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Parental Anxiety, Parenting Behavior, and Infant Anxiety: Differential Associations for Fathers and Mothers

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Abstract Most studies investigating the role of parenting behavior in the intergenerational transmission of anxiety from parents to children have focused on mothers. However, recent research suggests that mothers and fathers may parent differently and may differentially affect the development of child anxiety. Theoretical models propose that anxious parents engage in more anxiety-provoking and less anxiety-reducing parenting behavior than non-anxious parents. However, findings are inconsistent, possibly because most studies have not differentiated between anxiety disorders. Therefore, it remains unclear which specific anxiety disorders are linked to parenting behavior. This study examined (1) whether symptoms of specific parental anxiety disorders are linked to overinvolvement and challenging parenting behavior towards infants; and (2) the differential relationship of maternal/paternal overinvolvement and challenging parenting behavior with infant anxiety. Parents of 81 infants (10–15 months) completed the Overinvolvement and Challenging parenting behavior (CPB) scales of the Comprehensive Parenting Behavior Questionnaire, the Screen for Child Anxiety Related Emotional Disorders-Adult version, and the Fear scale of the Infant Behavior Questionnaire-Revised. Linear regressions showed that mothers' *generalized* anxiety disorder symptoms were associated with less CPB and more overinvolvement, whereas fathers' *social* anxiety disorder symptoms were associated with less CPB and more overinvolvement. Moreover, paternal, but not maternal, CPB was associated with less infant anxiety, and overinvolvement with more infant anxiety. Findings suggest that (1) different

dimensions of paternal/maternal anxiety are linked to their parenting behavior; (2) maternal/paternal parenting behaviors are differentially associated with infant anxiety.

Keywords Anxiety disorders · Parenting behavior · Sex differences · Infants · Fathers

Introduction

Research supports the familial aggregation of anxiety disorders (e.g., Hettema et al. 2001). It is clear that genes play a role in explaining individual differences in levels of anxiety among children (Gregory and Eley 2007). Next to heritability (Gregory and Eley 2007), family factors may be involved in the transmission of anxiety (disorders) from parents to children, such as attachment between a parent and child, the marital relationship, parenting behavior, and parental beliefs about their child (Bögels and Brechman-Toussaint 2006). In this paper, we will focus on parenting behavior in the intergenerational transmission of anxiety.

Parental excessive control has been consistently linked to anxiety in children (McLeod et al. 2007; Van der Bruggen et al. 2008). Several terms for this parenting dimension have been used in the literature, such as overprotection, over-control, overinvolvement, and intrusiveness. In the present paper, we will use the term overinvolvement, which refers to a parent's excessive interfering in a child's behavior and feelings, and discouragement of independence of the child (Chorpita and Barlow 1998; Majdandžić et al. 2014). Overinvolved parents provide more assistance and help to the child than is needed (Rapee 1997). Overinvolvement can lead to child anxiety as it may increase children's threat perception, may reduce children's perceived control over threat, and reduces children's opportunities to explore their

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environment and to develop new skills to cope with unexpected environmental events (Van der Bruggen et al. 2008).

More recently, a role for challenging parenting behavior in the development of child anxiety has been proposed (Bögels and Perotti 2011; Bögels and Phares 2008). Challenging parenting behavior is characterized by behaviors in which the parent playfully encourages the child to exhibit risky behavior or to go outside his/her comfort zone while keeping an eye on the safety and security of the child (Majdandžić et al. 2014). Majdandžić et al. (2014) stress that challenging parenting behavior can be of both a physical (e.g., rough-and-tumble play, chasing the child, tickling) and socio-emotional (e.g., teasing, defeating the child in a game, competing with the child) nature. In this sense, challenging parenting behavior is broader than pure physical play with the child. It has been hypothesized that challenging parenting behavior may buffer the development of child anxiety as challenging parenting behavior pushes the child's limits (Bögels and Perotti 2011; Bögels and Phares 2008).

Most studies on the association between parenting behavior and the development of child anxiety have focused on mothers. However, reviews suggest that mothers and fathers may parent differently (Möller et al. 2013; Paquette 2004). Across cultures, mothers have been found to spend more time with their children than fathers in all child care activities except for physical play, especially with younger children (Geary 2010). Next to quantitative differences between mothers' and fathers' parenting, qualitative differences have also been found (see the review of Möller et al. 2013). For example, fathers engage in more physical play than mothers, whereas pretend play is more shown by mothers than by fathers. With regard to parent–child interaction, mothers are more responsive and sensitive, and provide more warmth and support to their children than fathers. As another example, mothers empathize more with their children and talk more about emotions compared to fathers.

These sex differences in parenting may be explained by evolutionary based differences between men and women (Bögels and Perotti 2011; Möller et al. 2013). That is, in the course of evolution, men and women developed different specializations, because they faced different challenges with respect to surviving and reproducing (for an elaborate review of this issue see Bjorklund et al. 2002; Geary and Flinn 2001). Males specialized in social competition, risk taking, and taking chances, whereas females specialized in care, nurturing, and intimate bonding (Möller et al. 2013). Or, as Bögels and Perotti (2011) state: fathers specialized in 'external protection' (approaching potentially dangerous animals and unfamiliar humans, exploring new territory), whereas mothers specialized in 'internal protection' (feeding, soothing, comforting the

child). These different roles are assumed to be reflected in mothers' and fathers' parenting behavior (Bögels and Perotti 2011), which evidence confirms (Möller et al. 2013). For example, the fact that fathers spend more time playing with their children than mothers, and that fathers' type of play is more often of a physical nature (e.g., rough-and-tumble play), corresponds with their evolutionary based challenging role in the development of their offspring (Bögels and Phares 2008; Paquette 2004). As another example, that mothers empathize more with their children and provide more warmth and support to their offspring than fathers, fits with the evolutionary based caring and comforting role of mothers (Bögels and Phares 2008; Paquette 2004).

Alternatively, sociostructuralistic theories explain these sex differences in parenting by the differing distributions of males and females into social roles (see Eagly and Wood 1999; Wood and Eagly 2002). Social structuralists emphasize that the division of labor between men and women in a society is responsible for sex-differentiated behavior (see Deaux and LaFrance 1998). The accommodation of men to an employment role and roles with greater power and status favors assertiveness, independence, competition and dominance in males, whereas the accommodation of women to a domestic home-maker role and to female-dominated occupations produces more nurturing and caring behaviors in females, and favors the development of emotional interpersonal skills in women (Eagly and Steffen 1984; Ridgeway and Diekema 1992). It should be noted, however, that despite the fact that evolutionary psychology theories and sociostructuralistic theories use different explanations for the origins of sex differences in parenting, both theories agree that sex differences in parenting behaviors exist.

Both maternal and paternal parenting behavior seem to play a role in the development of child anxiety (see the review of Möller et al. 2013). However, sometimes effects are only found for mothers, and not for fathers, or vice versa. Regarding overinvolvement, both maternal and paternal overinvolvement seem to be associated with the development of child anxiety. So far, only one study investigated the role of challenging parenting behavior in child anxiety (Majdandžić et al. 2013). Using a longitudinal design, it was found that paternal challenging parenting behavior decreased observed social anxiety in first born, 4-year-old children, half a year later. Maternal challenging parenting behavior unexpectedly predicted more observed social anxiety in these children. The authors' explanation for this finding was that challenging parenting behavior may conflict with the evolutionary based protecting and caring role of mothers, resulting in the child feeling less safe and developing anxiety. Thus, studies report contradictory findings regarding the differential effects of paternal and maternal parenting behavior on child anxiety.

It has been hypothesized that parents' anxiety level influences their parenting behavior. That is, anxious parents are presumed to display more anxiety-provoking parenting behaviors. For example, theoretical models propose that anxious parents engage in more overcontrolling parenting than non-anxious parents (Chorpita and Barlow 1998; Ginsburg and Schlossberg 2002; Rapee 1997). However, findings on the association between parental anxiety and parenting behavior are inconsistent (e.g., Van der Bruggen et al. 2008). For example, with regard to the association between parental anxiety and parental overcontrol, some studies found a negative association (e.g., Adam et al. 2004; Feldman et al. 1997), other studies a positive association (e.g., Krohne and Hock 1991; Moore et al. 2004), whereas other studies reported no significant relationship (Barrett et al. 2002; Broome and Endsley 1989). Possibly, these inconsistent findings can be attributed to the fact that most studies comparing the parenting behavior of anxious and non-anxious parents have not differentiated between anxiety disorders (e.g., Ginsburg et al. 2004; Turner et al. 2003; Woodruff-Borden et al. 2002). Therefore, it remains unclear whether certain parenting behaviors are linked to specific parental anxiety disorders.

Recently, a few studies have addressed this gap in the literature by focusing on the parenting behavior of mothers with specific anxiety disorders. First, Murray et al. (2007) compared the behavior of mothers with current social anxiety disorder (SAD), and non-anxious mothers during the interaction with their 10-week-old infant and a stranger. To assess the presence of anxiety subgroup-specific effects, the behavior of a group of mothers with generalized anxiety disorder (GAD) was also compared with the behavior of the non-anxious mothers. It was found that when interacting with their infant, mothers with SAD were more anxious, and less actively engaged than control mothers. Control mothers and mothers with SAD did not differ in their sensitivity towards their child. Mothers with GAD were not more anxious than control mothers, but they were less engaged with their child. During the interaction with the stranger, SAD mothers expressed more anxiety, engaged less with the stranger, and encouraged their child less to interact with the stranger than control mothers. No difference was found between mothers with SAD and non-anxious mothers in their level of control of the infant-stranger interaction. Conversely, the behavior of mothers with GAD did not differ from the behavior of control mothers during the interaction with the stranger; no differences were found in the level of anxiety, engagement with the stranger, encouragement, and control of the infant-stranger interaction. Thus, results of this study suggest anxiety disorder specific effects on mother-infant interactions.

Second, Murray et al. (2012), using the same three groups as in 2007, examined mothers' parenting behavior

towards their 4.9-year-old children in three tasks: a non-threat task, a social threat task and a non-social threat task. Across these tasks, mothers with SAD and mothers with GAD displayed more passivity, and less encouragement than control mothers. Compared to control mothers, mothers with SAD displayed significantly less warmth, and mothers with GAD borderline significantly less warmth. The only parenting dimension for which a difference emerged between the mothers with SAD and the mothers with GAD was expressed anxiety; mothers with SAD expressed more anxiety compared to both the control mothers and mothers with GAD. The three groups did not differ in their level of intrusiveness, promotion of avoidance, and positive modelling. Different from their findings in 2007, the findings of this study show limited evidence of anxiety disorder specific effects on maternal parenting behavior.

Lastly, Crosby Budinger et al. (2013) compared the parenting behavior of parents (89 % mothers) with current SAD to parents with other anxiety disorders in a performance task with their non-anxious child (aged 7–12 years). It was found that compared to parents with other anxiety disorders, parents with SAD displayed less warmth, more criticism, and more doubt of child competency. Both groups of parents did not differ in their level of autonomy granting or overcontrol. In sum, there is mixed evidence for specific parental anxiety disorders being related to certain parenting behaviors.

The current study extended the important work of Murray et al. (2007, 2012) and Crosby Budinger et al. (2013) by (1) including both mothers and fathers; (2) differentiating between symptoms of five anxiety disorders (panic disorder, generalized anxiety disorder, social anxiety disorder, separation anxiety disorder, and specific phobia); and (3) including challenging parenting behavior as a parenting behavior that may be important in the prevention of the development of child anxiety. Moreover, there are relatively few studies directed towards the role of parenting in anxiety of very young children, compared to older children. As it is likely that parenting is most influential at this young age, since infants spend most time with their parents and are most dependent on them, it is important to assess the role of parenting in the development of anxiety in infants. Therefore, in the present study, both fathers and mothers of infants between 10 and 15 months completed questionnaires on parental anxiety symptoms, infant anxiety, and overinvolved and challenging parenting behavior. The goal of the present study was threefold. First, we assessed how symptoms of panic disorder, generalized anxiety disorder, social anxiety disorder, separation anxiety disorder, and specific phobia were associated with maternal/paternal overinvolvement and challenging parenting behavior. Posttraumatic stress disorder (PTSD) and obsessive compulsive

disorder (OCD) were not examined, as they are no longer under the umbrella of the anxiety disorders in DSM-5 (American Psychiatric Association 2013). PTSD is removed from the anxiety disorders and placed under the trauma and stressor-related disorders, as PTSD includes exposure to a traumatic or stressful event and because empirical evidence shows that PTSD manifests itself in not only fear and anxiety, but also in many other negative mood states (see Friedman et al. 2011). In DSM-5, OCD is placed under the Obsessive–Compulsive and Related Disorders, as empirical evidence supports the idea that the OCD-related disorders are interrelated in terms of diagnostic validators (see Phillips et al. 2010). We had no hypothesis regarding how symptoms of panic disorder, generalized anxiety disorder, social anxiety disorder, separation anxiety disorder, and specific phobia were differentially associated with maternal/paternal overinvolvement and challenging parenting behavior, as previous studies (Crosby Budinger et al. 2013; Murray et al. 2007, 2012) did not examine anxiety disorder specific effects of fathers on infant anxiety, and for mothers only assessed SAD and GAD, and not panic disorder, separation anxiety disorder, and specific phobia. Second, we tested the differential associations between maternal/paternal overinvolvement and challenging parenting behavior and infant anxiety. With respect to overinvolvement, we hypothesized that both paternal and maternal overinvolvement would be associated with more infant anxiety. Based on the results of the study of Majdandžić et al. (2013), we hypothesized that paternal challenging parenting behavior would be associated with less infant anxiety, whereas maternal challenging behavior would not be associated with infant anxiety or even with more infant anxiety. Third, we explored which parenting behavior is the best predictor of infant anxiety (i.e., challenging parenting behavior or overinvolvement). As mothers and fathers form a dynamic system in raising their children (e.g., Bögels and Perotti 2011; Majdandžić et al. 2012), we did not examine this separately for mothers and fathers, but for both parents together. As this has not been investigated before, we had no hypothesis on which parenting behavior (maternal challenging parenting behavior, paternal challenging parenting behavior, maternal overinvolvement, or paternal overinvolvement) would be the best predictor of infant anxiety.

Method

Participants

Parents of 81 infants (40 boys, 49 %) between 10 and 15 months ($M = 11.88$, $SD = 1.25$) participated in this study. The sample also participated in an experiment on the differential effect of paternal and maternal behavior on

Table 1 Characteristics of the participating fathers and mothers

	Mothers $N = 76$	Fathers $N = 74$
Age (M , SD)	34.43 (3.79)	36.51 (4.89)
Born in The Netherlands (n , %)	58 (76.3 %)	62 (83.8 %)
Working fulltime (n , %)	13 (17.1 %)	51 (68.9 %)
Married/living together (n , %)	73 (96.1 %)	73 (98.6 %)
Number of children (M , SD)	1.43 (.75)	1.45 (.76)
Educational level (M , SD) ^a	7.33 (1.10)	7.24 (.92)
Time parent spends with child ^b	3.96 (1.39)	2.38 (1.17)

^a On a scale from zero (primary education) to eight (university)

^b Number of days per week

infant responses to the visual cliff (Möller et al. 2014). Questionnaires were completed by 76 (93.8 %) mothers and 74 (91.4 %) fathers. Parents were recruited through an information letter distributed by the municipality of Amsterdam and by leaflets provided by child care centers. Parents received information about the study beforehand and signed informed consent. The study was approved by the ethical committee of the University of Amsterdam. Characteristics of the participating parents are depicted in Table 1.

Procedure

One of the parents was selected at random to visit our laboratory to participate in the visual cliff task (not used in the present study). One week before the visit to our laboratory, both parents received a set of questionnaires by mail, to be completed individually and returned on the day of the visit. After the laboratory visit, the parent received a second set of questionnaires for both parents to be filled out at home separately from their partner and that could be send back to the university in a post-free return envelope. Completing each set of questionnaires lasted approximately 1 h. The parent who visited our lab received a refund of travel expenses, and the infant received a small gift. Parents also received a copy of the video recordings that were made of the parent and the infant, and a compensation of 10 euro that they could keep themselves or could donate to Orange Babies, a foundation established to help pregnant women with HIV and their babies in Africa.

Measures

Parenting Behavior

Parents' parenting behavior was assessed by the Comprehensive Parenting Behavior Questionnaire 1-year version (CPBQ-1; Majdandžić et al. 2014). The questionnaire consists

of six scales: Challenging parenting behavior, Overinvolvement, Warmth, Negativity, Negative discipline, and Positive discipline, each consisting of several subscales. In the present study, only the scales Challenging Parenting Behavior and Overinvolvement were used. The Challenging Parenting Behavior scale (46 items) assesses the extent to which the parent encourages the child socio-emotionally (e.g., teasing) or physically (e.g., rough-and-tumble play) to exhibit risky behavior, or behavior that causes the child to go outside of his/her comfort zone. The scale assesses seven facets of challenging parenting behavior: teasing, rough-and-tumble play, encouragement of risk taking, social daring, competition, encouragement of assertiveness, and challenging modeling. Overinvolvement (28 items) assesses both overprotective and overcontrolling parenting behavior. Overprotection is defined as the extent to which the parent behaves (over) protectively towards the child and in this way limits exposure to new objects, people, or situations. Overcontrol is the extent to which the parent needlessly helps the child or interferes with his/her behavior and does not take the needs, interest, and desires of the child into account. Items were rated on a 5-point Likert-scale ranging from 1 (totally not applicable) to 5 (completely applicable). The Overinvolvement and Challenging Parenting Behavior scales of the CPBQ-1 possess good reliability (Cronbach's alpha): for Challenging Parenting Behavior .88 for mothers and .87 for fathers, and for Overinvolvement .79 for mothers and .78 for fathers (Majdandžić et al. 2014). In our study, Cronbach's alpha of the Challenging Parenting Behavior scale was .82 for mothers and .85 for fathers, and of Overinvolvement .74 for mothers and .70 for fathers. Regarding the divergent validity of the scales, strong negative correlations between the Overprotection and the Challenging Parenting Behavior scales of the CPBQ-1 have been found (Majdandžić et al. 2014). Regarding the convergent validity, scores on the Challenging Parenting Behavior scale correlate positively with observational measures of challenging parenting behavior (Majdandžić et al. 2014).

Parental Anxiety Symptoms

To assess parental anxiety, both parents completed the Screen for Child Anxiety Related Emotional Disorders—Adult version (SCARED-A; Bögels and Van Melick 2004; Van Steensel and Bögels 2014), a screening tool for identifying symptoms of anxiety disorders. The SCARED-A assesses a range of DSM-IV based anxiety symptoms that can be divided into symptoms of panic disorder (PD, 13 items), generalized anxiety disorder (GAD, 9 items), social anxiety disorder (SAD, 9 items), separation anxiety disorder (SEP, 12 items), obsessive-compulsive disorder (OCD, 9 items), posttraumatic stress disorder (PTSD, 4 items), and specific phobia (SP, 15 items). As already

mentioned in the Introduction, the subscales on OCD and PTSD were omitted because OCD and PTSD are removed from the anxiety disorders section of the DSM-5 (American Psychiatric Association 2013), and because they were not of interest in the present study. Parents indicated how frequently they experienced each of the remaining 58 anxiety symptoms using a 3-point Likert scale with almost never = 0, sometimes = 1, and often = 2. Good reliability and discriminant validity to detect anxiety disorders have been shown for the SCARED-A (Bögels and Van Melick 2004; Van Steensel and Bögels 2014). A mean item score per parent was created by averaging the 58 item scores. Cronbach's alpha of the SCARED total score in our study was .88 for mothers and .87 for fathers. Furthermore, mean item scores were calculated per parent for each of the five anxiety disorders (PD, GAD, SAD, SEP, and SP). Reliabilities (Cronbach's alpha) of the SCARED subscales were for mothers .70 (PD), .86 (GAD), .90 (SAD), .67 (SEP), and .71 (SP). For fathers, Cronbach's alphas were .73 (PD), .81 (GAD), .88 (SAD), .53 (SEP), and .57 (SP). The relatively low reliability of paternal SP possibly relates to the distinct nature of the different specific phobias and the relatively low reliability of paternal SEP is probably due to the low prevalence of symptoms of that disorder.

Infant Anxiety

Infants' anxiety was measured using the Fear scale of the Infant Behavior Questionnaire-Revised (IBQ-R; Gartstein and Rothbart 2003), a parent-report measure of temperament in infants between 3 and 12 months. The IBQ-R consists of 191 items, organized into 14 subscales. Parents rated the frequency of infant behaviors during the past week on a 7-point Likert-scale ranging from 1 (never) to 7 (always). The Fear scale (16 items) assesses infant's startle or distress to sudden changes in stimulation, novel physical objects or social stimuli. An example item is: "How often during the last week did the baby startle to a sudden or loud noise?" Cronbach's alpha of the Fear scale was .89 for mothers and .85 for fathers. Regarding the validity of the Fear Scale of the IBQ-R, significant associations have been reported between the IBQ Fear scale and laboratory measures of infant temperamental fear (Gartstein and Marmion 2008; Parade and Leerkes 2008). Moreover, the study of Gartstein et al. (2010) showed that higher IBQ Fear scores predict higher toddler anxiety symptoms. In the present study, fathers' and mothers' ratings of their child's fear were substantially correlated ($r = .55, p < .001$), therefore we calculated a mean item score across parents.

Data Analyses

Variables were checked for normality, and skewness and kurtosis were $<|2|$ for all variables. Multicollinearity was

checked for all study variables by using correlations, tolerances, and variance inflation factors (VIF). Stevens (1996) noted that correlation coefficients larger than .80 indicate multicollinearity. In addition, a VIF higher than 10 or a tolerance lower than .01 would indicate multicollinearity. As none of the variables in our study met these criteria, multicollinearity was not a problem.

Results

Infant anxiety did not correlate significantly with either mothers' ($r = .18, n = 71, p = .134$) or fathers' total anxiety score ($r = .15, n = 68, p = .214$). Maternal anxiety correlated borderline significantly with paternal anxiety, $r = .23, n = 69, p = .056$. Mothers reported higher levels of anxiety than fathers, except on the PD and SAD subscales on which mothers and fathers did not differ (Table 2).

Maternal challenging parenting behavior was significantly and positively associated with paternal challenging parenting behavior ($r = .50, n = 68, p < .001$). A significant positive correlation also emerged between maternal and paternal overinvolvement ($r = .42, n = 68, p < .001$). Correlating parenting dimensions within mothers and fathers revealed for both mothers and fathers a significant negative correlation between overinvolvement and challenging parenting behavior (for mothers: $r = -.44, n = 72, p < .001$; for fathers: $r = -.60, n = 68, p < .001$), indicating that the more overinvolvement a parent reported, the less challenging parenting behavior s/he reported. With respect to sex differences in parenting behavior, fathers ($M = 2.30, SD = .32$) reported more overinvolvement than mothers ($M = 2.20, SD = .37$), paired $t(67) = 2.17, p = .003$. Fathers ($M = 3.45, SD = .41$) and mothers ($M = 3.47, SD = .44$) did not differ in their level of challenging parenting behavior, paired $t(67) = -.35, p = .725$.

Bivariate correlations between parental anxiety and parenting behavior (separately for mothers and fathers) can

Table 2 Father-mother differences in anxiety symptoms using the SCARED-71

Variable	Mothers <i>M (SD)</i>	Fathers <i>M (SD)</i>	Paired <i>t (df)</i>	<i>p</i>	<i>d</i>
Full SCARED ^a	.34 (.18)	.27 (.17)	2.93 (68)	.005	.40
SCARED PD	.18 (.17)	.16 (.17)	.64 (68)	.526	.12
SCARED GAD	.58 (.42)	.43 (.34)	2.50 (68)	.015	.39
SCARED SAD	.43 (.44)	.34 (.38)	1.42 (68)	.159	.22
SCARED SEP	.33 (.23)	.25 (.17)	2.52 (68)	.014	.40
SCARED SP	.32 (.26)	.23 (.18)	2.01 (68)	.049	.40

^a excluding the OCD and PTSD scales

Table 3 Correlations between maternal and paternal parenting behaviors and parental anxiety symptoms

	Challenging parenting behavior		Overinvolvement	
	Mothers (<i>n</i> = 71)	Fathers (<i>n</i> = 67)	Mothers (<i>n</i> = 71)	Fathers (<i>n</i> = 67)
Full SCARED ^a	-.16	-.22	.50**	.20
SCARED PD	-.15	-.16	.34**	.03
SCARED GAD	-.22	-.13	.55**	.06
SCARED SAD	.05	-.28*	.06	.27*
SCARED SEP	-.10	-.09	.42**	.14
SCARED SP	-.13	-.09	.31**	.14

^a excluding the OCD and PTSD scales

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

be found in Table 3. For mothers, PD, GAD, SEP, and SP were significantly positively associated with overinvolvement, but SAD was not. Maternal anxiety did not correlate with challenging parenting behavior. For fathers, only SAD was significantly associated with challenging parenting behavior (negatively) and overinvolvement (positively).

To examine the relative association of parental anxiety symptoms of PD, GAD, SAD, SEP, and SP with maternal/paternal challenging parenting behavior and overinvolvement, four linear regression analyses were conducted (Table 4). In the first regression, maternal challenging parenting behavior was entered as outcome variable and maternal PD, GAD, SAD, SEP, and SP as predictors. Only maternal GAD emerged as a significant negative predictor of maternal challenging parenting behavior: The more GAD symptoms a mother reported, the less challenging parenting behavior she reported. In the second regression, paternal challenging parenting behavior was entered as outcome variable and paternal PD, GAD, SAD, SEP, and SP as predictors. For fathers, only SAD was significantly negatively associated with paternal challenging parenting behavior: The more SAD symptoms a father reported, the less challenging parenting behavior he reported.

In the third (for mothers) and fourth (for fathers) regression, overinvolvement was entered as outcome variable and PD, GAD, SAD, SEP, and SP were entered as predictors (Table 4). The same picture emerged: for mothers, GAD was the only significant predictor of overinvolvement, in the direction that the more GAD symptoms the mother reported, the more overinvolvement she reported, whereas for fathers, SAD was the only significant positive predictor of overinvolvement: The more SAD a father reported, the more overinvolvement he reported.

Two hierarchical linear regression analyses were conducted to assess the differential associations between maternal and paternal challenging behavior and

Table 4 Linear regression analyses assessing the association of anxiety disorder symptoms with challenging parenting behavior and overinvolvement for mothers and fathers

SCARED subscale	Maternal challenging parenting behavior			Paternal challenging parenting behavior		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
SCARED PD	−.13	−.94	.349	−.12	−.86	.394
SCARED GAD	−.32	−2.05	.045	.10	.59	.561
SCARED SAD	.19	1.40	.165	−.32	−2.02	.048
SCARED SEP	.16	.97	.333	−.01	−.03	.973
SCARED SP	−.08	−.57	.571	.04	.26	.793

SCARED subscale	Maternal overinvolvement			Paternal overinvolvement		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
SCARED PD	.14	1.24	.220	−.05	−.36	.720
SCARED GAD	.51	3.94	.000	−.23	−1.38	.173
SCARED SAD	−.17	−1.56	.123	.38	2.44	.017
SCARED SEP	.04	.26	.793	.13	.93	.355
SCARED SP	.12	1.10	.277	.07	.49	.626

Table 5 Hierarchical regression analyses assessing the differential effects of maternal and paternal challenging parenting behavior on infant anxiety, controlling for parental anxiety (*n* = 67 mother-father pairs)

	β	<i>t</i>	<i>p</i>
Step 1			
Maternal challenging parenting behavior	.24	1.74	.086
Paternal challenging parenting behavior	−.35	−2.53	.014
Step 2			
Maternal challenging parenting behavior	.26	1.92	.060
Paternal challenging parenting behavior	−.31	−2.23	.029
Maternal anxiety	.22	1.85	.070
Paternal anxiety	.06	.46	.647

Table 6 Hierarchical regression analyses assessing the differential effects of maternal and paternal overinvolvement on infant anxiety, controlling for parental anxiety (*n* = 67 mother-father pairs)

	β	<i>t</i>	<i>p</i>
Step 1			
Maternal overinvolvement	−.05	−.42	.679
Paternal overinvolvement	.39	2.99	.004
Step 2			
Maternal overinvolvement	−.16	−1.16	.252
Paternal overinvolvement	.37	2.88	.006
Maternal anxiety	.23	1.73	.088
Paternal anxiety	.05	.39	.698

overinvolvement and infant anxiety (Tables 5, 6). In both regressions, we controlled for parental anxiety as a relationship between parenting and infant anxiety could also

exist because they are both correlated with parental anxiety. Infant anxiety as reported by both parents was entered as outcome variable in both regressions. In the first regression, maternal and paternal challenging parenting behavior were entered as predictors in Step 1. In Step 2, maternal and paternal anxiety were entered as control variables. After controlling for parental anxiety, paternal challenging parenting behavior was significantly negatively and maternal challenging parenting behavior was borderline positively associated with infant anxiety. This indicates that the more challenging parenting behavior the father reported, the less anxious the infant was, whereas there was a trend for more challenging mothers to have more anxious infants. In the second regression, maternal and paternal overinvolvement were entered as predictors in Step 1. In Step 2, maternal and paternal anxiety were entered as control variables. Results showed that, after controlling for parental anxiety, paternal overinvolvement, but not maternal overinvolvement, was significantly positively associated with infant anxiety. Thus, the more overinvolvement the father reported, the more anxious the infant was, whereas maternal overinvolvement was unrelated to infant anxiety.

To investigate which parenting behavior was the best predictor of infant anxiety when fathers' and mothers' parenting behaviors were studied in combination, we again conducted a hierarchical regression analysis (Table 7). Infant anxiety was entered as outcome variable. In Step 1, maternal and paternal challenging behavior, and maternal and paternal overinvolvement were entered as predictors. Maternal and paternal anxiety were entered as control variables in Step 2. After controlling for maternal and paternal anxiety, paternal overinvolvement was the only significant predictor of infant anxiety.

Table 7 Hierarchical regression analyses assessing the differential effects of maternal and paternal parenting behaviors on infant anxiety, controlling for parental anxiety ($n = 67$ mother-father pairs)

	β	t	p
Step 1			
Maternal overinvolvement	.02	.13	.895
Paternal overinvolvement	.34	2.24	.029
Maternal challenging parenting behavior	.23	1.65	.105
Paternal challenging parenting behavior	−.13	−.80	.425
Step 2			
Maternal overinvolvement	−.09	−.62	.538
Paternal overinvolvement	.33	2.16	.035
Maternal challenging parenting behavior	.22	1.55	.126
Paternal challenging parenting behavior	−.13	−.82	.416
Maternal anxiety	.22	1.67	.099
Paternal anxiety	.04	.31	.756

Discussion

In this study, we aimed to assess how symptoms of specific anxiety disorders were associated with maternal/paternal overinvolvement and whether maternal/paternal overinvolvement and challenging parenting behavior were differentially associated with infant anxiety. Results indicated that, when symptoms of anxiety disorders were simultaneously studied as predictors of parenting behavior, for mothers only GAD was associated with challenging parenting behavior (negatively) and overinvolvement (positively). For fathers, only SAD was associated with challenging parenting behavior (negatively) and overinvolvement (positively). Regarding the associations between mothers' and fathers' parenting behavior and their infant's anxiety, we found that paternal challenging parenting behavior was significantly negatively associated with infant anxiety, whereas maternal challenging parenting behavior was borderline significantly positively associated with infant anxiety. Only paternal, but not maternal, overinvolvement was significantly positively associated with infant anxiety.

In general, mothers reported more anxiety symptoms than fathers, which is in line with previous studies showing that anxiety is more prevalent in women than men (e.g., Craske 2003; McLean and Anderson 2009). No sex difference was found for PD, both parents reported few PD symptoms (see Table 3). Fathers and mothers also did not differ in their level of SAD symptoms, which is in accordance with the finding that there is no gender difference in prevalence of SAD (e.g., McLean et al. 2011).

Although fathers and mothers did not differ in their level of reported SAD symptoms, only for fathers symptoms of SAD were associated with less challenging parenting

behavior and more overinvolvement. This finding may be explained by the evolutionary based role of fathers. As already mentioned in the Introduction, it has been theorized that males have specialized in confronting the external world (Bögels and Perotti 2011). It is the father's role to open children to this outside world (Paquette 2004). Paquette (2004) describes the relationship between fathers and their children as an "activation relationship" in which fathers encourage and stimulate their children to explore the physical and social environment and to take risks. If a father is socially anxious, he perceives the social world as a dangerous place, and as a result he may not be able to fulfill this challenging role (Bögels and Perotti 2011). Instead, socially anxious fathers might display more overinvolvement to ensure that the child stays safe.

For mothers, when symptoms of anxiety disorders were simultaneously studied as predictors of parenting behavior, only GAD symptoms were associated with more overinvolvement and less challenging parenting behavior. Worrying, the defining feature of GAD (American Psychiatric Association 2013) might explain this finding. Mothers with high levels of GAD symptoms might be extremely concerned about the health of their infants and possible misfortune happening to them, as a result of which these mothers display less challenging parenting behavior and more overinvolvement, ensuring the perceived safety of their infant. As worry is also a common associated feature of depression (American Psychiatric Association 2013), we checked whether it was rather maternal depression that could explain these results. Therefore, regression analyses were rerun including maternal depressive symptoms, as measured with the Beck Depression Inventory (BDI; Beck et al. 1988). These analyses showed, however, that maternal depressive symptoms were not associated with maternal challenging parenting behavior or overinvolvement. Higher levels of GAD symptoms remained significantly associated with less challenging parenting behavior and more overinvolvement of mothers. Thus, we found that GAD, on a symptom level, is associated with parenting difficulties, contrary to the findings of Murray et al. (2007). It is not surprising that in the study of Murray et al. (2007) mothers with GAD did not show parenting difficulties (in contrast to mothers with SAD). That is, mothers were confronted with a social challenge, namely engaging with a stranger, a situation that is not anxiety provoking to persons with GAD. Conversely, Murray et al. (2012) did find that GAD was associated with parenting difficulties across three tasks (non-threat, social threat, and non-social threat), but mothers with SAD also showed increased rates of parenting difficulties. However, when examining the specific forms of threat, subgroup effects became apparent. Mothers with SAD only showed parenting difficulties in the social threat task, whereas mothers with GAD primarily showed

parenting difficulties in the non-social threat task. As parenting behavior was assessed via questionnaires in the present study, context effects could unfortunately not be examined. Nevertheless, the study of Murray et al. (2012) shows that it is important to take into account the context in which parenting difficulties occur.

Contrary to our expectation that fathers would display more challenging parenting behavior, no differences were found between mothers and fathers. Thus, although males are in general more risk taking than females (Byrnes et al. 1999; Eckel and Grossman 2008), this is not reflected in their parenting behavior towards 10–15-month-old infants. Majdandžić et al. (2014) also found no sex differences in both self-reported and observed challenging parenting behavior towards infants of 4 and 12 months old. In contrast, in a study assessing mothers' and fathers' expectations and parenting choices about their 11-month-old infants' crawling behaviors on different slopes, Ishak et al. (2007) found that fathers were more likely to adopt challenge-orientated parenting choices than mothers. That is, more fathers than mothers indicated that they would challenge their child to descend slopes beyond the expected ability of the child. However, the study of Ishak et al. (2007) only assessed parental expectations of challenging behavior, and not actual challenging behavior. It may be that sex differences in challenging behavior only become apparent later in life when children are less fragile and vulnerable. A study of MacDonald and Parke (1986) has shown that paternal physical play reaches its highest level around toddlerhood and then declines. In support of this notion, Majdandžić et al. (2013) showed that fathers were more challenging towards their 2-year-old than mothers, but fathers and mothers did not differ in their level of challenging parenting behavior towards their 4-year-old. Clearly, we need to gain more insight in the development of challenging parenting behavior and associated father-mother differences.

Although fathers did not display more challenging parenting behavior than mothers, we found, as expected, that the more challenging parenting behavior a father reported, the less infant anxiety the father reported. This is in accordance with the theory of Bögels and colleagues (Bögels and Perotti 2011; Bögels and Phares 2008) that states that fathers' challenging behavior buffers the development of child anxiety as it pushes the child's limits. Maternal report of challenging parenting behavior was not significantly associated with infant anxiety, but there was a trend for this behavior to be associated with more infant anxiety, as was hypothesized. This corresponds with the finding of Majdandžić et al. (2013) that observed maternal challenging parenting increased children's anxiety. As our results only suggest a tentative relationship between maternal challenging parenting behavior and increased

infant anxiety, more research assessing the effects of maternal challenging parenting behavior on children's anxiety is needed.

Regarding sex differences in overinvolvement, fathers surprisingly reported more overinvolved behavior towards their infants than mothers. Moreover, paternal overinvolvement was associated with more infant anxiety. Thus, fathers do not only display more overinvolvement, when they display it, it is also associated with more anxiety in their infants. Interestingly, maternal overinvolvement was not associated with more infant anxiety. Hudson and Rapee (2002) argued that paternal overinvolvement might affect children to a lesser extent than maternal overinvolvement as fathers in Western cultures are less responsible for parenting their children compared to mothers. However, it may just be this limited responsibility that explains this sex difference in overinvolvement and the association with higher levels of infant anxiety. Fathers may be more insecure in interacting with their babies, as they know the child less at that young age compared to mothers, likely because of spending less time with their child (Geary 2010; Möller et al. 2013). This was also the case in our study: fathers spent on average more than 1.5 days a week less with their child than mothers (see Table 1). Insecurity may then turn fathers' normal controlling and protecting behavior sooner into overinvolvement than mothers' behavior, thereby increasing infants' anxiety. Note however that we did not assess causality and the relationship could also be the other way around: that fathers, because of less experience with the infant, display more overinvolved behavior when the infant expresses anxiety compared to mothers.

Paternal overinvolvement also came out as an important predictor of infant anxiety in the analyses with all four parenting behaviors (maternal/paternal challenging parenting behavior and maternal/paternal overinvolvement) as predictors. These analyses were conducted because maternal and paternal parenting do not occur in a vacuum in which separate parenting behaviors have isolated effects on infant anxiety, but rather mothers' and fathers' parenting behaviors are interdependent, and the relationship between maternal and paternal parenting contributes to children's developmental outcomes (e.g., Gable et al. 1994; Lindsey and Mize 2001). When analyzed in this way, paternal overinvolvement was the only parenting behavior that was significantly associated with infant anxiety, even after controlling for parental anxiety. The more overinvolvement the father reported, the more anxiety in their infants parents reported. Thus, paternal overinvolvement at this age of the child stands out as an important predictor of child anxiety.

The level of overinvolvement and challenging parenting behavior between fathers and mothers of the same family was highly correlated, which was also found by Majdandžić et al. (2014). This could point to assortative mating (i.e.,

similarity between spouses on a certain characteristic), so that couples that resemble each other in their parenting styles attract each other (Luo and Klohnen 2005; Watson et al. 2004). A different explanation may be that children evoke certain parenting behavior in both parents. It has indeed been shown that parenting and children's temperament are bidirectionally associated (Lengua and Kovacs 2005). Note, however, that although the correlations between maternal and paternal challenging parenting behavior and between maternal and paternal overinvolvement were high, these parenting behaviors were differentially associated with infants' anxiety.

As challenging parenting behavior and overinvolvement were negatively correlated ($-.44$ for mothers and $-.60$ for fathers), the question arises whether these parenting dimensions are opposite ends of a continuum or rather distinct constructs. The negative correlation shows that both dimensions are not truly independent and indicates an overlap between these constructs. However, there are a number of reasons to study them as separate constructs. First, the correlations are only moderate in magnitude, and not high enough to indicate a unitary construct (Silk et al. 2003). The absence of overinvolvement does not necessarily imply the presence of challenging parenting behavior. That is, parents may display low levels of overinvolvement without displaying challenging parenting behavior towards their child, and parents may display low levels of challenging parenting behavior without being overinvolved, or parents may be both overinvolved and challenging. Second, results of the meta-analysis of McLeod et al. (2007) suggest that using broad parenting measures may lead to an underestimation of the association between parenting and child anxiety. That is, between the broad parenting dimension 'control' and child anxiety, an effect size of $.25$ was found. However, when examining two subdimensions of parental control, different effect sizes were found for 'overinvolvement' and 'autonomy granting'. A significantly stronger association was found for the association between autonomy granting and child anxiety ($.42$) than for overinvolvement and child anxiety ($.23$). Third, maternal and paternal overinvolvement and challenging parenting behavior were in our study differentially associated with infant anxiety (see Tables 5, 6). Together, this supports the disentangling of overinvolvement and challenging parenting behavior in studies on parenting and the development of child anxiety.

Several limitations should be considered when interpreting the findings of our study. First, our sample was quite homogeneous; most families that participated in this research were from Dutch origin, were married, and from a high social economic background, possibly limiting the generalizability of our findings. As the association between more child negative emotionality and less supportive

parenting has been shown to be stronger in families from lower social economic background than in families from middle or higher socioeconomic backgrounds (Paulussen-Hoogbeem et al. 2007), replication studies with more heterogeneous samples are clearly needed. Second, we only focused on two-parent families with a father and a mother, and not on gay/lesbian families or single-parent families. Regarding two parents of the same gender, Bögels and Perotti (2011) noted that even same gender parent couples may have a task division with one parent being more challenging and playful, and with the other parent being more nurturing. Bögels and Perotti (2011) also hypothesize that role-differentiation may also be based on the anxiety level of the same gender parent couple. That is, the more anxious parent may specialize more in caring (the role of the mother), whereas the less anxious parent may specialize more in playing and challenging (the role of the father). With regard to the parenting of single parents, there are two opposing views (Dufur et al. 2010). The first is that single mothers and fathers will parent very differently, because mothers will enact their female way of parenting (i.e., nurturing/caring), whereas fathers will display their male parenting role (i.e., challenging). The second view is that single fathers and mothers would not differ in their parenting behavior, as they are solely responsible for providing all the resources to their children (i.e., they have to adopt both the maternal and paternal role). Dufur et al. (2010) showed that there are small differences between the parenting of single mothers and single fathers, but that demographic inequalities play a role in these differences. More research assessing the parenting of same gender parent couples and single parents and the association of parenting in these families with the development of child anxiety is clearly needed. Third, we only assessed symptoms of anxiety disorders in a non-clinical group of parents. Future research should compare the parenting behavior of fathers and mothers with clinical anxiety disorders. Fourth, our sample was intentionally limited to parents and their infants, as there are still few studies investigating the role of parenting behavior in the development of infant anxiety. However, replication studies with children from other age groups are necessary. The fifth limitation is our sole reliance on questionnaires, assessing only parental perceptions on parenting, parental anxiety, and infant anxiety. Observational measures may be needed to supplement the study on the associations between challenging parenting behavior, parental anxiety, and infant anxiety, as the meta-analysis by McLeod et al. (2007) showed that parenting had a larger effect on child anxiety when using observations compared to questionnaire measures of parenting. Sixth, as this was a cross-sectional study only investigating associations between parental anxiety, parenting behavior, and infant anxiety, causal conclusions cannot be drawn. Parental overinvolvement and a lack of

challenging parenting behavior may not only evoke anxiety in infants, infants' anxiety may also evoke more parental overinvolvement and less challenging parenting behavior. Longitudinal studies are needed to unravel the bidirectional pathways to the development of child anxiety. In spite of these limitations, our findings suggest that (1) different dimensions of paternal/maternal anxiety are linked to their parenting behavior; (2) maternal/paternal parenting behaviors are differentially associated with child anxiety; and (3) paternal overinvolvement stands out as a particularly important predictor of anxiety in infancy.

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