacht besteed aan de vroegste risicofactoren uit de omgeving, namelijk de risicofactoren tijdens de zwangerschap en tijdens de bevalling (pre- en perinatale risicofactoren).

In Hoofdstuk 2 werd het onderzoeken van het effect van de meest objectieve prenatale risicofactoren (bijv. rokende moeder tijdens zwangerschap) en perinatale risicofactoren (bijv. zuurstofgebrek tijdens de bevalling) voor angst in de kindertijd ten doel gesteld. Daarnaast maakten kinderen een visuospatiële kopieertaak om te bekijken of pre- en perinatale risicofactoren hun invloed uitoefenden via non-specifiek cerebraal dysfunctioneren. Hoog-angstige kinderen bleken meer prenatale risicofactoren te hebben doorstaan dan mediaan-angstige kinderen, terwijl dit niet gold voor perinatale risicofactoren. Hoog-angstige kinderen presteerden ook minder goed op de visuospatiële kopieertaak (meer afwijking) dan mediaan-angstige kinderen. Prenatale risicofactoren, de mate waarin afgeweken werd op de visuospatiële kopieertaak en hun interactiefactor voorspelden tezamen bijna 14% van de variantie van angst in de kindertijd. Dit percentage is indrukwekkend, wanneer men beseft dat angststoornissen voortkomen uit een interactie van zeer veel verschillende factoren en de hier onderzochte risicofactoren zelden bestudeerd worden. Het is dan ook waardevol deze allervroegste risicofactoren te onderzoeken, alsmede hun effect op het non-specifieke cerebraal functioneren in hoog-angstige kinderen. Wanneer men in de klinische praktijk met een kind te maken krijgt dat blootgesteld is aan prenatale risicofactoren, dan kan dit duiden op een angststoornis, zeker wanneer het kind reeds als hoog-angstig omschreven wordt. Wanneer artsen, psychologen en psychiaters alert zijn op deze factoren kan dit het aanduiden van hoog-angstige kinderen en het bieden van een preventieve interventie of behandeling bespoedigen. Verder is het de moeite meer aandacht te besteden aan de preventie van prenatale risicofactoren, temeer omdat prenatale risicofactoren ook gerelateerd zijn aan andere vormen van psychopathologie. De bevinding dat hoog-angstige kinderen meer afwijken op een visuospatiële kopieertaak dan mediaan-angstige kinderen zou kunnen wijzen op problemen in het executief functioneren (Gurvits et al., 2002). Voor toekomstige onderzoekers zou het interessant zijn om in detail te bestuderen in

welke mate angstige kinderen executieve/planningsproblemen hebben, of deze problemen de mate van behandelbaarheid beïnvloeden en of het behandelen van kinderen met deze problemen leidt tot een daling van hun angst.

Preventie van Angst bij Kinderen: Een Interventie Aanbieden.

De werkzaamheid van cognitieve gedragstherapie ter behandeling van klinisch angstige kinderen is hoog, met een gemiddelde pre-post effect size van .86 en een gemiddelde pre-follow-up effect size van 1.36 (In-Albon & Schneider, 2007). Daarnaast wijzen drie studies met late follow-ups (Barrett, Duffy, Dadds, & Rapee, 2001; Kendall, Safford, Flannery-Schroeder, & Webb, 2004; Siqueland, Kendall, & Steinberg, 1996) uit dat het effect van de behandeling vrij stabiel en langdurig is. Anderzijds zoekt het merendeel van mensen met een angststoornis pas gemiddeld na 8 jaar hulp. Daarenboven is een omgekeerd evenredige relatie aangetoond tussen het zoeken van hulp en de tijd sinds aanvang van de angststoornis en de leeftijd waarop men een angststoornis kreeg (Christiana et al., 2000). Deze bevindingen en de negatieve consequenties van angststoornissen op individueel en maatschappelijk niveau onderstrepen het belang van de preventie van angststoornissen. Verscheidene eerder verrichte angstpreventie studies richten hun interventies geheel of gedeeltelijk op de ouders van de angstige kinderen (bijv. Barrett & Turner, 2001; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). Wanneer interventies op ouders gericht zijn, worden ouders worden bijvoorbeeld opgeleid tot leken-therapeuten om hun kinderen te helpen bij het toepassen van cognitief gedragstherapeutische strategieën en worden ouderlijke angst en angstbevorderende opvoedstijlen zoveel mogelijk gereduceerd. Interventies die op ouders gericht zijn, verkleinen de kans dat angst van de ouder wordt overgegeven aan het kind, verminderen de afhankelijkheid van de cognitieve capaciteiten van het kind en leiden mogelijk tot een hogere generaliseerbaarheid van de geleerde technieken buiten de therapeutische setting. Het is binnen een preventieve context echter nooit systematisch onderzocht of het beter is om interventies te richten op de ouders van het angstige kind of op het kind zelf.

In de huidige studie werd een geïndiceerde preventie/vroege interventie georganiseerd, waarbij hoog-angstige kinderen gerandomiseerd werden aan een kind- of oudergerichte interventie of aan een niet-interventiegroep. Beide types interventies waren gebaseerd op de principes van cognitieve gedragstherapie en ze waren beide groepsbehandelingen. Aan de kind-gerichte interventie namen alleen hoog-angstige kinderen deel, terwijl aan de ouder-gerichte interventie alleen de ouders van de hoogangstige kinderen deelnamen. Op

deze wijze kon het unieke aspect van interveniëren via kinderen of ouders bestudeerd worden. De aanwezigheid en mate van angst bij de kinderen werd voor de interventie (voormeting), en één en twee jaar na de voormeting gemeten (1- en 2-jaars follow-up). De angst was geoperationaliseerd door angstsymptomen en door een dichotome maat die betrekking had op diagnoses van angststoornissen ('ADIS-verbeterd'). De maat 'ADIS-verbeterd' werd bepaald middels afname van de Anxiety Disorder Interview Schedule, een semi-gestructureerd interview, waarmee angstdiagnoses kunnen worden vastgesteld. 'ADIS verbeterd' zijn houdt in dat een kind ten minste een gemiddelde effect size van verbetering (.05) behaalde tussen de voormeting en de 2-jaars follow-up op de som van ernstscores van de ADIS-diagnoses (bijv. een sociale fobie met een ernstscore van 6 en een specifieke fobie met een ernstscore van 5 is samen een som van ernstscores van 11). Er werd een studie verricht naar de werkzaamheid van de interventies en er werd een economische evaluatie gedaan om het nut van de interventies te onderzoeken. De volgende twee paragrafen vatten de bevindingen van deze studies samen, waarna de bevindingen worden bediscussieerd.

In hoofdstuk 4, welke betrekking heeft op de werkzaamheid van de interventies, werd aangetoond dat alle groepen verbeterden op beide maten. Bovendien verschilden de drie groepen niet in de mate waarin de angstsymptomen afnamen, ongeacht een deelname aan een interventie. Wanneer de aanwezigheid van angstsymptomen echter vergeleken werd tussen de hoog-angstige groep die geen interventie kreeg en de mediaan-angstige groep bleek dat de hoog-angstige kinderen meer angstsymptomen hadden op alle meetmomenten dan de mediaan-angstige kinderen. Daarnaast waren meer kinderen 'ADIS-verbeterd' na deelname aan één van de interventies dan wanneer ze niet deelnamen aan een interventie. Angstsymptomen verminderden dus even sterk in de interventiegroepen en de niet- interventiegroep, maar wanneer data over angststoornissen in acht werden genomen en een dichotome uitkomstmaat werd gebruikt, profiteerden kinderen het meest van de kind- of ouder-gerichte interventie.

Naast het bestuderen van de werkzaamheid van preventieve interventies of niks doen, is het ook belangrijk om economische evaluatie uit te voeren. Daarom werd in Hoofdstuk 5 een economische evaluatie uitgevoerd naar de kind-gerichte, de ouder-gerichte en de niet-interventie groep. De economische evaluatie bestond uit een analyse van de kosten-effectiviteit, waarbij de relatieve kosten en effecten ('ADIS-verbeterd'-kind) van de drie strategieën tot 2 jaar werden vergeleken.

De kostenanalyse werd uitgevoerd vanuit het maatschappelijk perspectief en bevatte directe gezondheidszorg kosten (bijv. psycholoog, arts), directe kosten buiten de gezondheidszorg (bijv. professionele hulp in huis), indirecte kosten (bijv. afwezigheid van school) en persoonlijke kleine uitgaven (bijv. medicijnen zonder voorschrift). De kosten-analyse omvatte het gebruik van bronnen die gerelateerd zijn aan angst, psychologische problemen, fysieke problemen en overige problemen van het kind. Het gebruik van bronnen werd onderzocht middels prospectieve kostendagboekjes (Freer, 1980; Goossens, Rutten-Van Mólken, Vlaeyen, & Van der Linden, 2000) die gedurende 2 weken werden bijgehouden. De meeste kosten-effectiviteitsanalyses toonden aan dat het niet kosten-effectief zou zijn om hoog-angstige kinderen geen interventie aan te bieden. Het aanbieden van de ouder- of de kind-gerichte interventie was de meest kosten-effectieve strategie, afhankelijk van het maximale geldelijk bedrag dat de maatschappij wil betalen voor een 'ADIS verbeterd' kind (d.i. kosten-effectiviteitsdrempel). De meeste analyses toonden aan dat de ouder-gerichte interventie de optimale strategie was bij lagere kosten-effectiviteitsdrempels dan de kind-gerichte interventie. De kind-gerichte interventie domineerde echter de ouder-gerichte interventie op vlak van kosten en effecten als de analyse werd uitgevoerd vanuit het gezondheidszorgperspectief (d.i. alleen directe gezondheidszorggerelateerde kosten worden in acht genomen, zoals medicatie) en als alleen de deelnemers werden geanalyseerd die de hele studie bleven deelnemen. Als ouders angstig waren, domineerde de ouder-gerichte interventie de kind-gerichte interventie.

Op basis van de uitkomstmaat 'ADIS verbeterd' toonden zowel de werkbaarheidsstudie als de primaire analyses van de economische evaluatie dat het aanbieden van de kind- of ouder-gerichte interventie beter was dan geen interventie aanbieden. Zowel de ouders als de kinderen kunnen dus op een effectieve manier de angst van het kind beïnvloeden in een preventieve context. De volgende verklaringen kunnen aangedragen worden voor het feit dat de verwachte superioriteit van de ouder-gerichte interventie uitbleef. Ten eerste werden de kinderen geworven middels hun eigen reacties op een angstscreening in plaats van via een verwijzing van de ouders.

Hierdoor zijn ouders mogelijk minder geneigd de cognitief gedrags-therapeutische strategieën toe te passen bij hun angstige kind. De meeste behandelstudies waarin de effecten van familie versus kind-gerichte behandelingen werden vergeleken wezen echter uit dat er geen verschil in effectiviteit was, ook al waren de kinderen verwezen door hun ouders (In-Albon & Schneider, 2007). Ten tweede zouden de therapeuten beter kunnen zijn in het aanbieden van cognitief-gedrags-therapeutische interventies dan de ouders zelf. Ten derde zou

de kind-gerichte interventie de autonomie van het kind kunnen bevorderen, doordat ze de behaalde successen kunnen relateren aan hun eigen coping strategieën (Bodden, Bögels et al., 2008).

Ondanks de verwachting dat de ouder-gerichte interventie meer gelegenheid zou bieden om ouderlijke angst te verminderen, toonde de werkzaamheidsstudie (Hoofdstuk 4) aan dat ouderlijke angst even sterk verminderde in de ouder- als in de kind-gerichte interventie. Mogelijk is de relatie tussen angst van het kind en angst van de ouder bidirectioneel (zie ook Silverman, Kurtines, Jaccard, & Pina, 2009), waardoor een verbetering in de angst van het kind de angst van de ouders positief kan beïnvloeden. De ouder-gerichte interventie bleek echter wel superieur te zijn als ten minste één van de ouders angstig was als de kosten ook in acht werden genomen (economische evaluatie). Mogelijk geven angstige ouders meer geld uit aan hun kind als deze angstig is en mogelijk vermindert het uitgeven van geld als ouders een ouder-gerichte interventie volgen. Dit wordt ondersteund door data van de huidige studie, waarbij een vermindering van de totale kosten gevonden wordt voor families waarbij de angstige ouders deelnamen in de ouder-gerichte interventie.

Afgezien van de bevinding dat de ouder-gerichte interventie meer kosten-effectief is als ten minste één van de ouders angstig is, kunnen verder geen duidelijke verschillen tussen de twee interventies worden aangetoond qua werkzaamheid en effectiviteit. Op basis van de ervaringen tijdens de studie kan gesteld worden dat de haalbaarheid van het implementeren van de kind-gerichte interventie groter is dan van het implementeren van de ouder-gerichte interventie. Zo ervaren we problemen met het motiveren van ouders voor deelname aan de ouder-gerichte interventies, als ze vonden dat de angst van hun kind niet ernstig genoeg was. Verder waren de kind-gerichte interventies op school georganiseerd, direct na schooltijd, zodat de kinderen niet extra hoefden te reizen. De ouder-gerichte interventies waren in de avonden gepland, waardoor er reistijden en –kosten voor hen bij kwamen kijken. Daarnaast moedigden we beide ouders aan om naar de interventies te komen, waardoor ze voor het kind soms een babysitter moesten regelen. Voorts moesten de alarmsystemen van de scholen apart uitgeschakeld worden en moesten de scholen meer investeren in elektriciteit doordat de ouder-interventies 's avonds plaatsvonden. We hebben deze problemen gereduceerd door vijf van de acht sessies van de ouder-interventie via de telefoon te laten plaatsvinden. Een discussie over het verbeteren van de haalbaarheid van de interventies wordt gegeven in de paragraaf 'Beperkingen van de Studie, Overwegingen bij het Ontwerp Ideeën voor Toekomstig Onderzoek'.

Wat betreft de discussie over een dichotome variabele van significante verbetering in termen van angststoornissen van het kind ('ADIS verbeterd'), bleek een hogere werkzaamheid (Hoofdstuk 4) en kosten-effectiviteit (Hoofdstuk 5) van de kind- en ouder-gerichte interventies dan de niet-interventie groep als angst van het kind dichotoom geoperationaliseerd werd. Bovendien toonde de economische evaluatie met 'ADIS verbeterd' kind als uitkomstmaat aan dat het niet kosten-effectief zou zijn om hoog-angstige kinderen geen interventie te bieden. In een preventieve context zou men echter verwachten dat de uitkomstmaat op het niveau van symptomen sensitiever zou zijn voor het detecteren van verschillen tussen groepen dan uitkomstmaten op het niveau van diagnoses. Anderzijds had het grootste gedeelte van de huidige steekproef reeds een angststoornis op de voormeting en het merendeel van de kinderen had meer dan 1 angstdiagnose. Mogelijk kan de uitkomstmaat op het niveau van diagnoses op meer sensitieve wijze verschillen tussen groepen detecteren in geïndiceerde preventie en vroege interventie studies, omdat dit types van interventies zijn dichter tegen de behandeling van klinische problemen aanleunen dan andere vormen van preventie.

Ook al waren de resultaten verschillend voor de twee types gebruikte uitkomstmaten, toch verbeterden alle drie de hoog-angstige groepen op beide uitkomstmaten. Kinderen verbeterden zelfs beduidend als ze geen interventie kregen aangeboden. Onze bevinding dat het doorlopen van een natuurlijke ontwikkeling even effectief was als het volgen van een ouder- of kind-gerichte interventie op een dimensionele maat van angstsymptomen, beperkt de geloofwaardigheid van een algehele conclusie dat een preventieve interventie de moeite waard is. Ook al gaan klinische angststoornissen gedurende de kindertijd niet uit zichzelf weg (zie review: Hudson, Kendall, Coles, Robin, & Webb, 2002), mogelijk vermindert subklinische angst van nature wel in bepaalde mate. De huidige studie is niet de enige waarbij aangetoond wordt dat er een natuurlijke verbetering plaatsvindt in kinderen met subklinische angst. Andere preventie studies vonden ook algemene verbeteringen in zowel de interventie als de niet-interventie groepen (Dadds et al., 1999; Lowry-Webster, Barrett, & Dadds, 2003; Roberts et al., wordt gedrukt). Daarnaast vermindert angst van kinderen als ze ouder worden door een groeiend begrip en een toename van de mate waarin omgegaan kan worden met angstige situaties (Ollendick, King, & Muris, 2002). Tenslotte kan de aandacht die gegeven wordt aan de angst van het kind (en de ouders) tijdens de metingen meer openheid voor en een grotere bewustzijn van angst hebben gecreëerd waardoor angst van het kind kan dalen. Toekomstige wetenschappers kunnen de effecten van meten bestuderen door twee types controlegroepen te vergelijken. Hier zou angst in de eer-

ste groep zo onopvallend en zo min mogelijk ingrijpend mogelijk gemeten moeten worden (bijv. door een vragenlijst met een beperkt aantal vragen over angst en een aantal vragen over andere niet gerealiseerde onderwerpen op een computer in te vullen). In de tweede groep zouden de deelnemers de complete testbatterij van de huidige studie doorlopen (d.i. op verschillende tijdstippen ADIS interviews met beide ouders en met het kind, alle vragenlijsten voor het kind en de ouders over angst van ouders en van het kind en vragenlijsten over angstbevorderende opvoedstijlen). De twee groepen kunnen worden vergeleken in hun angstontwikkeling middels de items over angst die ingevuld werden op de vragenlijst op de computer tijdens de laatste meting na twee jaar.

Screenen voor Angst in de Kindertijd binnen Gemeenschappen

In deze angstpreventie studie werd de vragenlijst Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71, Bodden, Bögels, & Muris, 2009) afgenomen om voor hoog-angstige kinderen te screenen. De SCARED-71 is een aangepaste versie van de originele SCARED en het bevat 71 vragen over symptomen van alle DSM-IV angstdiagnoses (separatie angst stoornis, sociale fobie, specifieke fobie, gegeneraliseerde angststoornis, obsessief compulsieve stoornis, post-traumatische stress stoornis, paniekstoornis). Kinderen (8-12 jaar) vulden de vragenlijst SCARED-71 in tijdens de reguliere schooluren, waarbij de aanwezigheid van angstsymptomen werd bevraagd. Als kinderen in de top-15% scoorden op deze vragenlijst, werden ze hoog-angstig genoemd, terwijl kinderen mediaan-angstig werden genoemd als ze rond de mediaan scoorden. In dit proefschrift werd aangenomen dat kinderen die rond de mediaan scoorden beschouwd konden worden als normaal angstig. Na selectie als hoog- of mediaan-angstige werd het diagnostisch interview Anxiety Disorder Interview Schedule (ADIS, Siebelink & Treffers, 2001; Silverman & Albano, 1996) afgenomen.

De resultaten van Hoofdstuk 3 wijzen uit dat kinderen met top-15% op de SCARED-71 meer angststoornissen hadden (60%) dan kinderen die rond de mediaan scoorden (23%). Verder waren specifieke fobie, sociale fobie en separatie angststoornis de drie meest gediagnosticeerde angststoornissen in deze steekprof.

Deze drie stoornissen bleken specifiek voorspeld te worden door hun overeenstemmende subschaal van de SCARED-71. Deze resultaten onderstrepen het nut van het gebruik van angstvragenlijsten als screeningsinstrumenten en meer specifiek van het nut van de SCARED-71 als screeningsinstrument.

De hoge prevalentie cijfers van angststoornissen in de hoog-angstige groep betroffen een onverwachte bevinding (60% een of meer angststoornissen). Hoewel, in de studie van Dadds, Spence, Holland, Barrett & Laurens (1997) werd een vergelijkbare selectiemethode toegepast en zij vonden ook dat een groot aantal hoog-angstige kinderen een angststoornis had op de voormeting (+75%). In overeenstemming met deze resultaten, werd 23% van de median-angstige (d.i. “normaal” angstige kinderen) kinderen uit de huidige studie gediagnosticeerd met een angststoornis. Angstproblemen zijn alleen te diagnosticeren als er sprake is van significant interferentie van de angstproblemen in het dagelijks leven. Eén op de vier kinderen die scoorden rond de median hebben dus diagnoseerbare angstproblemen, wat verbazingwekkend is in een groep die als normaal en stoornis-vrij beschouwd wordt. Een statistische verklaring voor dit resultaat is dat de mediaan de meest voorkomende angstscore betreft en dus niet noodzakelijkerwijs normale angstscores. Aan de andere kant kunnen de gevonden hoge prevalentiecijfers betekenen dat de bestaande prevalentiecijfers van huidige angststoornissen in de algemene populatie (8-27%, Costello, Egger, & Angold, 2005) in feite een onderschatting is. Mogelijk worden veel kinderen niet geïdentificeerd doordat angst geïnternaliseerd is en doordat ouders moeite hebben internaliserende symptomen op te merken en te identificeren. Voorts kunnen de hoge prevalentiecijfers wijzen op een toename van angst bij kinderen over de tijd. Twenge (2000) voerde een meta-analyse uit over geboortecohort-studies van 1950 tot 1980 naar kinderen van 9-17 jaar uit de Verenigde Staten. De studie wees uit dat er een toename was van ongeveer 1 standaard deviatie in de zelf gerapporteerde angst van kinderen. “Normale” kinderen in de jaren '80 scoorden bovendien hoger dan kinderen met psychiatrische diagnoses uit de jaren '50. Verder voerden Tick, Van der Ende en Verhulst (2007) een geboortecohort uit in Nederland, waarbij samples uit 1983, 1993 en 2003 werden geïnccludeerd, bestaande uit kinderen van 6-16 jaar. De door de ouders gerapporteerde internaliserende problemen, met name Angstig/Depressief en Somatische problemen namen toe met het verstrijken van de tijd. Tenslotte kan het hoge percentage van angststoornissen in de kindertijd in mediaan- en hoog-angstige kinderen wijzen op te lage cut-off scores voor angststoornissen in de DSM-IV of de ADIS voor ouders en kinderen.

In Hoofdstuk 6 werd een economische evaluatie van screening en interveniëren uitgevoerd. Vier mogelijke strategieën werden vergeleken middels een *decision analytic model*, omdat niet alle data empirisch verzameld werden. De eerste potentiële strategie betrof “toepassen van de screeningsprocedure en het aanbieden van de kind-gerichte interventie”. De tweede potentiële strategie was “toepassen van de screeningsprocedure en het aanbieden van de ouder-gerichte inter-

ventie". De derde potentiële strategie was gebaseerd op de eerdere bevinding (Hoofdstuk 5) dat de ouder-gerichte interventie het meest kosten-effectief was als de ouders angstig waren en betrof "toepassen van de screeningsprocedure en het aanbieden van de ouder- of kind-gerichte interventie afhankelijk van angst van de ouder (d.i. kinderen van angstige ouders kregen een ouder-gerichte interventie aangeboden en de overige kinderen de kind-gerichte interventie)". De vierde potentiële strategie betrof de huidige situatie in Nederland, namelijk "niks doen", ofwel niet een preventieve interventie aanbieden, maar in plaats daarvan kinderen verwijzen voor behandeling wanneer de angstproblemen zo ernstig worden dat behandeling aangewezen is (bijv. schoolweigering). Het model toonde dat niks doen de meest kosten-effectieve strategie zou zijn voor de maatschappij voor lage kosten-effectiviteitsdrempels (d.i. onder €100), maar dat de strategie "aanbieden van de screeningsprocedure en het aanbieden van de ouder- of kind-gerichte interventie afhankelijk van de angst van de ouder" een hogere verwachte effectiviteit heeft bij relatief lage incrementele kosten. Het verschil in effect (d.i. de proportie 'ADIS verbeterde' kinderen) tussen deze twee strategieën was minimaal (d.i. .19 versus .18). Enerzijds wezen de resultaten op de werkzaamheid en de kosten-effectiviteit van screenen en interveniëren versus niet screenen en niet interveniëren. Anderzijds waren de verschillen in effecten tussen screenen en interveniëren versus niet screenen en niet interveniëren erg klein. Gegeven het feit dat deze studie de eerste Nederlandse angstpreventiestudie was, waarbij zowel de werkzaamheid als de kosten-effectiviteit van angstpreventie in acht werden genomen, is het te vroeg om duidelijke "voor of tegen angst preventie" conclusies te trekken. Het is van groot belang dat preventieve effecten op angst in de kindertijd over een langere termijn bestudeerd wordt en dat andere methodologische overwegingen in acht worden genomen (zie hieronder). De maatschappij zou de preventie van angststoornissen niet alleen moeten promoten op basis van theorieën of op basis van de klinische werkzaamheid in andere landen, maar ook op basis van Nederlandse angstpreventie studies en economische evaluaties. Tot nu toe lijken voldoende bewijzen voor de werkzaamheid hiervoor te ontbreken, terwijl er uit behandelstudies naar angststoornissen wel overtuigende data naar voren komt. Totdat angstpreventie beter gestoeld kan worden door bewijzen, zou de klinische behandeling van angst gepromoot moeten blijven worden. Bij voorkeur zouden (protocollaire) cognitieve gedragstherapeutische behandelingen (bijv. Bögels, 2008) moeten worden toegepast, aangezien dit het type behandeling is met de hoogste bewezen werkzaamheid voor angststoornissen. Het merendeel van kinderen met klinische angststoornissen krijgt nooit een adequate behandeling aangeboden. Dit komt doordat mensen die werkzaam zijn in de gezondheidszorg onvoldoende bekend zijn met

protocolaire cognitief gedragstherapeutische behandelingen, doordat te weinig therapeuten opgeleid zijn in het toepassen van deze protocolaire behandelingen en door de wachtlijsten in de geestelijke gezondheidszorg in Nederland. Er zou deze aspecten gewerkt moeten worden, zodat de duur van het zoeken naar hulp voor klinische behandeling verkort kan worden. Concluderend, kan het debat tussen de stellingen “voorkomen is beter dan genezen” en “*if it ain't broke, don't fix it*” alleen beëindigd worden door het uitvoeren van meer (langdurige) angstpreventie studies.

Beperkingen van de Studie, Overwegingen bij het Ontwerp en Ideeën voor Toekomstig Onderzoek

Zoals hierboven vermeld, is er meer onderzoek nodig om inzichten te bieden in het nut van angstpreventie en in de optimale methodes van screenen/selecteren, interveniëren en meten. De huidige studie biedt een aantal aanwijzingen waar toekomstige studies van kunnen profiteren.

Op vlak van screenen en selecteren, is het van belang om de “juiste” kinderen te selecteren om een interventie aan te bieden, precies die kinderen die een interventie nodig hebben en ervan kunnen profiteren. Sommige kinderen lijken uit zichzelf op te knappen zonder interventies, wat gerelateerd kan worden aan het natuurlijk toe- en afnemen van angst tijdens de ontwikkeling. Men kan beargumenteren dat deze kinderen geen interventie hoeft te worden aangeboden, zeker in tijden van economische crisis. Onnodige selectie van kinderen die het zonder interventies prima lijken te doen op langere termijn kan gemakkelijk vermeden worden door kinderen twee keer te screenen (bijv. nogmaals screenen na 3 maanden) en door alleen kinderen te selecteren met hoge angstscores op beide screeningsmomenten.

De externe validiteit van de huidige studie werd bedreigd door een lage inclusie van deelnemers en een hoge uitval van deelnemers, met name na de screeningsprocedure. Er werden afzonderlijke toestemmingen gevraagd voor deelname aan de screening en voor deelname aan de volgende stadia van de angst preventie studie (d.i. voormeting, interventie en de 1- en 2-jaars follow-up). Slechts 44% van de kinderen die waren geselecteerd als hoog-angstig na het invullen van de screeningsvragenlijst stemden toe tot verdere deelname. In de studie van Dadds en collega's (Dadds, Spence, Holland, Barrett, & Laurens, 1997) en in de studie van LaFreniere en Capuano (Lafreniere & Capuano, 1997) werden vergelijkbare screeningsprocedures toegepast en zij liepen ook aan tegen lage deelname cijfers in de geselecteerde kinderen (41% en 31% respectievelijk). Ook al lijkt

de uitval van deelnemers niet te voorkomen en ook al kunnen ze niet direct gerelateerd worden aan de opzet van de screeningsprocedure, toch kan de uitval van deelnemers tot minder representatieve steekproeven leiden en dus de externe validiteit bedreigen. Aan de huidige studie nam bijvoorbeeld minder dan 5% allochtonen deel, terwijl het percentage allochtonen in Limburg en in Nederland geschat wordt op 20% ("Centraal Bureau voor Statistiek", 2009). Het is belangrijk om representatieve steekproeven te verkrijgen. Met betrekking tot het lage percentage allochtonen is bijvoorbeeld aangetoond dat angstsymptomen op een cultuurspecifieke manier geïnterpreteerd worden (Hinton & Polack, 2009). De mate van deelname en de representativiteit van de steekproef kunnen verhoogd worden door een passieve toestemmingsprocedure toe te passen om ouderlijke toestemming te verkrijgen in plaats van een actieve toestemmingsprocedure (huidige studie). Bij actieve toestemmingsprocedures moeten ouders schriftelijk toestemming geven voor deelname van het kind, terwijl er bij passieve toestemmingsprocedures van uitgegaan wordt dat ouders toestemmen tenzij ze actie ondernemen (Pokorny, Jason, Schoeny, Townsend, & Curie, 2001). Inderdaad bewezen Anderman en collega's (1995) dat deelnemers via een actieve toestemmingsprocedure meer kans hadden om blank te zijn en om onderdeel uit te maken van een twee-ouder gezin dan deelnemers van wie de ouders geen schriftelijke toestemming hoefden te geven. Het gebruik van passieve versus actieve toestemmingsprocedures is echter controverseel en de keuze voor één van beide procedures hangt af van de eigenschappen van de studie (bijv. is het onderwerp van studie een gevoelig onderwerp, brengt de studie risico's met zich mee voor de deelnemers). Men zou kunnen stellen dat angstpreventie niet een erg gevoelig onderwerp is om te bestuderen (bijv. in vergelijking met seksueel overdraagbare aandoeningen) en dat deelname relatief weinig risico's met zich meebrengt. Als een actieve toestemmingsprocedure wordt toegepast kan deelname worden gestimuleerd door extra inspanningen te verrichten als ouders niet reageren, zoals het plegen van telefoontjes, het organiseren van vergaderingen met de ouders, de leraar dagelijks laten vragen naar de toestemmingsformulieren of de klassen bezoeken. Deze inspanningen leiden echter tot hogere onderzoekskosten (Ellickson & Hawes, 1989; Johnson et al., 1999). Een specifieke en effectieve vorm van een actieve toestemmingsprocedure, die wordt gepromoot door Pokorny en collega's (2001) en relatief weinig kost, is om de actieve toestemmingsprocedure te combineren met het schoolrapport dat ook door de ouders getekend moet worden. Deelname van allochtone inwoners kan specifiek gepromoot worden door instrumenten, brieven, flyers en protocollen te vertalen en door tweetalige professionals uit de geestelijke gezondheidszorg in te schakelen (Barrett, Sonderegger, & Xenos, 2003). Ook kan gedacht worden aan het inschakelen van een kind of een fa-

milieu uit een bepaalde cultuur om de studie te promoten aan leeftijdsgenoten met dezelfde culturele achtergrond.

Op het vlak van methodologische kwesties van de interventies, kan de werkzaamheid van de interventies mogelijk worden verhoogd door de preventieve interventies specifiek te richten op die kind- en oudergerelateerde (risico) factoren die vroeg in de angstontwikkeling optreden en niet zozeer aan angststoornissen gerelateerd hoeven te zijn. Zo zou het bijvoorbeeld mogelijk zijn dat familie interactie patronen pas dysfunctioneel worden als kinderen klinische angststoornissen hebben. In dat geval zou het onnodig zijn om de preventieve interventies te richten op dysfunctionele familie interactie patronen. Helaas zijn, voor zover wij weten, nog geen studies uitgevoerd die inzicht bieden in de vroege en late factoren van angstontwikkeling en hier kunnen toekomstige studies dus op insteken. Overeenkomstig met het idee dat interventies effectiever zouden zijn als ze worden aangepast aan de specifieke risicofactoren van de studie, toonde de huidige studie aan dat het aanbieden van een ouder-gerichte interventie als één van de ouders angstig is het meest kosten-effectief is. Het lijkt om die reden de moeite om ouderlijke angst voor de interventie te meten en, ingeval van hoogangstige ouders, een ouder-gerichte interventie aan te bieden. De lange termijn effecten van de interventies kunnen mogelijk verbeterd worden door booster sessies in te voegen (d.i. minimaal één extra sessie binnen een jaar na beëindiging van de interventie). Tijdens booster sessies kunnen deelnemers de geleerde cognitief gedragstherapeutische technieken weer ophalen en verder verfijnen (Neil & Christensen, 2009) en herhaling wordt in het algemeen gezien als de sleutel tot succes. De werkzaamheid van booster sessies is echter nog niet vastgesteld in een angstpreventie context, doordat er nog geen studies zijn uitgevoerd die de werkzaamheid van interventies met *booster* sessies vergelijken met de werkzaamheid van interventies zonder *booster* sessies.

De maatschappij kan sterk profiteren van onderzoeken waarbij interventies worden bestudeerd die goed te implementeren zijn, omdat dit de kloof tussen werkzaamheid (d.i. bevindingen onder gecontroleerde omstandigheden) en effectiviteit (bevindingen uit het “werkelijke leven”). Ook al is het bij het uitvoeren van een onderzoek belangrijk om bepaalde aspecten methodologisch te controleren (bijv. een randomisatie procedure toepassen om verschillen tussen de groepen te vermijden), zodat men zeker kan stellen dat de bevindingen van de studie gerelateerd kunnen worden aan de interventies, toch kunnen sommige aspecten van de interventie worden aangepast om de implementeerbaarheid van de interventie te verhogen. De haalbaarheid zou bijvoorbeeld vergroot kunnen worden door meer ouder-therapeuten contact tijdens de kind-gerichte interventies en meer kind-thera-

peuten contact tijdens de oudergerichte interventies toe te staan, zodat psycho-educatie breder kan plaatsvinden. Ook zou het haalbaarder en kosten-effectiever zijn om leraren in te schakelen voor het geven van de interventies in plaats van alleen psychologen en psychologie studenten deze taak te laten volbrengen, zoals in de huidige studie. Tenslotte bewezen Payne en Eckert via een multilevel method dat de eigenschappen van de structuur van de interventie de belangrijkste predictor betrof voor een kwalitatieve implementatie van preventie programma's op basisscholen (Payne & Eckert, 2010). Dat wil zeggen dat de kwaliteit van de implementatie toeneemt als een gestandaardiseerde en goed gesuperviseerd programma wordt toegepast, als de leden van het team regelmatig goede training krijgen en als scholen de interventies integreren in het schoolprogramma.

Op het vlak van het uitvoeren van de metingen, is het van belang in te gaan op het feit dat beide economische evaluaties in de vorm van een kosten-effectiviteitsstudie werden uitgevoerd vanwege de keuze van de uitkomstmaat. De meeste economische evaluaties bevatten zowel een kosten-effectiviteitsanalyse (waarbij de uitkomst uitgedrukt wordt als een eenheid van effect) als een kosten-utiliteiten analyse (waarbij de uitkomst uitgedrukt wordt als een voor kwaliteit gecorrigeerd levensjaar, ofwel QALY). In de economische evaluaties van het huidige proefschrift, werd de QALY maat niet meegenomen, ook al waren deze data aanwezig. Dit had te maken met het feit dat er op de voormeting relatief hoge utiliteiten werden gevonden ($M = .93$, $SD = .12$). Utiliteiten (minimum: 0, maximum: 1) drukken de voorkeur van de maatschappij uit om een bepaalde gezondheidstoestand te hebben, waarbij gezondheidstoestanden gebaseerd zijn op vijf gezondheidsgerelateerde dimensies (mobiliteit, zelf-zorg, gebruikelijke activiteiten, pijn/ongemak, angst/depressie) die gemeten worden door de vragenlijst EQ-5D. Op basis van de utiliteiten gevonden op ieder meetmoment werden de QALYs berekend. Doordat er op de voormeting zo een hoge utiliteit werd gevonden, was er nauwelijks ruimte voor verbetering, waardoor de QALY verschillen tussen de groepen niet te interpreteren vielen. De vragenlijst EQ-5D is bekend voor zijn plafondeffect in relatief gezonde populaties (Brazier, Roberts, Tsuchiya, & Busschbach, 2004). De hoge utiliteiten voor de interventies zijn niet kenmerkend voor kinderen met angstproblemen. Zo was de gemiddelde utiliteit voor kinderen met angststoornissen .85 in de studie van Bodden en collega's (2008). De hoge utiliteit van de huidige studie kan waarschijnlijk gerelateerd worden aan het feit dat de kinderen waren geworven binnen de gemeenschap in plaats van via klinische praktijken. Waarschijnlijk beïnvloedt angst meer gezondheids-gerelateerde aspecten in klinisch angstige kinderen dan in kinderen die niet klinisch angstig zijn, maar wel angstproblemen hebben.

Eén van de belangrijkste redenen die de deelnemers hadden om niet verder deel te nemen was dat het teveel werk zou zijn, waarmee waarschijnlijk bedoeld werd op het gebruik van een overvloed aan vragenlijsten en andere instrumenten. Ook al is het interessant en nuttig om psychosociaal functioneren op verschillende manieren te meten en om een breed scala aan risicofactoren mee te nemen in de analyses, toch moet men met name in een preventieve context zorgvuldig aandacht besteden aan het vinden van de juiste balans tussen wetenschappelijk interessante informatie te vinden en het overladen van deelnemers. Als er minder vragenlijsten zouden worden afgenomen tijdens de metingen, zouden er meer metingen kunnen plaatsvinden voor de belangrijkste uitkomstvariabelen (huidige studie: ADIS, SCARED-71 en kosten-dagboek). Zo zou het zeer nuttig zijn als de deelnemers meer kosten-dagboeken zouden invullen gedurende de studie, bijvoorbeeld tijdens de periode van de interventie en vaker tijdens de follow-up periode. Dit was niet gedaan in de huidige studie en kosten over twee jaar waren gebaseerd op informatie van drie kosten-dagboeken, tezamen met een kostencalculatie van de interventies. Ondanks de bevinding dat data voortkomend uit kostendagboeken representatief zijn voor lange tijdspannes (Goossens, Rutten-Van Mólken, Vlaeyen, & Van der Linden, 2000), toch leidt het beperkt aantal kostenmetingen binnen de huidige studie tot onzekerheid van de resultaten van de kosten-effectiviteitsanalyses. Tenslotte, zoals eerder vermeld, is het aangetoond dat preventieve effecten sterker worden met het verstrijken van de tijd. Om die reden zouden de follow-up metingen over lange-re tijdspannes moeten worden uitgevoerd, zodat de lange termijn kosten en effecten van preventieve interventies in kaart kunnen worden gebracht.

Conclusie

De resultaten van de huidige studie wijzen op de bruikbaarheid van het bestuderen van de vroegste risicofactoren van angststoornissen, op de werkzaamheid en de kosten-effectiviteit van preventieve interventies en op het nut en de kosten-effectiviteit van het toepassen van een screeningsprocedure gevolgd door het aanbieden van een interventie. Daarnaast blijkt dat het toepassen van de screeningsprocedure en het aanbieden van de ouder-interventie het meest kosten-effectief als ten minste één van de ouders angstig was. De sterkte van deze bevindingen was echter bescheiden en de resultaten moeten bevestigd en verder ondersteund worden door toekomstige longitudinale angstpreventie studies, waarbij de effecten over langere tijdspannes bestudeerd worden.

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Curriculum Vitae

Ellin Simon is geboren in Steenwijk in 1980. Ze studeerde Psychologie aan de Rijks universiteit Groningen en Cognitieve Neurowetenschappen aan de Universiteit van Utrecht en slaagde voor deze studies in 2003 en 2006.

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