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Exploring Parental Predictors of Child Anxiety: The Mediating Role of Child Interpretation Bias

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Abstract

Background—Separate lines of research have shown that higher levels of parental overcontrol and parental anxiety are related to higher levels of child anxiety. The mechanisms of transmission, however, are poorly understood.

Objective—It has been theorized, though not empirically tested, that parental overcontrol and anxiety increase children's interpretation bias by signaling to the child that the environment is threatening (e.g. through modeling or restriction of autonomy), thus increasing the child's anxiety level.

Methods—The present study investigated this theory using 75 parent–child dyads (parents aged 27–52, 82 % female; children aged 7–12, 52 % female, 80 % Caucasian). All parents were diagnosed with a primary anxiety disorder, while no child was diagnosed with an anxiety disorder.

Results—Children's interpretation bias, measured using ambiguous stories, was shown to partially mediate the relation between parental overcontrol and child anxiety and completely mediate the relation between parental anxiety and child anxiety. There was no significant relation between parental overcontrol and parental anxiety.

Conclusions—Findings partially support theoretical models, which posit that higher levels of overcontrol and parental anxiety signal to children that their environment is threatening, perhaps increasing their threat appraisal of ambiguous situations and increasing their anxiety. Implications and directions for future research are discussed.

Keywords

Child; Parent; Cognitions; Parenting; Overcontrol; Anxiety

Introduction

There is strong empirical evidence that a cognitive bias toward threatening stimuli is associated with higher levels of anxiety in children (Hadwin et al. 2006). While

interpretation bias has been measured in different ways, findings using ambiguous stories have consistently shown that anxious children show an increased tendency to interpret ambiguous situations as threatening (Barrett et al. 1996; Chorpita et al. 1996; Creswell and O'Connor 2006; Dineen and Hadwin 2004; Muris et al. 2003a). Furthermore, children with higher levels of anxiety are faster and require less information to conclude that ambiguous stories will be threatening (Muris and van Doorn 2003; Muris et al. 2000). Bögels and Zigterman (2000) reported that anxious children (ages 9–18; $n = 15$) interpreted ambiguous stories as more threatening than clinical controls (ages 9–17; $n = 15$; children diagnosed with oppositional defiant disorder, attention deficit-hyperactivity disorder, or conduct disorder). In a 1-year longitudinal study of a community sample ($n = 65$), Creswell and O'Connor (2011) found that children's (10–11 years of age) anticipated distress response to ambiguous stories predicted an increase in anxiety symptoms over time. A similar finding was reported by Warren et al. (2000). Thus, it appears that interpretation bias may play a significant role in the development of anxiety disorders in children (Creswell et al. 2011). As such, the development of anxious interpretative biases in children, and their role in developmental models of anxiety, becomes a vital focus of research.

While genetic influences, like personality characteristics, may play a role in the development of interpretative biases (Eley and Zavos 2010), and in turn anxiety, there is a growing body of literature examining environmental, explicitly parental, factors. Specifically, there is evidence that parental anxiety and parental interpretation bias are subsequently related to interpretation bias in children (Creswell et al. 2011; Field and Lester 2010). Lester et al. (2009) reported that parents showed a similar interpretation bias for ambiguous situations involving themselves and their child (as measured by ambiguous stories pertaining to their own environment and that of their children). Furthermore, anxious, compared to nonanxious, parents demonstrated higher interpretation bias in ambiguous situations for both themselves and their children (Lester et al. 2009). As such, anxious parents may view their own and their child's environment as more threatening than nonanxious parents and may communicate that threat to their child. In support of this hypothesis, Creswell et al. (2005) reported that parent and child responses to ambiguous situation questionnaires were highly correlated in a clinical sample of 27 parent–child dyads. Analogous results were found using a non-clinical sample (Creswell and O'Connor 2006).

Despite emerging evidence of the association between parental anxiety, parental interpretation bias and child interpretation bias, less is known about the influence of parental behaviors and child interpretation biases. One such behavior, parental overcontrol, defined as an excessive amount of involvement in a child's daily routine and activities, or emotional experiences, and an encouragement of dependence on the parents (Barber 1996), is thought to signal to children that their environment is threatening and that they will be unable to cope or master such situations on their own. Consequently, children whose parents are more overcontrolling may perceive ambiguous or nonthreatening situations as threatening; therefore increasing their level of anxiety (Chorpita and Barlow 1998; Hudson and Rapee 2004; Wood 2006). Conversely, allowing children autonomy is thought to allow them to gain mastery over their environment, thereby reducing their perceptions of threat and decreasing their level of anxiety (Affrunti and Ginsburg 2012; Wood et al. 2003). One study found that attention bias (as measured through a visual search task) partially mediated the relation between maternal overcontrol and separation anxiety in sample of 129 non-referred children aged 6–14 years old (Perez-Olivas et al. 2008). Although this study used only nonanxious children in its sample, was restricted to separation anxiety as its only outcome measure, and the effect of parental overcontrol on interpretation (as opposed to attention) bias was not explored, it suggests that interpretation bias may mediate the relation between both parental anxiety and parental overcontrol and child anxiety.

The present study addressed this issue. Specifically, we investigated a theoretical model (see Fig. 1) that hypothesized that the relations between parental overcontrol and child anxiety level, and parental anxiety and child anxiety level, would each be mediated by the child's interpretation bias. Testing this model provides important information in understanding how interpretation bias, and subsequently anxiety, develops in children and how parents may maintain or increase this bias with certain parenting behaviors. Second, we investigated the relative importance of parental anxiety and parental overcontrol within this model. This builds upon previous research by identifying the associations between parental anxiety, parental overcontrol, child interpretation bias, and child anxiety, within a single model, and determining whether or not parental anxiety or parental overcontrol were more strongly related to interpretation bias, and subsequently anxiety, in children.

Method

Participants

Participants were 74 parent–child dyads. All parents met criteria for a DSM-IV anxiety diagnosis, generalized anxiety disorder ($n = 52$), social phobia ($n = 10$), obsessive compulsive disorder ($n = 4$), panic disorder with agoraphobia ($n = 4$), panic disorder without agoraphobia ($n = 3$), and specific phobia ($n = 1$). The presence or absence of diagnoses was determined by trained evaluators using the Client ADIS (Brown et al. 1994). Participating parents were primarily female (82.7 %) and ranged in age from 27 to 52 ($M = 40.75$, $SD = 5.22$). The majority of parents had a college degree or higher (88 %), a family income of 80,000 or more (76 %), and were married (85.3 %).

Children ranged in age from 7 to 12 years of age ($M = 8.86$, $SD = 1.64$) and were primarily Caucasian (82.2, 5.5 % African American). There was an even split between male and female children (52.1 % female). Twenty-three percent of the children had total scores over 25 (the suggested clinical cut off) on the Screen for Child Anxiety-Related Emotional Disorders—Child Version (SCARED-C); the range of scores was 0–41. None of the children were diagnosed with an anxiety disorder, or any other psychiatric or medical condition needing treatment, or were receiving psychological or pharmacological treatment aimed at reducing anxiety. This study selected a sample of non-anxious children as previous research has implicated excessive child anxiety as influencing parenting behaviors (Hudson and Rapee 2004; Hudson et al. 2009).

Procedure

Families were recruited as part of a larger study examining the impact of an anxiety prevention program on non-anxious offspring of anxious parents (Ginsburg 2009). All families who contacted the study completed a preliminary phone screen to determine their eligibility, prior to an in-person evaluation. Families that were deemed eligible based on this phone screen were scheduled for an in-person assessment in which all the measures of the present study were administered. Prior to completing their initial evaluation, all participants, both children and parents, completed a written informed assent/consent.

Measures

Parental Anxiety—Parental anxiety was measured using the State-Trait Anxiety Inventory (Trait Version) (STAI; Spielberger et al. 1983), a 20-item questionnaire measuring the stable, enduring symptoms of anxiety. The measure uses a 4-point Likert scale from 1 (almost never) to 4 (almost always) and yields a total score. Scores range from 20 to 80, where higher scores indicate greater anxiety. The STAI correlates highly with other measures of adult anxiety ($rs = .73-.85$) and has shown excellent test–retest reliability ($rs = .73-.86$). The internal consistency for this scale in the current sample was .91.

Parental Overcontrol—Parental overcontrol was measured using child reports on the *Egna Minnen Beträffande Uppfostran*—My memories of upbringing—Child version (EMBU-C; Muris et al. 2003a, b, c), a 40-item scale used to assess perceptions of parental behaviors. The questionnaire includes 4 subscales, each with 10 items; overprotection/control, emotional warmth, rejection, and anxious rearing. Each item is answered using a 4-point Likert scale from 1 (no, never) to 4 (yes, most of the time). For the purposes of this study only the overprotection/control subscale was used. Scores range from 10 to 40, where higher scores indicate greater overcontrol. A sample item of this subscale is “your parents watch you very carefully.” The internal consistency for the 10-item subscale for the current sample was .65.

Child Interpretation Bias—Child interpretation bias was measured using five hypothetical, ambiguous stories using experimental procedures adopted from Barrett et al. (1996), Muris et al. (2003a, b), and Lu et al. (2007). Two stories consisted of five sentences, one story consisted of four sentences, and the final two stories were three sentences. Stories consisted of two social stories (e.g. giving an oral report in front of the class, approaching unfamiliar children playing a game) and three generalized anxiety stories (e.g. riding your bike on a busy street, encountering your teacher on the playground, losing a book at school). Children were read stories aloud, one sentence at a time, by a trained independent evaluator. After each sentence, children were instructed to give a rating for how threatening they perceived the story would be (i.e., will the story have a bad or scary ending), on a scale of 0–4, where 0 = “not threatening at all”, 1 = “a little threatening”, 2 = “somewhat threatening”, 3 = “quite threatening”, and 4 = “very, very threatening.” Although children were told to focus on what would happen at the end of the story, threat ratings were obtained throughout the procedure. At the end of each story, children were read the story a second time, without interruption, and were then asked to provide an open ended answer to what would happen next in that situation. Scoring for this study involved only a determination of the threat rating. The threat rating was the mean rating of all responses, except for the open ended responses, totaled across the five stories. The range for the mean threat rating was from 0 to 2.9. The internal consistency for this measure was .91.

Child Anxiety—Child anxiety was measured using the SCARED-C (Birmaher et al. 1997). The SCARED-C is a 41-item measure of pediatric anxiety shown to differentiate between clinically anxious and nonanxious psychiatrically ill youth (Birmaher et al. 1997). Children answer questions using a 3-point Likert scale indicating to what degree a statement about themselves is true, from 0 (not true) to 2 (very or often true). The SCARED-C yields a total score, obtained by summing the 41 items, and five subscale scores which correspond to some of the DSM-IV anxiety disorders (subscales are panic, generalized anxiety, separation anxiety, social anxiety and school phobia). For the purposes of this study the SCARED-C Total score was used to assess overall anxiety levels. Possible total scores range from 0 to 84, where higher scores reflect higher overall levels of child anxiety. Internal consistency for the total score for this sample was .89.

Results

Descriptive and Correlational Analyses

Means and standard deviations on all measures appear in Table 1. In order to establish the relations between variables needed for mediational analyses, first order correlations were calculated between the two IVs, DV, and mediator. Table 1 shows the first order correlations between child anxiety, parental anxiety, parental overcontrol and child interpretation ratings. Child anxiety was significantly and positively associated with levels of parental overcontrol

and child interpretation bias rating. Levels of child interpretation bias ratings were significantly related to levels of parental overcontrol and level of parental anxiety.

Mediational Analyses

To examine the first research question, namely, does child interpretation bias mediate the relation between parental factors (anxiety and overcontrol) and child anxiety, we ran mediation analyses. Mediation was tested by determining the significance of the indirect effect of the independent variable (parental overcontrol and parental anxiety, X) on the dependent variable (child anxiety, Y) through the mediator (child interpretation bias rating, M), quantified as the product of the effects of Y on M and M on X, deducting the effect of Y. The Sobel test was used to determine if the indirect effect was statistically significant (Baron and Kenny 1986; Sobel 1982). As Fig. 1 shows, the total effect of parental overcontrol on child anxiety was significant ($t = 4.06, p < .01$). Also, there was a significant effect of parental overcontrol on child interpretation bias rating ($t = 2.77, p < .01$) as well as child interpretation bias rating on child anxiety, when controlling for parental overcontrol ($t = 3.51, p < .01$). This resulted in a significant indirect effect ($z = 2.17, p = .03$). That is, child interpretation bias rating was a significant mediator of the relation between parental overcontrol and child anxiety (Fig. 1). Despite significant mediation, the direct effect ($c' t = 3.08, p < .01$) remained significant, suggesting that child interpretation bias rating was only a partial mediator.

As Fig. 1 further shows, the total effect of parental anxiety on child anxiety was significant ($t = 2.48, p = .02$). There was also a significant effect of parental anxiety on child interpretation bias rating ($t = 2.33, p = .02$) as well as child interpretation bias rating on child anxiety, when controlling for parental anxiety ($t = 3.95, p < .01$). This resulted in a significant indirect effect ($z = 2.07, p = .04$). That is, child interpretation bias rating was a significant mediator of the relation between parental anxiety and child anxiety (Fig. 1). The direct effect of parental anxiety on child anxiety ($c' t = 1.58, p < .12$) was not significant, suggesting that child interpretation bias rating completely mediated this relation. There was no significant association between parental anxiety and parental overcontrol ($t = .633, p = .53$). Additionally, there was no significant interaction effect of overcontrol with either parental anxiety ($t = .434, p = .67$) or child interpretation bias rating ($t = -.081, p = .94$) on child anxiety.

To examine our second aim, regarding the relative strength or importance of the parental variables within this model, we tested the significance of the independent association between parental overcontrol and child interpretation bias and parental anxiety and child interpretation bias using Fisher's r -to- Z transformation (Cohen and Cohen 1983). Correlation coefficients were determined by running linear regressions between either parental overcontrol or parental anxiety and child interpretation bias, while controlling for the other independent variable. That is, the regression between parental overcontrol and child interpretation bias controlled for parental anxiety ($r = .07$) and the regression between parental anxiety and child interpretation bias controlled for parental overcontrol ($r = .13$). According to Fisher's r -to- Z transformation, used to compare the two correlation coefficients, the two associations were not significantly different ($z = .34, p = .73$). In other words, there was no difference in the strength of association between child interpretation bias and parental anxiety and parental overcontrol.

Discussion

The twofold purpose of this study was to empirically examine whether child interpretation bias mediated the relation between parental factors (parental anxiety or overcontrol) and child anxiety and also to determine the relative importance of these parental factors in

relation to child interpretation bias. Based on theoretical models (e.g. Chorpita and Barlow 1998) we hypothesized that child interpretation bias would mediate the relations between parental overcontrol and child anxiety and parental anxiety and child anxiety. Overall, our data provided partial support for this model. Consistent with previous research (Barrett et al. 1996; Chorpita et al. 1996; Creswell and O'Connor 2006; Dineen and Hadwin 2004; Muris et al. 2003a), children that ascribed higher levels of threat to ambiguous situations had higher levels of anxiety. Further, parents who exhibited higher levels of overcontrolling behaviors, such as watching their child very carefully, demanding to know what their child is doing, and not allowing their child to decide what they want to do, had children that ascribed higher levels of threat to ambiguous situations and had higher levels of anxiety. That is, interpretation bias influenced child anxiety directly, and acted as a partial intermediary for the relation of parental overcontrol and child anxiety.

Stronger mediational results were found when examining parental anxiety level in the place of parental overcontrol; as parental anxiety level increased, children's tendency to interpret ambiguous situations as threatening also increased, as did their level of anxiety. This suggests that parents' anxiety directly increases children's interpretation biases, which subsequently increases their anxiety level. However, given the cross sectional nature of this study, it is equally plausible that increases in anxiety led to increases in perceptions of threat (Muris et al. 2004).

With respect to the second aim, there was no difference in the independent strength of the relations between parental anxiety and child interpretation bias and parental overcontrol and child interpretation bias, and, consistent with previous research, there was no relation between parental overcontrol and parental anxiety (Costa and Weems 2005). As such, it is likely that each exerts separate and unique effects. Specifically, the influence of parental anxiety on children's interpretation bias may be due to genetics (see Eley and Zavos 2010), or anxious modeling (i.e., parents may voice their worries of danger and threat out loud in front of the child; Field 2006; Field et al. 2007; Murray et al. 2007a, b). Indeed, there is evidence that interpretation biases can be induced over repeated trials (Mathews and MacLeod 2002) and that this may be analogous to what a child with an anxious parent experiences as they develop (Lester et al. 2009). Parental overcontrol, as noted, may affect children's interpretation bias by signaling that their environment is dangerous and restricting their opportunities to encounter (and thus minimize) perceived challenges or threatening situations.

These findings expand our understanding of the relation between parental anxiety, parental overcontrol, and child interpretation bias and child anxiety. In building on the work of Perez-Olivas et al. (2008), we found that interpretation bias, rather than attention bias, mediated the relation between parental overcontrol and child anxiety, and extended anxiety from one domain (separation) to a general rating of anxiety. Furthermore, we provided support for studies that have shown an association between parental anxiety and child interpretation bias (Bögels et al. 2003) but develop them further by including parental behaviors (i.e., overcontrol) and child anxiety levels in a single model. In finding a relation between parental overcontrol, parental anxiety, child interpretation bias, and child anxiety, we have provided support for the notion that parenting behaviors, as well as parental anxiety level, can be related to interpretation biases in children, and subsequently child anxiety. However, since our study only investigated parental overcontrol and parental anxiety, other parental behaviors (e.g. rejection, punishment, anxious modeling) that may influence both interpretation bias and child anxiety need to be examined.

Limitations

The current study used correlational analyses and cannot claim any causal associations among these variables. Thus, it is possible that child anxiety leads to increases in child interpretation bias and higher overcontrol in parents. Furthermore, findings that parental overcontrol may be influenced by child anxiety (Becker et al. 2010; Costa and Weems 2005; Ginsburg et al. 2004; Manassis and Bradley 1994; Parker 1983) suggest that the relation between parental over-control, child interpretation bias and child anxiety may be reciprocal, where all three influence each other. Furthermore, because child interpretation bias accounted for 21 % of the variance in child anxiety, while parental overcontrol accounted for 18 % and parental anxiety accounted for 8 %, there are likely other variables (e.g. peer factors, coping skills, temperament) that affect the relation between these three constructs, which are worth investigating. For example, Costa and Weems (2005) found that self-reported maternal anxious attachment beliefs mediated the relation between maternal and child anxiety. However, the proportion of variance in child anxiety explained by interpretation bias is slightly higher than for other mediators of this relation, such as perceived competence (Affrunti and Ginsburg 2012).

Another limitation was the reliance on self-report measures that were completed by the child. Although children's perceptions of these constructs are critical, using a single reporter can introduce reporter bias and cause reports to be influenced by factors such as the child's comprehension or social desirability. The use of an independent and objective measure of child anxiety, parental overcontrol and interpretation bias could strengthen the associations and conclusions in future research.

Lastly, the generalizability of the study was restricted due to characteristics of the sample. The sample consisted of children 7–12 years of age. As such, it was impossible to examine the model within a developmental framework. Replication with older children is necessary to determine the relation of these constructs throughout adolescence. Also, the sample consisted of primarily of Caucasian children in two-parent upper, middle class families. Using a more diverse sample is necessary to better understand the relations between interpretation bias, parental anxiety, overcontrol and child anxiety among different racial/ethnic groups.

Conclusions

Results from the current study provide important information on the interplay of child interpretation bias, parental overcontrol, parental anxiety and child anxiety. The implications of these findings suggest that child interpretation bias is a mechanism of transmission between both parental anxiety and parental overcontrol, and child anxiety. This supports theoretical models, which suggest that parental overcontrol can signal threat to a child in an otherwise ambiguous situation, which increases the child's level of anxiety (Chorpita and Barlow 1998). As such, treatments and prevention for child anxiety should focus on both child cognitive biases, such as interpretation bias, as well as parenting behaviors, such as overcontrol, that may play a role in the continuation of cognitive biases and anxiety in the child.

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References

- Affrunti NW, Ginsburg GS. Maternal overcontrol and child anxiety: The mediating role of perceived competence. *Child Psychiatry and Human Development*. 2012; 43(1):102–112.10.1007/s10578-011-0248-z [PubMed: 21874362]
- Barber BK. Parental psychological control: Revisiting a neglected construct. *Child Development*. 1996; 67(6):3296–3319.10.2307/1131780 [PubMed: 9071782]
- Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 1986; 51(6):1173–1182.10.1037/0022-3514.51.6.1173 [PubMed: 3806354]
- Barrett PM, Rapee RM, Dadds MM, Ryan SM. Family enhancement of cognitive style in anxious and aggressive children. *Journal of Abnormal Child Psychology*. 1996; 24(2):187–203.10.1007/BF01441484 [PubMed: 8743244]
- Becker K, Ginsburg G, Domingues J, Tein J. Maternal control behavior and locus of control: Examining mechanisms in the relation between maternal anxiety disorders and anxiety symptomatology in children. *Journal of Abnormal Child Psychology*. 2010; 38(4):533–543.10.1007/s10802-010-9388-z [PubMed: 20108034]
- Birmaher B, Khetarpal S, Brent D, Cully M. The screen for child anxiety related emotional disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1997; 36(4):545–553. doi:10.1097/00004583-199704000-00018. [PubMed: 9100430]
- Bögels SM, Zigterman D. Dysfunctional cognitions in children with social phobia, separation anxiety disorder, and generalized anxiety disorder. *Journal of Abnormal Child Psychology*. 2000; 28(2):205–211.10.1023/A:1005179032470 [PubMed: 10834771]
- Bögels SM, van Dongen L, Muris P. Family influences on dysfunctional thinking in anxious children. *Infant and Child Development*. 2003; 12(3):243–252.10.1002/icd.288
- Brown, TA.; DiNardo, PA.; Barlow, DH. Anxiety disorders interview schedule for DSM-IV. New York, NY: Graywind Publications; 1994.
- Chorpita BF, Barlow DH. The development of anxiety: The role of control in the early environment. *Psychological Bulletin*. 1998; 124(1):3–21.10.1037/0033-2909.124.1.3 [PubMed: 9670819]
- Chorpita BF, Albano AM, Barlow DH. Cognitive processing in children: Relation to anxiety and family influences. *Journal of Clinical Child Psychology*. 1996; 25(2):170–176. doi:10.1207/s15374424jccp2502_5.
- Cohen, J.; Cohen, P. Applied multiple regression/correlation analysis for the behavioral sciences. 2. Hillsdale, NJ: Erlbaum; 1983.
- Costa NM, Weems CF. Maternal and child anxiety: Do attachment beliefs or children's perceptions of maternal control mediate their association? *Social Development*. 2005; 14(4):574–590.10.1111/j.1467-9507.2005.00318.x
- Creswell C, O'Connor TG. 'Anxious cognitions' in children: An exploration of associations and mediators. *British Journal of Developmental Psychology*. 2006; 24(4):761–766. doi: 10.1348/026151 005X70418.
- Creswell C, O'Connor TG. Interpretation bias and anxiety in childhood: Stability, specificity and longitudinal associations. *Behavioural and Cognitive Psychotherapy*. 2011; 39(2):191–204.10.1017/S1352465810000494 [PubMed: 20875165]
- Creswell C, Schniering CA, Rapee RM. Threat interpretation in anxious children and their mothers: Comparison with nonclinical children and the effects of treatment. *Behaviour Research and Therapy*. 2005; 43(10):1375–1381. doi:10.1016/j.brat.2004.10.009. [PubMed: 16086987]
- Creswell C, Shildrick S, Field AP. Interpretation of ambiguity in children: A prospective study of associations with anxiety and parental interpretations. *Journal of Child and Family Studies*. 2011; 20(2):240–250.10.1007/s10826-010-9390-7
- Dineen KA, Hadwin JA. Anxious and depressive symptoms and children's judgements of their own and others' interpretation of ambiguous social scenarios. *Journal of Anxiety Disorders*. 2004; 18(4):499–513.10.1016/S0887-6185(03)00030-6 [PubMed: 15149710]

- Eley, TC.; Zavos, HMS. Genetics. In: Hadwin, JA.; Field, AP.; Hadwin, JA.; Field, AP., editors. Information processing biases and anxiety: A developmental perspective. Malden, MA: Wiley-Blackwell; 2010. p. 209-232.
- Field AP. The behavioral inhibition system and the verbal information pathway to children's fears. *Journal of Abnormal Psychology*. 2006; 115(4):742–752.10.1037/0021-843X.115.4.742 [PubMed: 17100531]
- Field, AP.; Lester, KJ. Learning of information processing biases in anxious children and adolescents. In: Hadwin, JA.; Field, AP.; Hadwin, JA.; Field, AP., editors. Information processing biases and anxiety: A developmental perspective. Walden, MA: Wiley-Blackwell; 2010. p. 253-278.
- Field AP, Ball JE, Kawycz NJ, Moore H. Parent–child relationships and the verbal information pathway to fear in children: Two preliminary experiments. *Behavioural and Cognitive Psychotherapy*. 2007; 35(4):473–486.10.1017/S1352465807003736
- Ginsburg GS. The child anxiety prevention study: Intervention model and primary outcomes. *Journal of Consulting and Clinical Psychology*. 2009; 77(3):580–587.10.1037/a0014486 [PubMed: 19485597]
- Ginsburg GS, Grover RL, Ialongo N. Parenting behaviors among anxious and non-anxious mothers: Relation with concurrent and long-term child outcomes. *Child & Family Behavior Therapy*. 2004; 26(4):23–41.10.1300/J019v26n04_02
- Hadwin JA, Garner M, Perez-Olivas G. The development of information processing biases in childhood anxiety: A review and exploration of its origins in parenting. *Clinical Psychology Review*. 2006; 26(7):876–894.10.1016/j.cpr.2005.09.004 [PubMed: 16524655]
- Hudson, JL.; Rapee, RM. From anxious temperament to disorder: An etiological model of generalized anxiety disorder. In: Heimberg, RG.; Turk, CL.; Mennin, DS., editors. Generalized anxiety disorder: Advances in research and practice. New York, NY: Guilford; 2004. p. 51-76.
- Hudson JL, Doyle AM, Gar N. Child and maternal influence on parenting behavior in clinically anxious children. *Journal of Clinical Child & Adolescent Psychology*. 2009; 38(2):256–262.10.1080/15374410802698438 [PubMed: 19283603]
- Lester KJ, Field AP, Oliver S, Cartwright-Hatton S. Do anxious parents interpretive biases towards threat extend into their child's environment? *Behaviour Research and Therapy*. 2009; 47(2):170–174.10.1016/j.brat.2008.11.005 [PubMed: 19117552]
- Lu W, Daleiden E, Lu S. Threat perception bias and anxiety among Chinese school children and adolescents. *Journal of Clinical Child and Adolescent Psychology*. 2007; 36(4):568–580. [PubMed: 18088215]
- Manassis K, Bradley SJ. The development of childhood anxiety disorders: Toward an integrated model. *Journal of Applied Developmental Psychology*. 1994; 15(3):345–366. doi:10.1016/0193-3973(94)90037-X.
- Mathews A, MacLeod C. Induced processing biases have causal effects on anxiety. *Cognition and Emotion*. 2002; 16(3):331–354.10.1080/02699930143000518
- Muris P, van Doorn M. 'Danger is lurking everywhere, even in parts of a jigsaw puzzle': Anxiety-related threat perception abnormalities in children: Their assessment with projective material. *Behaviour Change*. 2003; 20(3):151–159.10.1375/behc.20.3.151.24835
- Muris P, Merckelbach H, Damsma E. Threat perception bias in nonreferred, socially anxious children. *Journal of Clinical Child Psychology*. 2000; 29(3):348–359.10.1207/S15374424JCCP2903_6 [PubMed: 10969419]
- Muris P, Meesters C, von Brakel A. Assessment of anxious rearing behaviors with a modified version of 'egna minnen beträffande uppfostran' questionnaire for children. *Journal of Psychopathology and Behavioral Assessment*. 2003a; 25(4):229–237.10.1023/A:1025894928131
- Muris P, Merckelbach H, Schepers S, Meesters C. Anxiety, threat perception abnormalities, and emotional reasoning in nonclinical Dutch children. *Journal of Clinical Child & Adolescent Psychology*. 2003b; 32(3):453–459.10.1207/S15374424JCCP3203_13 [PubMed: 12881033]
- Muris P, Rapee R, Meesters C, Shouten E, Geers M. Threat perception abnormalities in children: The role of anxiety disorders symptoms, chronic anxiety, and state anxiety. *Journal of Anxiety Disorders*. 2003c; 17(3):271–287.10.1016/S0887-6185(02)00199-8 [PubMed: 12727122]

- Muris P, Jacques P, Mayer B. The stability of threat perception abnormalities and anxiety disorder symptoms in non-clinical children. *Child Psychiatry and Human Development*. 2004; 34(3):251–265.10.1023/B:CHUD.0000015000.13845.9d [PubMed: 14767181]
- Murray L, Cooper P, Creswell C, Schofield E, Sack C. The effects of maternal social phobia on mother–infant interactions and infant social responsiveness. *Journal of Child Psychology and Psychiatry*. 2007a; 48(1):45–52.10.1111/j.1469-7610.2006.01657.x [PubMed: 17244269]
- Murray L, Cooper P, Creswell C, Schofield E, Sack C. The effects of maternal social phobia on mother–infant interactions and infant social responsiveness. *Journal of Child Psychology and Psychiatry*. 2007b; 48(1):45–52.10.1111/j.1469-7610.2006.01657.x [PubMed: 17244269]
- Parker, G. Parental overprotection: A risk factor in psychosocial development. New York, NY: Grune & Stratton; 1983.
- Perez-Olivas G, Stevenson J, Hadwin JA. Do anxiety-related attentional biases mediate the link between maternal over involvement and separation anxiety in children? *Cognition and Emotion*. 2008; 22(3):509–521.10.1080/02699930801886656
- Sobel, ME. Asymptotic confidence intervals for indirect effects in structural equations models. In: Leinhardt, S., editor. *Sociological methodology* 1982. San Francisco: Jossey-Bass; 1982. p. 290–312.
- Spielberger, CD.; Gorsuch, RL.; Lushene, PR.; Vagg, PR.; Jacobs, AG. Manual for the state-trait anxiety inventory (form Y). Palo Alto, CA: Consulting Psychologists Press; 1983.
- Warren SL, Emde RN, Sroufe LA. Internal representations: Predicting anxiety from children’s play narratives. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2000; 39(1): 100–107.10.1097/00004583-200001000-00022 [PubMed: 10638073]
- Wood JJ. Parental intrusiveness and children’s separation anxiety in a clinical sample. *Child Psychiatry and Human Development*. 2006; 37(1):73–87.10.1007/s10578-006-0021-x [PubMed: 16932853]
- Wood JJ, McLeod BD, Sigman M, Hwang W, Chu BC. Parenting and childhood anxiety: Theory, empirical findings, and future directions. *Journal of Child Psychology and Psychiatry*. 2003; 44(1): 134–151.10.1111/1469-7610.00106 [PubMed: 12553416]

Fig. 1.

Model of the mediating role of interpretation bias rating in the relation between parental overcontrol, parental anxiety and child anxiety, with appropriate standardized betas. c The total effect of the independent variable on the dependent variable, a is the effect of the independent variable on the mediator, b the effect of the mediator on the dependent variable while controlling for the independent variable, and c' the direct effect of the independent variable on the dependent variable while controlling for the mediator. ^aFollows the mediation where parental anxiety is the independent variable and child anxiety is the dependent variable. ^bFollows the mediation where parental overcontrol is the independent variable and child anxiety is the dependent variable

* $p < .05$

Table 1

Range, means, standard deviations and first order correlations for all variables

Variable (<i>n</i> = 74)	Correlations		Range	<i>M</i>	<i>SD</i>
	Parental anxiety	Child anxiety	Child interpretation bias		
Parental anxiety	–		24.00–74.00	49.55	10.40
Child anxiety	.283 *	–	.00–41.00	18.63	9.86
Child Interpretation bias rating	.266 *	.470 **	.00–2.90	1.34	.73
Parental overcontrol	.073	.439 **	12.00–37.00	24.61	5.14

* $p < .05$;** $p < .001$