

Confirming your worst fears

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CHAPTER 6

Summary and General Discussion

Childhood anxiety is associated with marked social, emotional, behavioral, and cognitive problems, which can have detrimental consequences later in life (Kessler et al., 2005). Research has shown that many anxiety disorders in adults are rooted in childhood (Muris, 2007), and therefore research on the developmental antecedents of these problems is highly relevant. The overall aim of this dissertation was to examine some of these developmental antecedents by investigating the relation between threat-related cognitive biases and childhood anxiety within a family context. Starting point was a theoretical model in which detrimental parenting (modeling and threat information transmission) installs cognitive biases, which in turn fuel fear and anxiety in children.

The results of the studies included in this dissertation have confirmed the notion that parenting behaviors as well as threat-related cognitive biases are involved in childhood anxiety. The findings enhance our understanding about risk- and protective factors in the origin and maintenance of childhood anxiety. In this chapter, I will first present a summary and overview of the main findings of the separate studies. Then, I will discuss the (clinical) implications of the findings. Finally, I will address the strengths and limitations of the studies and provide some suggestions for future research.

Rough-and-tumble play as a protective factor in the development of childhood anxiety

In our study on R&T play (**Chapter 2**), parents of non-clinical children (aged 2 to 6 years) were asked to complete measures of childhood anxiety symptoms and parental trait anxiety and overprotection, as well as a self-developed index of parental R&T play and care activities. The results showed that fathers more often exhibit R&T play with their children than mothers, while mothers exhibit more caring behaviors than fathers. This is in line with our expectations and findings of earlier studies (Bögels & Phares, 2008; Lindsey & Mize, 2001; Paquette, Carbonneau, Dubeau, Bigras, & Tremblay, 2003). Another hypothesis was that R&T play would be negatively associated with children's anxiety symptoms, because this parental variable is thought to act as a protective factor for the development of anxiety disorders, by making the child more resistant to challenging encounters (Bögels & Phares, 2008). This hypothesis was not supported by our data. That is, no statistically significant negative correlation between R&T play and child anxiety was found. One reason for the absence of this expected link could be that our operationalization of R&T play was too 'narrow'. More precisely, our R&T play measure did not include social elements such as teasing or more extreme parental behaviors such as the promotion of risk taking, which have been shown relevant in previous research (Gaumon & Paquette, 2013; Majdandžić,

Möller, Vente, Bögels, & van den Boom, 2014; Paquette & Dumont, 2013). Despite the fact that we did not find a direct relation between R&T play and child anxiety, we did find a significant interaction effect of R&T play and paternal trait anxiety on children's anxiety symptoms, indicating that low trait anxious fathers who reported to engage more frequently in R&T play, had more anxious children. A possible explanation for this finding could be that the R&T play of low anxious fathers is *too rough*, thereby unwillingly promoting the anxiety levels of their offspring.

Threat-related confirmation bias and anxiety

A threat-related confirmation bias can be defined as the inclination to search for information that is congruent to someone's fear and anxiety, while ignoring information that is incongruent to someone's fear and anxiety. Someone with such a bias would become more afraid because he or she is constantly looking for feedback that confirms fear and anxiety, while ignoring information that could disconfirm these emotional states. In **Chapter 3**, the relation between childhood anxiety and confirmation bias was investigated using an experimental procedure during which fear in 7- to 13-year-old children was elicited by showing pictures of two dangerously looking animals (i.e., aye aye and possum) and creating a contrast with one neutral (non-threatening) animal (i.e., quokka). Questionnaires were used to assess levels of perceived fear and threat for each of the animals, while confirmation bias was measured using the Search for Additional Information Scale (SAIS), during which children had the opportunity to request additional threatening or non-threatening information about the animals. It was found that children who experienced more fear and threat in relation to dangerously looking animals, displayed a stronger inclination to search for more threatening and less non-threatening information about these animals, indicating the presence of a confirmation bias. This pattern of information search was not found in case of the non-threatening animal. Altogether, these results confirmed our expectations and were well in line with previous research on confirmation bias in children (Muris, Huijding, Mayer, van As, & van Alem, 2011; Muris et al., 2009).

Cognitive biases as a mediator between detrimental parenting and childhood anxiety

Another important aim of this dissertation concerned the test of our theoretical model and was related to the question whether children's cognitive biases mediate the relation between detrimental parenting behaviors and childhood anxiety. More precisely, in **Chapters 4 and 5** it was hypothesized that children's cognitive biases

would act as a connector in the link between parental modeling and threat information transmission on the one hand, and children's anxiety symptoms on the other hand.

Chapter 4 is concerned with a cross-sectional study, which was conducted to investigate the relation between parental threat information transmission and modeling, two types of cognitive biases (interpretation bias and confirmation bias), and childhood anxiety. Parents as well as their children (aged 7 to 12 years) participated in this study. They both completed the Parental Enhancement of Anxious Cognitions (PEAC) questionnaire for measuring parental modeling and threat information transmission. Furthermore, children also filled in a scale for measuring anxiety symptoms and they performed a number of computerized tasks to assess confirmation and interpretation bias. Parents completed measures of trait anxiety and overprotection. The results indicated that both interpretation and confirmation bias mediated the link between parental threat information transmission and children's anxiety levels, which is in accordance with earlier studies investigating the mediational role of cognitive bias in the relation between detrimental parenting behaviors and childhood anxiety problems (Gallagher & Cartwright-Hatton, 2008; Pereira, Barros, Mendonça, & Muris, 2014; Perez-Olivas, Stevenson, & Hadwin, 2008). Only interpretation bias (not confirmation bias) mediated the link between modeling (of mothers only) and children's anxiety symptoms. The finding that the mediation effect in the case of modeling was less convincing than that for threat information transmission may well have to do with the operationalization of our measurement of cognitive biases, which was more verbal in nature. This could be the reason that these biases are more clearly related to threat information transmission, which also refers to a verbal process. The mechanism operating during parental modeling is less verbal and might relate to a more implicit process such as social referencing (de Rosnay, Cooper, Tsigaras, & Murray, 2006). The results of the study presented in **Chapter 4** further revealed significant correlations between parental trait anxiety and overprotection on the one hand, and parental modeling and threat information transmission on the other hand, which can be taken as tentative support for the validity of the PEAC scales.

Chapter 5 describes the follow-up study of the children and parents who were included in the cross-sectional study presented in **Chapter 4**. On three time points during a 1-year period, children and parents completed the same set of measures to assess detrimental parenting, cognitive biases, and anxiety symptoms. We only focused on the results of the child-report data, because cross-informant correlations were very weak and in most cases non-significant. The results of this longitudinal study yielded somewhat different results than those obtained in the cross-sectional investigation. First of all, it was found that cognitive biases and anxiety influenced each other bi-directionally. More precisely, on each of the three time points, most

support was found for a model in which interpretation bias enhanced confirmation bias, which subsequently promoted anxiety, which in turn had an enhancing effect on interpretation bias. These findings are in accordance with earlier findings also highlighting the bi-directional relationship between cognitive bias and anxiety (e.g., Remmerswaal, Huijding, Bouwmeester, Brouwer, & Muris, 2014). Further, unexpectedly, it was found that cognitive biases and anxiety had an influence on detrimental parenting instead of a scenario in which detrimental parenting had an impact on cognitive biases and anxiety, which seems to indicate that it is more likely that anxious children elicit detrimental parenting behaviors than the other way around. While such an effect has been noted elsewhere in the research literature (e.g., Brunk & Henggeler, 1984), the result may also have to do with the method of the study (i.e., using only child self-report) and simply reflect another type of cognitive bias in children, that is an attention bias for negative parenting behaviors. Most interestingly, the study presented in **Chapter 5** yielded no evidence for longitudinal associations between cognitive biases and anxiety. Thus, there were no indications that cognitive biases increased anxiety levels or that anxiety levels enhanced cognitive biases over time. The same was true with regard to the parenting variables of threat information transmission and modeling, for which no longitudinal associations with anxiety or cognitive biases were found. Given these results, it was no longer justifiable to test the aforementioned mediational model in which cognitive biases act as the connector between parenting and childhood anxiety (see Barrett, Rapee, Dadds, & Ryan, 1996; Remmerswaal, Muris, & Huijding, 2016; Sicouri et al., 2017).

Parenting factors in the development and maintenance of childhood anxiety

The relation between parenting and children's anxiety symptoms is often assumed to be unidirectional: for example, overprotection, modeling, threat information transmission, or anxious rearing have an enhancing effect on children's anxiety symptoms, whereas R&T play has a protective impact on this type of emotional symptoms. In **Chapter 4**, evidence was found for the relation between parental modeling and threat information on the one hand, and children's anxiety symptoms on the other hand. However, as in most other investigations in this research field, this evidence was merely correlational in nature. On the basis of our longitudinal study, in which we analyzed our results by means of structural equations modeling (using LISREL), we came to a totally different conclusion, namely that cognitive biases and anxiety symptoms had an enhancing influence on detrimental parenting. This seems to indicate that anxious children elicit detrimental parenting.

This point has also been made in a review by Fisak and Grills-Taquechel (2007), who noted that when examining family prevalence rates, one can perform top-down studies that investigate anxiety in children of parents with an anxiety disorder, and bottom-up studies, which examine anxiety in the parents of children with an anxiety disorder. Both designs have shown that anxiety symptoms and disorders run in families, and on the basis of these results it is often assumed that the transmission of anxiety goes from parent to child. However, it cannot be ruled out that the transfer occurs the other way around or may even be bi-directional (Fisak & Grills-Taquechel, 2007).

There is increasing evidence that the latter scenarios are indeed more valid. That is, observational, experimental, and survey studies have shown that parents of anxious children are more intrusively involved, more negative, and less emotionally warm than parents of nonclinical children (Hudson, Doyle, & Gar, 2009; Hudson & Rapee, 2001; Siqueland, Kendall, & Steinberg, 1996). In one of these studies an experimental and observational procedure was applied (Hudson et al., 2009). Forty-five children with an anxiety disorder were compared to 46 nonclinical children. Mothers and children (aged 7 to 14 years) were observed during a speech preparation task. Each mother had to interact with a child from the same diagnostic group as their child and with a child from the other diagnostic group. Results indicated that mothers of clinically anxious children were more negative during interactions with clinically anxious children than with nonclinical children (Hudson et al., 2009). This implies that the anxiety level of the child may elicit negative parenting. Several other experimental studies have also shown that by manipulating children's behaviors, parental responses can be affected (e.g., Brunk & Henggeler, 1984; Osofsky & O'Connell, 1972). It is therefore important to stress the reciprocal relation between parenting and child anxiety rather than a direct causal effect of parental behavior on child anxiety (Gouze, Hopkins, Bryant, & Lavigne, 2017).

The importance of including both parents in research

Several studies in this dissertation (**Chapter 2, 4, and 5**) have stressed the importance of investigating the (different) roles of mothers and fathers. In **Chapter 2**, it was found that mothers showed more caring behavior, while fathers showed more R&T play behavior towards their children. In **Chapter 4**, the results were analyzed separately for mothers and fathers. It was found that from the children's point of view, mothers displayed more modeling and threat information transmission than fathers. However, in the tested mediation models, no evidence was found indicating that mothers and fathers play a different role. In **Chapter 5** it was decided to average the child-reported

mother- and father data, since they were strongly correlated. However, one should be aware that this strong correlation might have been mainly due to the fact that children rated mother- and father parenting behaviors on one and the same questionnaire.

Previous studies often had the problem that only mothers were included. This is because mothers are often seen as the primary caregiver of the child and are more easily accessible for participation in research. However, it has been argued that fathers do play a unique role in the development and maintenance of anxiety problems in children (see review by Bögels & Phares, 2008). From an evolutionary perspective, one can argue that fathers are specialized in confronting their offspring with the external environment by having encounters with potentially dangerous animals and unfamiliar people, while mothers provide their children with comfort and food and typically take care of the internal protection of their offspring (Bögels & Perotti, 2011). It has been argued that these differential roles of mothers and fathers are reflected in their parenting behavior, with mothers showing more caring and nurturing behaviors and fathers showing more challenging and risk-taking behaviors (Bögels & Perotti, 2011). Therefore, it is important to hold this differential role of parents in mind with regard to studies involving parenting behaviors.

Clinical implications

The findings of this thesis could have clinical implications for the treatment as well as the prevention of childhood anxiety. When we consider the clinical implications of the present findings, two questions can be raised: (1) Is it useful to involve parents in the treatment of children with anxiety problems? And (2) Is cognitive bias modification training a useful alternative for treating children with this type of internalizing problems?

Related to the first question we can look at studies involving parents in the therapy of children with anxiety disorders. The results concerning the inclusion of parents in the treatment of anxious youths are mixed (see review by Barmish & Kendall, 2005). However, a number of parenting factors seem to be potential candidates contributing to the maintenance of anxiety and as such could be regarded as useful targets for treatment. A recent systematic review on the relation between parenting behavior and child anxiety included several studies that were based on questionnaires, observations, and experimental designs (Emerson, Ogielka, & Rowse, 2018). It was shown that several parental factors, including modeling, parental expectations, and (anxious) rearing behaviors, were of influence on children's anxious cognitions. We can also conclude from our cross-sectional study that parental modeling and threat information transmission might be relevant factors related to childhood anxiety.

However, this conclusion does not hold for the longitudinal study included in this dissertation, in which we found no evidence for the claim that parental behaviors enhanced anxiety symptoms in children. Instead, the data indicated a reverse relation with the parenting behaviors of modeling and threat information being an epiphenomenon of children's anxiety.

Next to the involvement of detrimental parental behavior in childhood anxiety, it has furthermore been shown that when parents provide positive information about a stimulus or situation to the child, fear and avoidance behavior of children can be successfully reduced (Kelly, Barker, Field, Wilson, & Reynolds, 2010; Muris et al., 2011; Remmerswaal, Muris, Mayer, & Smeets, 2010). Therefore, this type of parenting behavior could be employed to diminish anxiety or maybe even prevent the development of childhood anxiety.

The second important question 'Do these cognitive biases offer a lead that can be exploited during therapy?' is related to our findings regarding cognitive biases and childhood anxiety. The most frequently used treatment to reduce anxiety is cognitive behavioral therapy (CBT), which includes techniques such as cognitive restructuring, exposure-based behavioral interventions, and relaxation training (Heimberg, 2002). CBT has shown to be effective in reducing anxiety in youth (see meta-analysis by Scaini, Belotti, Ogliari, & Battaglia, 2016), although there is still a substantial minority of people who does not respond to this type of intervention. Furthermore, there are studies showing that this treatment fails to show clinically significant responses (see review by Kendall, Settipani, & Cummings, 2012).

According to cognitive theories, biases in information processing and cognitive control deficits play an important role in the etiology and maintenance of anxiety disorders (e.g., Mathews & MacLeod, 2005). Therefore, cognitive bias modification (CBM) training could offer a possible solution in this regard. Computerized training programs have been developed that aim to correct the typical errors in information processing that are often noted in people with anxiety disorders. In the case of interpretation bias, participants are trained to interpret stories in a positive way by prompting the anxious individual to complete a word fragment in a positive way. For confirmation bias, participants can be trained to search for positive instead of negative information by providing them with feedback regarding their choices.

A study that documented a significant reduction in childhood anxiety following CBM training was conducted by Reuland and Teachman (2014). In this study, the researchers investigated the effects of interpretation bias modification in 18 socially anxious children aged 10-15 years using a between-subjects design. In the first treatment condition, cognitive biases of the children were corrected. In the second condition, an attempt was made to modify the cognitive biases of the parents. In the

third condition, the cognitive biases of both the child and the parents were targeted. The results indicated a decrease in anxiety symptoms, although there were no significant differences across the three conditions.

A further study showing the efficacy of CBM training in children relied on a non-clinical sample of 43 10- and 11-year-old children who were selected for high social anxiety (Vassilopoulos, Banerjee, & Prantzalou, 2009). Half of the children were trained over a two-week period including three sessions prompting them to choose benign over negative interpretations of potentially threatening social scenarios. The other half of the children were included in a test-retest control group. It was found that after training, children in the experimental condition showed lower levels of interpretation bias and social anxiety symptoms in comparison to the control group (Vassilopoulos et al., 2009).

Another study that used a highly similar paradigm showed less positive outcomes of this type of training (Orchard, Apetroaia, Clarke, & Creswell, 2017). In this study, 56 children (7 to 12 years old) with a diagnosis of social anxiety disorder were included. Half of the children performed 3 sessions of cognitive bias modification training targeting interpretation bias, while the other half did not receive the training. Participants were instructed to choose between a threatening and a non-threatening ending for a set of 15 ambiguous scenarios and after each scenario they were provided with feedback to train them towards choosing the non-threatening response. Results showed that there were no effects of the training on interpretation bias and social anxiety (Orchard et al., 2017).

In general, studies conducted so far on the employment of CBM for treating anxiety have yielded mixed results. Several meta-analyses (mostly including adult participants) have shown that CBM programs produced significant but rather weak changes in information-processing styles and anxiety symptoms (Cristea, Kok, & Cuijpers, 2015; Eldar et al., 2012; Hakamata et al., 2010; Hallion & Ruscio, 2011; Heeren, Mogoșe, Philippot, & McNally, 2015; Mogoșe, David, & Koster, 2014). Effect sizes of these studies investigating the impact of CBM on a reduction in anxiety are in fact small ($g = 0.13$; Hallion & Ruscio, 2011). In comparison, the effect sizes found in studies involving CBT for anxiety problems are considerably larger ($g = 0.73$; Hofmann & Smits, 2008). In addition, indications of publication bias have been found in the CBM research field (Liu, Li, Han, & Liu, 2017).

Despite the fact that studies have shown inconsistent results, several characteristics of CBM have been identified that appear to produce more successful outcomes. The first feature is that this intervention should include multiple sessions (Hallion & Ruscio, 2011; Lisk, Pile, Haller, Kumari, & Lau, 2018). A second characteristic of a good program is based on the idea that cognitive biases are likely to be mutually

reinforcing (Hirsch, Clark, & Mathews, 2006). Thus, the training should target various types of biases to create a combined effect (de Hullu, Sportel, Nauta, & de Jong, 2017; Sportel, de Hullu, de Jong, & Nauta, 2013). A third important element is that the training should be ecologically valid by providing the participants with real-life situations they can identify with (Hallion & Ruscio, 2011). Furthermore, it has been suggested that CBM would be more suitable for some anxiety disorders than for others. For example, people with social anxiety disorder display the lowest rates of treatment utilization of the anxiety disorders. The vast majority never seek treatment for their social anxiety and those who eventually do so make an initial appointment only after several years with the disorder (Grant et al., 2005; Olfson et al., 2000). For CBM programs, the threshold to seek help would probably be lower as compared to CBT and therefore such an intervention seems to be an interesting alternative for people with this type of anxiety problem. Furthermore, CBM could also be a good solution for less severe cases of anxiety problems in general and could serve as a preventive method.

Strengths and limitations of the current research project and future directions

The studies in this dissertation are characterized by a number of strengths. First, both mothers and fathers are included in the studies. This is important because both mothers and fathers have different roles in the upbringing of children, which should also be taken into account in future research on the role parenting variables in childhood anxiety. Second, the inclusion of two different biases is also a strong point, as most of the previous studies often took only one cognitive bias into account. This provides the opportunity to look at the differential influence of both confirmation bias and interpretation bias on childhood anxiety. Third, all paradigms used in the studies were designed in such a way that they had high ecological validity. Thus, the paradigms reflected typical daily situations feared by anxious children. Fourth, a newly developed questionnaire, the Parental Enhancement of Anxious Cognitions (PEAC) was developed, which made it possible to simultaneously examine both parental modeling and threat information transmission within the context of childhood anxiety.

Despite these strengths, the results of this dissertation should be interpreted in the light of a number of limitations, which also form a starting point for recommendations for future research. The first issue has to do with the format of the PEAC. Children's scores of their mothers' and fathers' rearing practices on this scale appeared to be strongly correlated, which may have been the result of the method of scoring each item simultaneously for both parents. For future studies, it would be advisable to present the father and mother versions of this questionnaire serially instead of parallel.

A second limitation has to do with the (dis)agreement between parents and children. We have particularly looked at this in **Chapter 4 and 5** and found out that the correlations between child- and parent-reported data was all rather low (all r 's $< .28$). This is a common problem in childhood psychopathology literature when using cross-informant data (see the review by De Los Reyes & Kazdin, 2005). However, parents as well as children both provide useful information from their own viewpoint which seems to be important for our understanding of the origins children's anxiety problems.

A third limitation pertains to the strong reliance on self-report measures. Especially for the key constructs of modeling and threat information transmission, it would have been important if we had not only employed self-report rating scales, but also had included some kind of interview or observational method to assess these fear-enhancing parental behaviors. For example, children could have either been asked open-ended questions to learn more about their parents' actual behaviors or how threatening their parents view the world (in relation to new places, unfamiliar people, or risky situations), or child-parent interactions could be observed in challenging situations. Especially in the light of the low parent-child agreement on the questionnaires, this approach would have given insight on the relative validity of various questionnaire data.

A fourth limitation has to do with the design of the studies. A drawback of the design in **Chapter 4** is the cross-sectional nature of the study, which precludes interpretations in terms of cause-effect relations. The longitudinal approach of **Chapter 5** was an improvement in this regard. However, even when conducting longitudinal studies, it remains possible that both biases and anxiety are caused by a third factor (such as neuroticism). Therefore, the most powerful way to test causation is to manipulate cognitive variables and observe the impact on emotional experience. This can only be achieved by means of an experimental design. Such an experimental design would also be useful to not only test the effect of parenting behavior on anxiety of children, but also the other way around. By manipulating the behavior of children, we could investigate the effect on parental behavior. Such an approach would give us more insight in the relation between parenting and childhood anxiety.

A final limitation has to do with the fact that all studies have been executed in nonclinical samples, making it difficult to generalize the results to a clinical population. It would be interesting to investigate the relations between parenting, cognitive biases, and childhood anxiety in clinical samples in future research.

Some additional considerations might be taken into account in future research. First of all, while parents can be considered as an important source of threat information for their children, other sources may be important as well. Media and

peers have also been shown to have a significant influence that is independent from parental information (e.g., Remmerswaal & Muris, 2011), and should therefore also be considered in future studies. Another important consideration has to do with the age range of the children and the developmental perspective. It is likely that several cognitive, social, and emotional capacities first have to be developed before certain cognitive biases can emerge. Few researchers have explored information processing biases within a developmental framework and therefore future studies should use a wider age range and compare different age groups to gain more insight into age-related changes with regard to cognitive biases and the influence of parents (Hadwin & Field, 2010).

Concluding remarks

Altogether, the results indicate that familial learning experiences and cognitive biases are implicated in children's anxiety symptoms. The following conclusions can be drawn from the studies included in this dissertation: (1) Mothers and fathers appear to play different roles in the upbringing of their offspring and as such may also have a differential impact on their children's anxiety level. With regard to R&T play, we found that fathers showed more of this behavior than mothers. In contrast, mothers showed more caring behaviors than fathers. With regard to modeling and threat information transmission, the rates at which parents exhibit these behaviors also differ. According to children, mothers show more of these detrimental parenting behaviors than fathers do. Although the rates at which parents exhibit modeling and threat information transmission differ, the mechanisms appear to be highly similar for both mothers and fathers: that is, modeling and threat information transmission have the same relation to children's anxiety and cognitive biases for both mothers and fathers. Another important conclusion is that (2) childhood anxiety and cognitive biases influence each other bi-directionally. In this circular relation, interpretation bias has an effect on confirmation bias, which in turn has an effect on childhood anxiety, which influences interpretation bias again. Next to the fact that anxiety and bias influence each other in a bi-directional way, this conclusion also seems to hold for the relation between childhood anxiety and detrimental parenting behaviors (3). In our cross-sectional study, evidence was found suggesting that detrimental parenting styles (modeling and threat information transmission) have an influence on anxiety. In our longitudinal study we found this relationship to be rather the other way around: anxiety in children evokes detrimental parenting. Finally, (4) the support for our theoretical model in which cognitive biases act as mediators in the relation between detrimental parenting and childhood anxiety, was weak. While we did find partial

support for our model in the cross-sectional study presented in **Chapter 4**, we did not find any proof of evidence when using a methodologically superior longitudinal study design (**Chapter 5**). It thus remains important to further study the effects of cognitive biases on anxiety within a familial context, both for the formation of better theories as well as for improving intervention strategies for anxious youth in the clinical setting.

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