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### Coparenting and child anxiety

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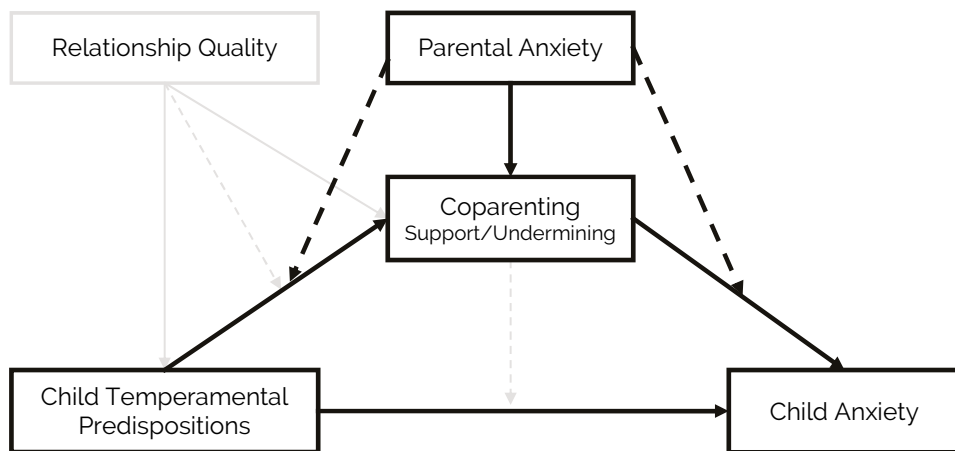
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Graphical representation of the associations tested in this thesis (adjustment of the model by Majdandžić et al., 2012). Dashed lines represent moderation effects. Lines in black are the effects that are tested in Chapter 3. Lines in grey are tested in other chapters.

# CHAPTER

**The role of parental anxiety  
in the predictive associations  
between fearful temperament,  
coparenting, and child  
anxiety symptoms**

# 3

## ABSTRACT

### Objective

Anxious parents are more likely to have temperamentally fearful children, and a fearful temperament increases the risk of later child anxiety. Undermining and supportive coparenting behavior have been related to children's fearful temperament. We investigated coparenting as a mediator in children's development from fearful temperament to anxiety. Also, anxious parents may be more supportive and less undermining, or less supportive and more undermining than low-anxious parents' coparenting. Therefore, the current study aimed to investigate the role of parental anxiety as a moderator, resulting in a moderated mediation model.

### Methods

We collected interview data on prenatal parental anxiety disorder severity ( $N = 151$ ). After child birth, we observed infant fearful temperament at 1 year and supportive and undermining coparenting at 2.5 years in lab visits and home visits. At 4.5 years, both fathers and mothers reported on their child's anxiety symptoms.

### Results

Overall, coparenting did not mediate the associations between infant fearful temperament and child anxiety. Supportive coparenting was unrelated to infant fearful temperament and child anxiety symptoms and parental anxiety did not play a role in these associations. For high-anxious parents, higher infant fearful temperament predicted less undermining coparenting, and in turn, higher undermining coparenting predicted higher child anxiety. On the other hand, for low-anxious parents, infant fearful temperament was unrelated to undermining coparenting, and higher undermining coparenting related to less child anxiety.

### Conclusions

Our results point to the role of parental anxiety disorders in the associations between infant fearful temperament, coparenting, and child anxiety. We conclude that researchers and practitioners need to attend to the role of parental anxiety in the associations between coparenting and anxiety development.

## INTRODUCTION

Child anxiety disorders are the most common form of psychopathology in childhood (Wittchen et al., 2011). It has been established that already in infancy, fearful temperament serves as a risk factor for the development of later child anxiety (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). Given that child anxiety increases the risk for poor outcomes in children (such as more anxiety problems later in life, psychopathology other than anxiety such as conduct disorder and depression, drug abuse and poorer educational outcomes; Beesdo-Baum & Knappe, 2012; Bittner, Egger, Erkanli, Costello, Foley, & Angold, 2007; Woodward & Fergusson, 2001), it is important to investigate factors that can discontinue the development from infant fearful temperament to later anxiety.

Parental anxiety is a predictor of child anxiety: anxiety runs in families, which means that anxious parents are at an increased risk to have an anxious child (Hettema, Neale, & Kendler, 2001). The role of heritability in the transmission of anxiety from parents to children is small (Hettema et al., 2001), however, leaving a role for environmental factors in the explanation of the intergenerational transmission of anxiety (Bögels & Brechman-Toussaint, 2006; Murray, Creswell & Cooper, 2009). Thus, family characteristics other than parents' own anxiety may influence the development of child anxiety over time. One of the factors that may play a role in the transmission of anxiety is coparenting (Majdandžić, de Vente, Feinberg, Aktar, & Bögels, 2012).

The coparenting relationship is defined as “the ways that parents and/or parental figures relate to each other in the role of parent” (Feinberg, 2003, p. 96). Coparenting behaviors are usually studied as the extent to which parents undermine or support their partner's role as a parent (McHale, 1995; Belsky, Putnam, & Crnic, 1996). Supportive coparenting behaviors include affirmation of the partner's parenting choices, whereas undermining behaviors include criticism and blaming of the partner's parenting (Belsky, Woodworth, & Crnic, 1996; Feinberg, 2003; McHale, 1995; Weissman & Cohen, 1985). Minuchin (1974) referred to coparenting as the family's executive subsystem, thereby proposing that coparenting might be the mechanism underlying change (i.e., development) in the family system.

Given that coparenting has been proposed to be the mechanism underlying changes in the family system (Minuchin, 1974), coparenting may serve as a mediator in child development (Feinberg, 2003; Teubert & Pinquart, 2010). If family processes unfold through the quality of the coparenting relationship, it might be the case that child development, specifically the development from being a fearful infant to being an anxious child, occurs through the quality of the coparenting relationship. Hence, coparenting may serve as a mediator in the development from infant temperament to child anxiety. Up until now, research established that coparenting mediates the associations between marital conflict and parenting behavior (Bonds & Gondoli, 2007; Floyd, Gilliom, & Costigan, 1998; Margolin, Gordis, & John, 2001; Pedro, Ribeiro, & Shelton, 2012; Sturge-Apple, Davies, & Cummings, 2006), and between marital violence and child anxiety (Katz & Low, 2004). This latter study found that when

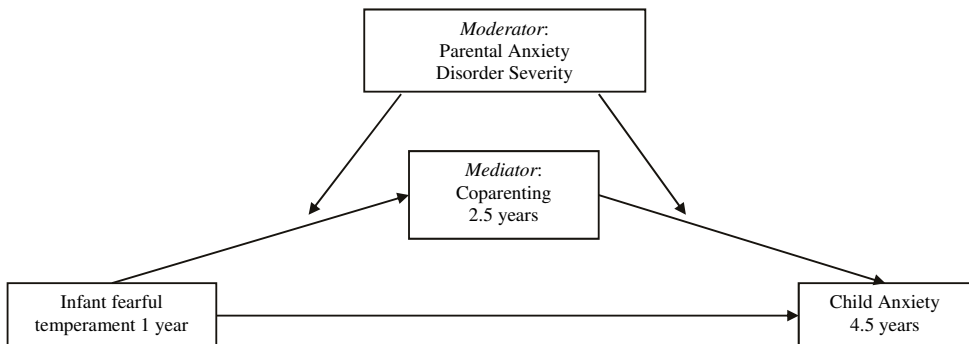
parents with high levels of marital violence were undermining in coparenting their children, children were at an increased risk to be anxious. Another study investigated coparenting as a mediator in the associations between parental anxiety and family maladjustment (Delvecchio, Sciandra, Finos, Mazzeschi, & DiRiso, 2015) and found that high parental anxiety through poor coparenting related to more family maladjustment. These studies lend support to the hypothesis that coparenting serves as a mechanism in the way family characteristics affect both family and child outcomes. Up until now, however, research has not investigated whether coparenting is also an important factor through which anxiety development unfolds. Therefore, the current study aimed to investigate the mediating role of coparenting in children's development from a fearful infant to an anxious child.

Several studies investigated the direct associations between child fearful or difficult temperament and coparenting. In families with 5-month-olds to 5-year-olds, children's difficult temperament was found to correlate with less supportive coparenting (Davis, Schoppe-Sullivan, Mangelsdorf, & Brown, 2009; Gordon & Feldman, 2005; Laxman et al., 2013; Schoppe-Sullivan, Mangelsdorf, Brown, & Sokolowski, 2007; Van Egeren, 2004) and more undermining coparenting (Cook, Schoppe-Sullivan, Buckley, & Davis, 2009; Katz & Low, 2004; Lindsey, Caldera, & Colwell, 2005; Metz, Majdandžić & Bögels, 2016). In 3.5-month- to 4-year-olds, researchers found that high supportive coparenting in infancy predicts lower levels of later difficult child temperament (Davis, Schoppe-Sullivan, Mangelsdorf, & Brown, 2009; Laxman et al., 2013) and that higher undermining coparenting in infancy predicted more later child anxiety (McHale & Rasmussen, 1998). One study found that higher child difficult temperament predicted less later supportive coparenting, demonstrating that child behaviors also predict later coparenting behaviors (Davis et al., 2009). In contrast to these findings, one study found that high levels of undermining predicted a decrease in children's fearful temperament (Belsky et al., 1996) and some studies did not find cross-sectional (Stright & Bales, 2003) or predictive associations (Metz et al., 2016) between coparenting and child difficult or fearful temperament. Even though most research suggests that high levels of support and low levels of undermining are related to less (precursors of) child anxiety, the direction of effects is not clear from all studies. A reason for these divergent results may be due to other factors that play a role in the direct associations between coparenting and child outcomes.

Several scholars have pointed out that the associations between coparenting and child behaviors may be moderated by family factors such as parental anxiety (Feinberg, 2003; Majdandžić et al., 2012; McHale et al., 2004). Majdandžić et al. (2012) theorized that anxious parents' coparenting differs from the coparenting of non-anxious parents, thereby suggesting an additional pathway in the intergenerational transmission of anxiety. The authors proposed that parental anxiety can influence coparenting in the following ways: parental anxiety may lead to more supportive coparenting (because the anxious parents' increased insecurity in parenting leads this anxious parent to follow the lead of their partner,

or because the anxious parent calls for more support), or to more undermining coparenting (because the anxious parents' impulses to protect the child may increase undermining of the less non-anxious parent, or anxious parents may be critical and undermining of their partner; Majdandžić et al., 2012). Empirical studies indeed found that parental anxiety was related to less self-reported supportive coparenting (Delvecchio et al., 2015) and to more self-reported undermining coparenting (Metz et al., 2016). Moreover, empirical evidence demonstrated that the combination between fathers' high negative emotionality (a construct involving the experiences of fear, anger, and anxiety; Krueger, Caspi, Moffitt, Silva, & McGee, 1996) and high difficult child temperament resulted in more undermining coparenting (Laxman et al., 2013). This result supports the notion that parental anxiety may serve as a moderator in the associations between coparenting and child outcomes. Therefore, we explored whether parental anxiety moderated the associations between infant fearful temperament, coparenting quality, and child anxiety.

The combination of the theoretical assumption that coparenting serves as a mediator in family development (Feinberg, 2003; Teubert & Piquart, 2010) and that the associations between coparenting and family development may be moderated by parental anxiety (Feinberg, 2003; Laxman et al., 2013; Majdandžić et al., 2012) led us to propose a moderated mediation model (Preacher, Rucker, & Hayes, 2007; see Figure 1). In this moderated mediation model, we investigated the mediating role of observed coparenting in the development from early infant fearful temperament into later child anxiety, and the moderating role of parental anxiety disorder severity in these relations. We hypothesized that high infant fearful temperament at 1 year predicts less supportive coparenting and more undermining coparenting at 2.5 years, and high supportive coparenting and low undermining coparenting at 2.5 years predict less child anxiety symptoms at 4.5 years. We explored the mediating role of coparenting in the associations between infant fearful temperament and child anxiety symptoms, as well as the moderating role of parental anxiety disorder severity in the associations between infant fearful temperament, coparenting, and child anxiety.



**Figure 1:** Graphical representation of the moderated mediation model.

## METHOD

### Participants

The current study is part of an ongoing longitudinal investigation (The Social Development of Children). Couples expecting their first child were recruited through advertisements in magazines and flyers distributed by midwives. Before child birth, the sample consisted of 151 families. The Department of Psychology's ethical approval was obtained and written informed consent was received from all participants. Families received a 20 euro gift voucher after finishing every measurement. At the prenatal measurement, father's age was 34.5 years ( $SD = 5.4$ ) and the average educational level of fathers was 6.5 ( $SD = 1.7$ ) on an 8-point scale from 1 (*primary education*) to 8 (*university*); fathers' average income level was 4.6 ( $SD = 1.3$ ) on a 7-point scale from 1 ( $< 500$  euros) to 7 ( $> 5,000$  euros). Mothers' average age was 31.6 ( $SD = 4.2$ ), mothers had an educational level of 7.0 ( $SD = 1.2$ ), and mothers' average monthly income level was 4.0 ( $SD = 1.4$ ).

In the current study, we focused on data from the prenatal measurement, and from measurement occasions when the child was 1 year, 2.5 years and 4.5 years old. At 1 year ( $M = 12.4$  months,  $SD = 0.72$ ), 125 families participated; at 2.5 years ( $M = 30.1$  months,  $SD = 0.53$ ), 123 families participated; at 4.5 years ( $M = 53.9$  months,  $SD = 0.57$ ), 110 families participated. Attrition was mainly due to couples indicating that they did not have enough time to participate.

At the prenatal measurement, the average relationship duration was 6.1 years ( $SD = 3.70$ ) and 98% ( $n = 148$ ) of parents were married or living together; 2% ( $n = 3$ ) indicated an "other" marital status. At the 1 year measurement, 93.6% ( $n = 117$ ) of parents were married or living together; 0.8% ( $n = 1$ ) indicated an "other" marital status, 0.8% ( $n = 1$ ) of parents were divorced, and 4.8% ( $n = 6$ ) of couples did not report their marital status. At the 2.5 year measurement, 91.1% ( $n = 112$ ) of parents were married or living together; 2.4% ( $n = 3$ ) indicated an "other" marital status, 1.6% ( $n = 2$ ) of parents were divorced, and 4.9% ( $n = 6$ ) of couples did not report their marital status. At the 4.5 year measurement, 91.8% ( $n = 101$ ) of parents were married or living together; 1.8% ( $n = 2$ ) indicated an "other" marital status, 2.7% ( $n = 3$ ) of parents were divorced, and 3.6% ( $n = 4$ ) of couples did not report their marital status. Of all children, 82 (54.3%) were girls; of 2 families (1.3%) the child's gender was unknown.

### Procedure

At the prenatal measurement, parents separately visited our University research lab to complete a clinical semi-structured interview assessing their anxiety disorders and we collected biographical data as well as questionnaire data about parents' relationship satisfaction and their own anxiety. When children were 4 months, 1 year and 2.5 years old, fathers and mothers separately came to the lab with their child to conduct structured tasks, completed a home visit with several tasks, and filled out a number of questionnaires about



their child and their parenting behaviors. At 4.5 years, fathers and mothers came to the lab separately and filled out questionnaires; no home visit was conducted. In the current study, we used observations of infant fearful temperament at 1 year, observations of triadic play (coparenting) in the home visit at 2.5 years, and questionnaire data about the child's anxiety symptoms at 4.5 years.

## Measures

### *Parental anxiety disorder severity*

At the prenatal measurement, parents' level of anxiety severity was assessed through the Anxiety Disorder Interview Schedule (ADIS; DiNardo, Brown, & Barlow, 1994), a semi-structured clinical interview based on the DSM-IV criteria for anxiety disorders. Four trained and experienced interviewers assessed fathers' and mothers' current and lifetime anxiety disorder status. A trained psychologist recoded 10% of the data to establish interobserver reliability. Interobserver agreement for all ADIS diagnoses, based on absence or presence of the specific disorder, was 97.55% (range 90%-100%,  $SD = 2.95$ ).

In the ADIS, for every disorder, severity of the diagnosis is reflected in a severity score. Participants indicated whether they experienced anxiety for the following disorders: panic disorder, agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder, and obsessive compulsive disorder (following DSM-IV criteria). Disorders that occurred within the past 6 months were categorized as current anxiety disorders; disorders that occurred more than 6 months ago were categorized as past anxiety disorders. For every indicated anxiety problem, participants received a severity score ranging from 1 – 8, according to ADIS guidelines. Severity scores of 4 and above are considered clinical. Following Simon, Bögels and Voncken (2011), we summed severity scores of past and current anxiety disorders, resulting in a lifetime score of parental anxiety disorder severity. Mothers' past and current anxiety disorder severity were correlated,  $r = .49$ ,  $p < .001$ , and fathers' past and current anxiety disorder severity were also correlated,  $r = .47$ ,  $p < .001$ . The continuous score of lifetime severity reflects both the number of the diagnosed anxiety disorders and their impact on participants' lives (Simon et al., 2011). The intraclass correlation for the interobserver reliability of mothers' lifetime severity scores was .95 and for fathers' lifetime severity scores .99. Because mothers' and fathers' scores of anxiety disorder severity were highly correlated,  $r = .45$ ,  $p < .001$ , we aggregated mothers' and fathers' anxiety disorder severity into one score for parental anxiety disorder severity.

### *Infant fearful temperament*

At 1 year, we assessed infant fearful temperament with 11 tasks from well-known standard laboratory instruments to assess fearful temperament (Aktar, Majdandžić, de Vente, & Bögels, 2013). All tasks were conducted by a female experimenter while the parent was sitting behind the child. The experimenter instructed the parent to remain neutral (except

if the child's reaction necessitated soothing). Three tasks were from the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith & Rothbart, 1996): Unpredictable mechanical toy (a large, remote controlled toy train drove across the table towards the child three times), Stranger approach (a male stranger talked to, approached and picked up the child who was seated in a high chair), and Masks (the experimenter appeared from behind a curtain successively showing three masks; a grandmother, a tiger, and a black robot). Four discomfort tasks were used (Kochanska, Coy, Tjebkes, & Husarek, 1998): Ice (an ice cube was held against the foot and the neck of the child), Lemon (the child was given a spoon of diluted lemon juice), Spray (water was sprayed on the child's face), and Blender (the child was exposed to the noise of a blender for 30 seconds). In the Truck task (Calkins, Fox, & Marshall, 1996; Fox, Henderson, Rubin, Calkins, & Schmidt, 2001), a female stranger came into the room, played with a toy truck with blocks, and invited the child to join. Three unpredictable mechanical toy tasks were conducted at the home visit, modelled after Rothbart (1988): Buzzing animal (a small vibrating animal toy was placed within arm's reach distance of the child), Ambulance (a toy ambulance with light and sound rode towards the child), and Horse (a neighing toy horse approached the child).

In each task, the following child behaviors were coded across time intervals (see Goldsmith & Rothbart, 1996): latency to first fear response (except in Truck and the home visit tasks), intensity of facial fear, intensity of bodily fear, intensity of escape, and intensity of distress vocalizations. In addition, several task-specific behaviors were coded (e.g., latency to touch toy in relevant tasks; gaze aversion in Stranger Approach; distance to the stranger in Truck). The scores were averaged across coding intervals, then standardized and averaged for each task. Six observers were trained by a master coder to code the 11 tasks. To establish inter-observer reliability, the master coder coded 20% of each observer's data pool. Average inter-observer reliability (intraclass correlation) of coded variables across tasks was good: .82 ( $SD = .11$ ; range .61 to .98). Internal consistency across child behaviors for each task was good, ranging from .70 to .91. Internal consistency across tasks was .79; because of this high internal consistency, we aggregated the 11 scores into one score for infant fearful temperament.

### ***Coparenting***

Coparenting was assessed through a structured play task, which was conducted during the home visit. Two trained graduate students visited families in their own homes to conduct a series of tasks, one of which was a play task to assess coparenting. Father, mother and child performed a claying task in which they were instructed to individually make a part of an animal and then to put the animal together with the three of them. This task was chosen, because it induces a joint goal in the triad and thereby elicits collaborative efforts between parents in the presence of their child. Students ended the task when families were taking longer than 8 minutes to finish the animal.

Coparenting was scored based on a coding protocol by Cowan and Cowan (1996), which consisted of the scales: pleasure, warmth, cooperation, displeasure, coldness, anger and competition (Schoppe, Mangelsdorf, & Frosch, 2001). Previous research that used the coding system of Cowan and Cowan (1996) collapsed these 7 scales into the two broader dimensions of supportive coparenting (an average of pleasure, warmth and cooperation) and undermining coparenting (an average of displeasure, coldness, anger, and competition; Altenburger, Lang, Schoppe-Sullivan, Dush & Johnson, 2015; Farr & Patterson, 2013; McHale, et al., 2004; Schoppe-Sullivan, Mangelsdorf, Brown, & Sokolowski, 2007). In these previous studies, Cronbach's alpha for the dimensions was high (Schoppe et al., 2001). Because the high internal consistencies indicate that the scales measured the same dimension, we collapsed the scales into the two general dimensions of support and undermining before coding the data.

Coders assigned one score for support and one score for undermining to every family based on the entire interaction, taking into account the behaviors developed by Cowan and Cowan (1996) described above. Supportive and undermining coparenting were scored on a scale from 1 (*absent to very rare*) to 5 (*very much*). Supportive coparenting reflected the amount of pleasure parents had during the triadic interaction, the amount of warmth they expressed to each other, the extent to which parents collaborated with each other, and the extent to which they were involved with each other during the task. Undermining coparenting scores reflected the amount of displeasure parents expressed regarding their partner's interaction with the child; detachment from the partner; patronizing of the partner; hostility towards the partner; and competition over the child's attention. Coding was performed by a trained graduate student and the first author, and 16% ( $n = 17$ ) of the data was double coded for reliability. The interobserver reliability (ICC) for supportive coparenting and for undermining coparenting was .75.

In addition to these scores, a third coparenting construct was measured: cohesion. This measure was based on the extent to which the family collaborated during the coparenting interaction and the extent to which the triad appeared balanced in the sense that parents responded to their partner's needs and requests. We added this construct to measure the quality of the coparenting interaction, and the family cohesion in one measure. The interrater reliability for cohesion was good,  $ICC = .76$ . Cohesion and supportive coparenting were highly correlated,  $r = .81$ ,  $p < .001$ ; therefore, cohesion and support were aggregated into one score of supportive coparenting.

### ***Child anxiety symptoms***

The total score of the Dutch version of the revised Preschool Anxiety Scale (PAS-R, Edwards, Rapee, Kennedy, & Spence, 2010) was used to measure children's anxiety symptoms at 4.5 years. Through 30 items, the PAS-R measures five anxiety disorders: social anxiety, generalized anxiety, separation anxiety, specific phobias, and OCD. In line with DSM-5

and with earlier use of the scale, the two items measuring OCD were not included (Broeren, Muris, Diamantopoulou, & Baker, 2013; Edwards et al., 2010). Examples of items are “My child is afraid of loud noises” and “My child worries about doing the right thing”. Items were rated on a 5-point Likert scale from 1 (*not at all true*) to 5 (*very often true*). The scale has good construct validity and internal consistency (Edwards et al., 2010). Reliability in the current study was good; Cronbach’s alpha = .88 for mothers’, and .92 for fathers’ ratings. Mothers’ and fathers’ ratings of their child’s anxiety symptoms were correlated ( $r = .42, p < .001$ ) and were averaged to obtain one measure of child anxiety symptoms.

## Data Analysis Plan

First, we inspected drop out. Then, Pearson’s correlations were performed to investigate the associations between infant fearful temperament at 1 year, observed coparenting at 2.5 years, child anxiety at 4.5 years, and parents’ prenatal anxiety disorder severity.

To test the moderated mediation model, we constructed path models (see Figure 1). We followed Preacher and colleagues (2007) in the statistical definition of the models. In the moderated mediation model, our aim was to test the indirect effect from infant fearful temperament through coparenting on child anxiety, and to test whether this indirect effect differed at different values of parental anxiety disorder severity. Moderated mediation effects were estimated by calculating the indirect effect from infant fearful temperament through coparenting on child anxiety symptoms, depending on different values of parental anxiety disorder severity (see Preacher et al., 2007).

We constructed separate path models for supportive coparenting and undermining coparenting. All models were fully saturated; therefore, no fit indices were calculated and only significant paths were interpreted in the analyses. Path models were analyzed in R (version 3.3.0) using the lavaan package (Rosseel, 2012). Full Information Maximum Likelihood (FIML) estimation was used to estimate the models. FIML assumes that missing data are missing at random; our data met this criteria (MCAR test,  $\chi^2(36) = 47.34, p = .098$ ). All predictor variables were standardized before entering them into the path models. Model paths were considered significant at the  $\alpha = .05$  level.

Some studies have found that the associations between infant temperament, coparenting, and child anxiety differ for fathers and mothers (Gordon & Feldman, 2008; Lindsey, Caldera & Colwell, 2005; Van Egeren, 2004). One study found that only fathers’ negative emotionality was a significant moderator in the associations between children’s difficult temperament and coparenting (Laxman et al., 2013). Therefore, we conducted post-hoc analyses to investigate whether our results differed when running two separate models for fathers’ and mothers’ anxiety disorder severity.

## RESULTS

### Preliminary Analyses

Before analyzing our data, we inspected whether families who dropped out differed on descriptive variables from families who did not drop out. After the prenatal measurement, 26 families (17.11%) dropped out; after the 1 year measurement, 2 families dropped out (1.60%); and after the 2.5 year measurement, 13 couples dropped out (10.57%). Hence, in total, 41 families (27.15%) dropped out of our study between the prenatal measurement and the 4.5 years measurement. When comparing these dropped out families to families who did not drop out, we found that mothers who dropped out had a lower salary ( $M = 3.33$ ,  $SD = 1.07$ ) than mothers who did not drop out ( $M = 4.21$ ,  $SD = 1.40$ ),  $t(140) = 3.60$ ,  $p < .001$ . We found no differences between couples who did and did not drop out on parents' age, relationship duration, fathers' income, parents' educational level, child gender, or the key study variables (infant fearful temperament, and coparenting).

Table 1 displays the correlations between all key study variables, as well as means and standard deviations. We investigated differences between boys and girls on these key study variables through t-tests and found no significant differences ( $p < .05$ ). In the current sample, 61.60% ( $n = 93$ ) of mothers had one or more lifetime anxiety disorders, and 42.38% ( $n = 64$ ) of the fathers had one or more lifetime anxiety disorders.

**Table 1** Means, Standard Deviations and Correlations of the Key Study Variables.

	1.	2.	3.	4.	5.
1. Parents' Anxiety Disorder Severity					
2. Infant fearful temperament 1 year	-.12				
3. Support 2.5 years	-.02	.16†			
4. Undermining 2.5 years	-.05	-.12	-.21*		
5. Child Anxiety 4.5 years	.13	.16†	.09	-.18†	
M (SD)	6.75 (6.73)	0.00 (1.00)	3.04 (0.78)	2.50 (0.93)	1.96 (0.45)
N	151	120	110	118	110

†  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$

Note: The score of infant fearful temperament is a composite of several tasks consisting of aggregated Z-score of coded variables, see Method.

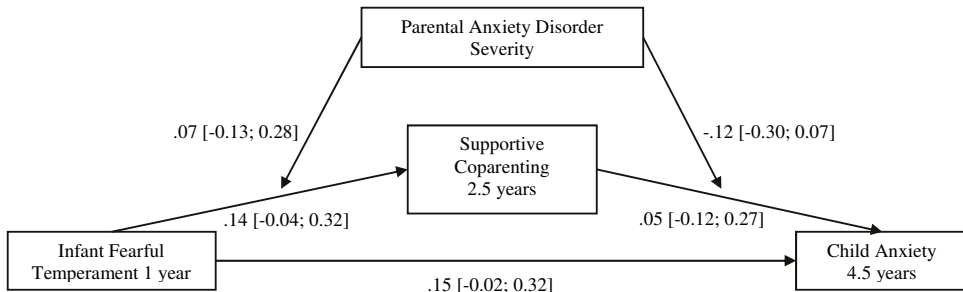
### Path Analyses

#### Supportive coparenting

First, we tested the path model that addressed the associations between infant fearful temperament, supportive coparenting and child anxiety symptoms (Figure 2). With regard to the direct effects, we found a trend demonstrating that high infant fearful temperament at 1 year was related to more child anxiety symptoms at 4.5 years ( $p = .075$ ). We found no

associations between infant fearful temperament at 1 year and supportive coparenting at 2.5 years and between supportive coparenting at 2.5 years and child anxiety symptoms at 4.5 years ( $p = .128$ , and  $p = .577$ , respectively).

With regard to the moderation effects, we found that parental anxiety disorder severity did not moderate the path from infant fearful temperament at 1 year to supportive coparenting at 2.5 years ( $p = .486$ ). We also found no moderation effect of parental anxiety disorder severity in the path from supportive coparenting at 2.5 years to child anxiety symptoms at 4.5 years ( $p = .211$ ). Finally, we tested the moderated mediation effects to investigate whether the indirect effect from infant fearful temperament at 1 year through coparenting at 2.5 years related to child anxiety symptoms at 4.5 years depended on parental anxiety disorder severity. We found no evidence for moderated mediation, as we found no significant indirect effects for families with parents with high (2 *SD* above the mean;  $\beta = -.05$ ,  $p = .463$ ), average ( $\beta = .00$ ,  $p = .598$ ) and low (2 *SD* above the mean;  $\beta = .00$ ,  $p = .987$ ) levels of parental anxiety disorder severity. Thus, coparenting did not mediate the associations between infant fearful temperament at 1 year and child anxiety symptoms at 4.5 years, and the mediation effect did not depend on parents' anxiety disorder severity.



**Figure 2.** Path model representing the moderating role of parental anxiety on the relations from infant fearful temperament at 1 year to supportive coparenting at 2.5 years and on the relations from supportive coparenting at 2.5 years to child anxiety at 4.5 year. Between brackets, 95% confidence intervals are displayed.

\*  $p < .05$

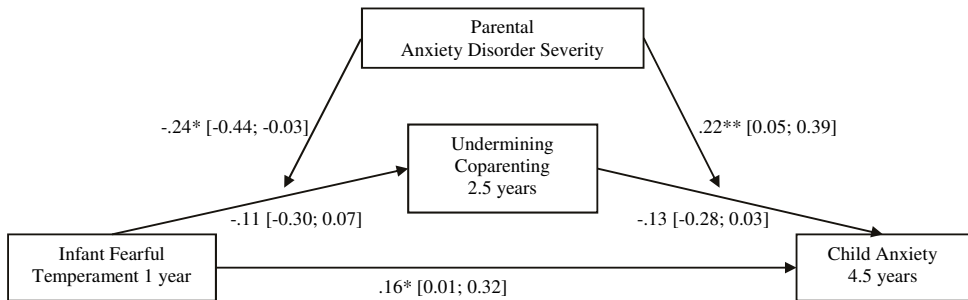
As a post-hoc analysis, we once reran the models separately with mothers' anxiety disorder severity, and once with fathers' anxiety disorder severity. We found that the outcomes remained highly similar when running separate models for mothers' and fathers' anxiety disorder severity: direct, indirect, and moderation effects remained unchanged.

In sum, we did not find indications that infant fearful temperament predicts later supportive coparenting, or that supportive coparenting predicted later child anxiety symptoms. In addition, we did not find the expected moderation effects of parental anxiety in the associations between infant fearful temperament, supportive coparenting, and child anxiety symptoms. Hence, supportive coparenting was unrelated to infant fearful

temperament and child anxiety symptoms and parental anxiety did not play a role in these associations.<sup>1</sup>

**Undermining coparenting**

Second, we tested the path models that addressed the associations between infant fearful temperament at 1 year, undermining coparenting at 2.5 year, and child anxiety symptoms at 4.5 years (Figure 3). We again found that more infant fearful temperament at 1 year predicted more child anxiety symptoms at 4.5 years ( $p = .044$ ). We found no direct effect from infant fearful temperament at 1 year to undermining coparenting at 2.5 years ( $p = .234$ ), and also no direct effect from undermining coparenting at 2.5 years to child anxiety symptoms at 4.5 years ( $p = .103$ ).

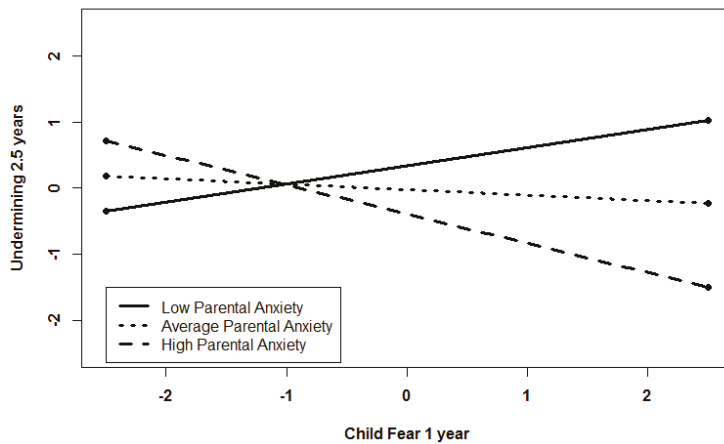


**Figure 3.** Path model representing the moderating role of parental anxiety on the relations from infant fearful temperament at 1 year to undermining coparenting at 2.5 years and on the relations from undermining coparenting at 2.5 years to child anxiety at 4.5 year. Between brackets, 95% confidence intervals are displayed.

\*  $p < .05$ .

With regard to the moderation effects, we found that parental anxiety disorder severity moderated the relation between infant fearful temperament and undermining coparenting (see Figure 4 for a graphical representation) in the following direction: for parents with high scores on anxiety disorder severity (2 *SD* above the mean), higher infant fearful temperament at 1 year was related to less undermining coparenting at 2.5 years ( $\beta = -.55$ ,  $p = .008$ ), and for parents with average and low scores on anxiety disorder severity, infant fearful temperament did not relate to undermining coparenting ( $\beta = -.11$ ,  $p = .234$ , and  $\beta = .36$ ,  $p = .134$ , respectively). Thus, only in families in which one or both parents had high scores on anxiety disorder severity, higher infant fearful temperament at 1 year predicted lower scores on undermining coparenting at 2.5 years. In families in which parents had average to low scores on anxiety disorder severity, infant fearful temperament at 1 year did not predict undermining coparenting at 2.5 years.

<sup>1</sup> All discussed associations in the model for supportive coparenting was reran with parent-reported infant fearful temperament. Fearful temperament was measured using a composite score of fathers' and mothers' reports of their infants' temperament, a scale from the Revised Infant Behavior Questionnaire (IBQ-R; Gartstein & Rothbart, 2003).

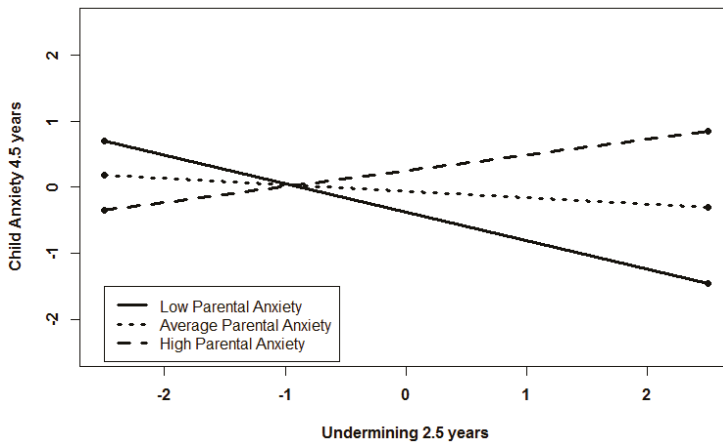


**Figure 4.** Graph of the interaction between parental anxiety disorder severity and infant fearful temperament at 1 year as predictors of undermining coparenting at 2.5 years. Low parental anxiety = 2 *SD* below the mean; average parental anxiety = the mean, high parental anxiety = 2 *SD* above the mean.

We also found a moderation effect of parental anxiety disorder severity on the association between undermining coparenting at 2.5 years and child anxiety symptoms at 4.5 years (see Figure 5 for a graphical representation). For parents with high scores on anxiety disorder severity, we found a trend that higher undermining coparenting at 2.5 years was related to higher child anxiety symptoms at 4.5 years ( $\beta = .31, p = .099$ ). For parents with average scores on anxiety disorder severity, undermining coparenting at 2.5 years and child anxiety at 4.5 years were unrelated ( $\beta = -.13, p = .103$ ). Unexpectedly, for parents with low scores on anxiety disorder severity higher scores on undermining coparenting at 2.5 years were related to less child anxiety symptoms at 4.5 years ( $\beta = -.57, p = .002$ ). Thus, we found opposite effects for parents with high and low scores on anxiety disorder severity: whereas higher undermining coparenting is related to more child anxiety symptoms in families with one (or two) parents with high anxiety disorder severity, higher undermining coparenting is related to *less* child anxiety symptoms in families with low anxiety disorder severity.

We tested the moderated mediation effect, to investigate whether the indirect effect from infant fearful temperament at 1 year through coparenting at 2.5 years related to child anxiety symptoms at 4.5 years. We did not find evidence for this hypothesized moderated mediation effect: we found no significant indirect effects for families with parents with high (2 *SD* above the mean;  $\beta = -.18, p = .161$ ), average ( $\beta = .01, p = .335$ ), or low (2 *SD* above the mean;  $\beta = -.21, p = .179$ ) parental anxiety disorder severity. Thus, coparenting did not mediate the associations between infant fearful temperament at 1 year and child anxiety symptoms at 4.5 years.





**Figure 5.** Graph of the interaction between parental anxiety disorder severity and undermining coparenting at 2.5 years as predictors of child anxiety at 4.5 years. Low parental anxiety = 2 SD below the mean; average parental anxiety = the mean, high parental anxiety = 2 SD above the mean.

When rerunning all models separately with mothers' anxiety disorder severity, and with fathers' anxiety disorder severity as post hoc analyses, we found that the moderation effect of mothers' anxiety disorder severity on the association between infant fearful temperament at 1 year and undermining coparenting at 2.5 years reached significance ( $\beta = -.28, p = .010$ ), as was the case for the aggregated parental anxiety disorder severity score. For fathers, this effect was in the same direction, but it did not reach significance ( $\beta = -.10, p = .262$ ). Hence, it appears that mothers' anxiety disorder severity is a stronger moderator in the association between infant fearful temperament and undermining coparenting than fathers' anxiety disorder severity. For the second moderation effect of mothers' versus fathers' anxiety disorder severity on the association between undermining coparenting at 2.5 years and child anxiety at 4.5 years, we found a trend for mothers in the same direction as in the model with the aggregated parental anxiety score ( $\beta = .15, p = .063$ ); for fathers, we found a significant effect in the same direction as in the model with the aggregated parental anxiety score ( $\beta = .20, p = .017$ ). Hence, for the interaction effect of parental anxiety disorder severity with undermining, results mainly remained the same running separate models for mothers' and fathers' anxiety disorder severity compared to the model with the aggregated score of parental anxiety disorder severity, with slightly stronger effects for fathers' anxiety disorder severity.

In summary, our results indicate that parents with higher levels of anxiety disorder severity whose infants display higher fearful temperament at 1 year display lower undermining coparenting at 2.5 years. This effect was stronger for mothers than for fathers. In turn, lower levels of undermining coparenting at 2.5 years in anxious parents may relate to less child anxiety at 4.5 years. On the other hand, for parents with low levels of anxiety disorder severity undermining coparenting does not depend on infant fearful temperament,

but higher levels of undermining at 2.5 years, rather than lower levels, predict less child anxiety at 4.5 years. We did not find indications that the relation between infant fearful temperament at 1 year and child anxiety symptoms at 4.5 years is mediated through undermining coparenting at 2.5 years.<sup>2</sup>

## DISCUSSION

In the current study, we investigated the role of coparenting as a mediator in the association from infant fearful temperament to child anxiety, and the moderating role of parental anxiety in these associations. We found that higher observed infant fearful temperament predicted higher later parent-reported child anxiety. We found no associations from infant fearful temperament to supportive coparenting, or from supportive coparenting to child anxiety; neither did we find evidence for a mediating role of supportive or undermining coparenting in the development from infant fearful temperament to child anxiety, nor did we find evidence for parental anxiety disorder severity as a moderator in the associations between infant fearful temperament, coparenting and child anxiety. However, we did find that parental anxiety disorder severity moderates the associations between infant fearful temperament and undermining coparenting, and between undermining coparenting and later child anxiety. These interaction effects revealed that parents with high levels of anxiety disorder severity who had a highly fearful child became more undermining coparents, whereas the undermining coparenting of parents with low levels of anxiety disorder is unaffected by the infants' fearful temperament. In addition, parents with high levels of anxiety disorder severity who were undermining had children who became more anxious over time, whereas parents with low levels of anxiety disorder severity who were undermining had children who became less anxious over time.

In contrast with previous studies, we found no associations between infant fearful temperament and supportive coparenting, and between supportive coparenting and child anxiety. Others did find associations between fearful or difficult temperament and supportive coparenting in 5-month-olds, both cross-sectionally (Gordon & Feldman, 2008) and longitudinally (Davis et al., 2009; Laxman et al., 2013). Interestingly, the studies in which associations between child temperament, supportive coparenting, and child anxiety were significant used questionnaire data for only child fearful temperament/child anxiety, or also for coparenting. More in line with our results and our methodology, one study only found associations between observed infant fearful temperament and observed undermining coparenting, but not with supportive coparenting (Belsky, Putnam, & Crnic, 1996). One explanation for the differences in findings is thus that the associations between infant

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<sup>2</sup> All discussed associations in the model for undermining coparenting were replicated in a second analysis in which fearful temperament was measured using a composite score of fathers' and mothers' reports of their infants' temperament (IBQ-R, Gartstein & Rothbart, 2003). Only the interaction effect between infant fearful temperament and parental anxiety disorder severity as a predictor of undermining coparenting became non-significant ( $\beta = -.04, p = .763$ ) in the model with parent-reported fearful temperament.

temperament and coparenting differ due to methodology, as has been suggested before (Van Egeren & Hawkins, 2004). It could also be the case that, in fact, supportive coparenting is not related to infants' fearful temperament, as previous research mostly investigated the associations with the broader construct of difficult temperament and negative affectivity.

We also did not find a moderation effect of parental anxiety disorder severity in the associations between infant fearful temperament, supportive coparenting, and child anxiety. Hence, we can conclude that these three constructs were unrelated for all parents, independent of their anxiety disorder severity. In line with this finding, Laxman et al. (2013) also found that negative emotionality did not moderate the associations between parent-reported child difficult temperament and observed supportive coparenting. Hence, it may be the case that parental anxiety (and the related construct of negative emotionality) is unrelated to the associations between supportive coparenting and child behaviors. This is also in line with the lack of direct effects between supportive coparenting and parental anxiety in previous research (Metz et al., 2016). Hence, supportive coparenting may not be influenced by parental anxiety, which can also explain why parental anxiety does not moderate the associations between supportive coparenting and child behaviors.

With regard to undermining coparenting, we found that the associations between infant fearful temperament and undermining coparenting differed depending on parental anxiety disorder severity: only for parents with high levels of anxiety disorder severity, high fearful temperament in infancy predicted less undermining coparenting in toddlerhood, whereas fearful temperament and undermining coparenting were unrelated in families with parents with low to average levels of anxiety disorder severity. Thus, it may be so that couples in which one or both parents have high anxiety disorder severity are more sensitive to the anxious behaviors of their infant, and therefore adjust their coparenting in such a way that they become less undermining over time. Our results run in the opposite direction as results found in previous research on negative emotionality (Laxman et al., 2013): here, a difficult temperament related to more undermining coparenting if the father was high on negative emotionality, whereas we found that a fearful temperament relates to less undermining coparenting if one of the parents is highly anxious. One difference between our study and that of Laxman et al. (2013) was that we used observations of infant fearful temperament, whereas Laxman et al. (2013) used parent reports of child difficult temperament. Note however that when we re-analyzed our data with parent-reports of infant fearful temperament, we did not find a moderating effect of parental anxiety in the associations between infant fearful temperament and undermining coparenting, while we did find this effect with observed fearful temperament. Hence, our results suggest that the moderation effect of parental anxiety on the associations between infant fearful temperament and undermining coparenting differs for observed versus parent-reported infant temperament. This could be because parents' reports about their infants' fearful temperament depend on the parents' own parental psychopathology (Briggs-Gowan, Carter, & Schwab-Stone, 1996;

Treutler & Epkins, 2003). However, also with parent-reported infant fearful temperament, we did not replicate Laxman et al.'s (2013) effect that fathers' negative emotionality in combination with infant difficult temperament related to more undermining coparenting. Other differences between our study and that of Laxman et al. (2013) are that we studied parental anxiety, rather than the broader construct of negative emotionality, and that we used a clinical interview to assess anxiety, rather than parent-reports. These differences could also underlie differences in outcomes.

In post-hoc analyses, we analyzed models for mothers' and fathers' anxiety disorder severity separately. Contrary to Laxman et al (2013), we only found significant effects for mothers' parental anxiety disorder as a moderator in the association from infant fearful temperament to undermining coparenting, but not for fathers' parental anxiety disorder severity. Thus, not only did the direction of effects differ between our study and that of Laxman et al. (2013), we also found stronger evidence for an influence of mothers' anxiety, whereas Laxman et al. (2013) only found associations with fathers' negative emotionality. Interestingly, Laxman et al. (2013) found that higher levels of mothers' negative emotionality correlated with *lower* levels of undermining coparenting, whereas the authors found a trend in the direction that fathers' negative emotionality correlated with higher levels of undermining coparenting. Thus, it could be so that mothers' anxiety or negative emotionality are related to less undermining, whereas fathers' anxiety and negative emotionality relate to more undermining. This could then also explain why mothers' anxiety in combination with infant fearful temperament is related to less undermining, whereas this was not expected based on Laxman et al.'s (2013) outcome for fathers' negative emotionality. However, these results need to be interpreted with caution, as we did not replicate Laxman et al.'s (2013) findings and are the first to report these results; further research is needed to establish the nature of the differences between fathers' and mothers' anxiety in the associations between infant fearful temperament and undermining coparenting.

We not only found that parents' anxiety disorder severity played a role in the associations between infant fearful temperament and undermining, but we also found that parents with high and low anxiety disorder severity differed in the associations between undermining coparenting and later child anxiety: for parents with high levels of anxiety disorder severity, we found a trend that high levels of undermining coparenting related to more child anxiety over time, whereas for parents with low levels of anxiety disorder severity, high levels of undermining coparenting related to *less* child anxiety over time. Here, we did not find differences between fathers and mothers. Our results suggest that if parents are undermining in a family environment without an anxious parent, children become less anxious over time. On the other hand, in a family which is undermining and has an anxious parent, the child becomes more anxious over time. Hence, it may be the case that the combination of a highly undermining coparenting relationship with a highly anxious parent results in a more anxious child. This is in line with the reasoning of Majdandžić et al. (2012),

who suggested that an unsafe family environment can provoke anxiety in the child. The finding that children become less anxious over time in families with low levels of parental anxiety disorder severity who display high levels of undermining is surprising, given the general findings that more undermining is related to more infant fearful temperament and child anxiety (Cook et al., 2009; Lindsey et al., 2005; McHale & Rasmussen, 1998; Metz et al., 2016). However, longitudinal associations from undermining coparenting to child anxiety were only found by McHale and Rasmussen (1998). Hence, evidence on these longitudinal associations is still scarce. In line with our findings, it has been theorized that undermining coparenting can serve to toughen up children (Belsky et al., 1996; Park, Belsky, Putnam, & Crnic, 1997). These authors found that children who were highly fearful at 10 months were less fearful when they were 3 years old if parents were observed to be highly undermining (Belsky et al., 1996). Therefore, these authors suggested that it may be the case that more harsh coparenting can serve to make children more resilient and less likely to become anxious over time. Our results add to this finding that it may only be the case that undermining coparenting of non-anxious parents serves this beneficial outcome in children initially at risk for developing anxiety, whereas anxious parents' undermining coparenting can have detrimental effects on children's anxiety development, in line with the majority of empirical findings.

Taking the two moderating effects of parental anxiety disorder severity in the associations between infant temperament and child anxiety together, we found indications that parent couples who are highly anxious before the birth of their first child (either one or both parents) and then give birth to an infant that is predisposed to develop anxiety because of a high fearful temperament at the age of 1 year, in time learn to adapt to the needs of their sensitive infant by undermining their partner less when the child is 2,5 years of age. Possibly, when their children (of now 4,5 years) have moved away from their original anxious predisposition and have developed less anxiety when their parents did less undermining coparenting, and have moved towards their anxious predisposition and have developed more anxiety when their parents did more undermining coparenting. For parents who were not anxious before the birth of their child, it appears that these couples' undermining is unaffected by their child's temperament at 1 year; when these parents are undermining at 2.5 years, this protects their child from developing anxiety when they are 4.5 years old.

The current study was the first to investigate the mediating role of coparenting in the developmental trajectory from infant fearful temperament to child anxiety. Contrary to expectations, we found that in all parents, supportive and undermining coparenting did not mediate the relationship from infant fearful temperament to child anxiety. Hence, our results do not support the notion that change in family outcomes occurs through coparenting, as family systems theory proposed (Minuchin, 1974; Weissman & Cohen, 1985), and our results do also not support the idea that the mediational process through

coparenting differs for highly anxious and low-anxious parents. However, we did find that infant fearful temperament, coparenting, and child anxiety are related, and that these effects are moderated by parental anxiety. Thus, family member anxiety and coparenting do appear to be interrelated.

The current study carries several strengths. First of all, we collected longitudinal data which included observations of both infant fearful temperament and coparenting and we used these observational data to predict clinical symptom levels of child anxiety. Moreover, we reanalyzed all models with parent-reported fearful temperament, which enabled us to identify possible differences in the associations between observed versus parent-reported infant fearful temperament and coparenting. We also investigate parents' anxiety disorder severity before child birth, which made it possible to identify prenatal parental anxiety disorder severity as a risk factor in the development of child anxiety symptoms at 4.5 years, and we investigated fathers' and mothers' anxiety disorder severity separately. In addition, we were the first to investigate the theorized role of coparenting as a mechanism of change in the development of child anxiety. Through advanced statistical modeling, we investigated the role of parental anxiety in the associations between infant fearful temperament, coparenting, and child anxiety. This enabled us to investigate the complex dynamics that are at play in the intergenerational transmission of anxiety.

Our study also had some limitations and results should be interpreted with these limitations in mind. First, our data concern a fairly homogeneous sample of highly educated parents. This means that our results cannot be generalized to clinical samples. Furthermore, we used a prenatal measure of parents' anxiety disorder severity, which enabled us to study parents' trait anxiety unaffected by the infants' characteristics; however, it is likely that parental anxiety changes in the light of the child's characteristics, as the transmission of anxiety is a transactional process (Majdandžić et al., 2012), which means that it may be the case that parents' anxiety severity after birth is a more direct moderator of the associations between infant temperament, coparenting, and child anxiety.

Our findings lead us to propose several implications for future research and practice. First, research should investigate parent samples with clinical anxiety levels, because our results suggest that it may be especially in those samples that the role of undermining coparenting has detrimental effects on the development of child anxiety. Moreover, these studies need to investigate whether our results can be replicated in a clinical sample, and also whether supportive coparenting plays a more significant role in high risk samples. Second, future research is needed to investigate the longitudinal associations between parental anxiety, (precursors of) child anxiety, and coparenting, as it may be the case that the transactional processes between coparenting, parental anxiety, and child anxiety change over time. It can also be the case that concurrent measures of parental anxiety show stronger relationships with coparenting and child anxiety, than our prenatal measure. Third, more research is needed on the role methodology plays in the associations between coparenting and infant

fearful temperament. Our results suggest that the way fearful temperament is measured influences the associations with coparenting. Also, the way coparenting is measured may affect the results in these associations. To understand the way coparenting relates to child outcomes, comprehensive research on the influence of methodology on research findings in this area is needed. Finally, we were the first to investigate the mediating role of coparenting in the development of child anxiety; future research is needed to replicate and to elaborate our findings.

With regard to practice, in the treatment of adult anxiety it is important to take into account that parents' anxiety disorders can be associated to the way they cooperate in their parenting, and this can again influence the development of anxiety in their child. Also in the treatment of child anxiety, practitioners should attend to the possible associations with undermining coparenting and parental anxiety, as these two factors can be explanatory in the development of child anxiety. With regard to prevention, it may benefit children if pregnant couples with at least one anxious partner are informed about the possible risks that their undermining behaviors can have on their child. Research demonstrated that prenatal programs can improve coparenting quality after birth (Feinberg & Kan, 2008; Feinberg, Jones, Kan, & Goslin, 2010) and it may be especially useful to offer these kinds of programs to anxious parents.

## CONCLUSION

This study investigated the role of coparenting in the developmental trajectory from infant fearful temperament to child anxiety, as well as moderating effects of parental anxiety disorder severity in these associations. We conclude that parental anxiety plays a significant role in the associations between infant fearful temperament, undermining coparenting, and child anxiety. Highly anxious parents adapt to their infant's fearful temperament by becoming less undermining. If anxious parents are undermining, this may serve as a risk factor in the development of child anxiety, whereas undermining coparenting of low-anxious parents may serve as a protective factor in the development of child anxiety. Based on these findings, we recommend researchers and practitioners to attend to the role of parental anxiety in the associations between coparenting and children's development of anxiety.