

Fathers' Challenging Parenting Behavior Prevents Social Anxiety Development in Their 4-Year-Old Children: A Longitudinal Observational Study

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Abstract Recent models on parenting propose different roles for fathers and mothers in the development of child anxiety. Specifically, it is suggested that fathers' challenging parenting behavior, in which the child is playfully encouraged to push her limits, buffers against child anxiety. In this longitudinal study, we explored whether the effect of challenging parenting on children's social anxiety differed between fathers and mothers. Fathers and mothers from 94 families were separately observed with their two children (44 % girls), aged 2 and 4 years at Time 1, in three structured situations involving one puzzle task and two games. Overinvolved and challenging parenting behavior were coded. Child social anxiety was measured by observing the child's response to a stranger at Time 1, and half a year later at Time 2, and by parental ratings. In line with predictions, father's challenging parenting behavior predicted less subsequent observed social anxiety of the 4-year-old child. Mothers' challenging behavior, however, predicted more observed social anxiety of the 4-year-old. Parents' overinvolvement at Time 1 did not predict change in observed social anxiety of the 4-year-old child. For the 2-year-old child, maternal and paternal parenting behavior did not predict subsequent social anxiety, but early social anxiety marginally did. Parent-rated social anxiety was predicted by previous parental ratings of social anxiety, and not by parenting behavior. Challenging parenting behavior appears to have favorable effects on observed 4-year-old's social anxiety when displayed by the father. Challenging parenting behavior emerges as an important focus for future research and interventions.

Keywords Challenging behavior · Parenting · Fathers · Mothers · Social anxiety

Social anxiety disorder is the most prevalent anxiety disorder (Bögels et al. 2010; Stein and Stein 2008) and usually has its onset in childhood (Chavira and Stein 2005). Social anxiety during childhood is associated with depression, loneliness, low self-esteem, and school absence (Bögels et al. 2010; Rapee and Spence 2004). A combination of genetic vulnerability, such as an inhibited temperament, and certain parenting behaviors increase the risk of developing social anxiety disorder (Murray et al. 2009). Considerable research examined the influence of parenting on the development of child anxiety, but most studies focused on parenting behavior of mothers. Several reviews, however, point to a potentially different role of fathers and mothers in parenting of children (Paquette 2004), and to a possible difference in influence between fathers and mothers on the development of child anxiety (Bögels and Phares 2008). This difference may have an evolutionary basis (Bögels and Perotti 2011; Möller et al. 2013).

Two parenting dimensions arise as risk factors for child anxiety in general: overcontrol and rejection (McLeod et al. 2007; Van der Bruggen et al. 2008). Overcontrolling parenting behavior is displayed in needlessly helping the child and excessively interfering in his/her behavior and feelings. This restriction of the child's autonomy can lead to anxiety problems, because the child is prevented from learning (social) competencies (Ballash et al. 2006). Rejection or hostility may lead to perceptions of the environment as threatening and may encourage children to develop a negative self-image, increasing the risk of developing an anxiety disorder (Bögels and Brechman-Toussaint 2006). Overcontrolling parenting behavior is positively associated with child anxiety, with meta-analytic effect sizes varying from 0.25 (McLeod et al. 2007) to 0.58 (for observation studies; Van

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der Bruggen et al. 2008). Rejection is less strongly associated with child anxiety, with a meta-analytic effect size of 0.20 (McLeod et al. 2007).

Historically, most research into the influence of parenting behavior on the development of anxiety has focused on mothers. Some studies that did include fathers found that paternal overcontrol was also related to child anxiety (e.g., Verhoeven et al. 2011, in non-clinical samples of elementary school-aged children and adolescents). Other studies demonstrated an association of overcontrolling behavior of mothers with child anxiety, but not of fathers (e.g., Hudson and Rapee 2002, comparing overcontrolling behavior of parents of 7–16 year-old anxiety-disordered children with parents of non-clinical children). Notably, in the meta-analysis of McLeod et al. (2007) on the association between parenting and child anxiety, which included 45 studies on mothers and 25 studies on fathers, parent gender did not emerge as a moderator of the association between parenting and child anxiety, suggesting no differences in influence between fathers and mothers. However, the meta-analysis by Van der Bruggen et al. (2008) found that the association between parental control and child anxiety was large in studies that did include fathers ($n=5$, $d=0.84$) and medium in studies including mothers only ($n=18$, $d=0.50$), although it should be mentioned that this difference in effect size was not significant.

While it has been stressed that mothers and fathers share more similarities than differences in parenting (Lamb 1995; Roggman 2004; Tamis-LeMonda 2004), there is a body of research showing that mothers and fathers do differ considerably in specific behaviors. For example, Lamb (1977) demonstrated that fathers held their child in the first year of life most often to play, whereas mothers held their child most often for caretaking functions. In parents of preschool-aged children, both parents report that fathers spend more time playing actively with their child than mothers, and mothers spend more time than fathers taking care of the child (Bonney et al. 1999). Fathers do not only play more with their children, the play of fathers also differs from that of mothers. In parents of 15 to 30 months-old children, mothers more often chose non-social and intellectual activities, whereas fathers preferred social and physical activities (Clarke-Stewart 1978). Other studies also show that fathers engage more in physical play and mothers engage more in pretend play (e.g., Lindsey et al. 1997, in parents of preschool-aged children; MacDonald and Parke 1986, in parents of 1–10 year-old children). In a recent review on the evolutionary basis of sex differences in parenting in Western societies, Möller et al. (2013) conclude that, regarding time spent with children, there is convincing evidence that mothers spend more time with their children than fathers in all child care activities except for physical play and similar activities. Regarding the nature of parent–child interactions,

Möller et al. conclude that although a number of studies report that fathers and mothers are equally sensitive and responsive to their children (e.g., Malmberg et al. 2007, in parents of 10–12 months-old infants), the majority of studies support the view that fathers encourage taking chances and social competition in their children more than mothers, while mothers are more protective and stimulate caring for others and intimate bonding more than fathers.

Based on these findings, some argue that mothers and fathers play a different role in child rearing. For example, Paquette (2004) posits that the mother-child relationship is primarily an attachment relationship, characterized by calming, soothing and comforting the child, while the father-child relationship is rather an activation relationship, in which fathers open their children to the outside world. Paquette (2004) proposes that fathers play a challenging role in parenting. He describes this role as a collection of behaviors in which the parent stimulates, surprises, and destabilizes the child, encouraging the child to take risks. These behaviors would enable children to learn to be brave in unfamiliar situations, to explore the world, to overcome obstacles, and to stand up for themselves. Fathers' characteristic physical play, such as rough-and-tumble play (Carson et al. 1993), is an example of physical challenging behavior; more verbal forms include teasing, or stimulating competition and performances.

Fathers' challenging parenting behavior (Majdandžić et al. 2013) may not only promote an active, competitive, independent, and curious attitude in children; according to Bögels and Phares (2008), it may also buffer against early separation, stranger, and novelty anxiety. They propose that paternal challenging parenting behavior is important for the prevention of child anxiety. Moreover, Bögels and Phares argue that a lack of paternal challenging parenting behavior (e.g., when the father is anxious) may play an even larger role in the development of child anxiety than overcontrol, which has already been demonstrated to increase anxiety in the child (McLeod et al. 2007). As mothers' role is considered to be more protective and caring (Paquette 2004), mothers' parenting behavior may turn into overanxious parenting or overinvolvement sooner than fathers', which promotes anxiety in the child (e.g., Thirlwall and Creswell 2010, in a non-clinical sample of 4–5 year-old children).

In the present study, we examined whether the influence of parenting behavior on child social anxiety development differs between fathers and mothers. We used a longitudinal design controlling for begin-level of child social anxiety. Parenting behavior was observed in three structured situations, assessing three parenting dimensions: overinvolvement, rejection, and challenging behavior. Child social behavioral inhibition was assessed on two measurement occasions (Time 1 and Time 2, half a year apart) by observing the child's reaction to a male stranger. Social anxiety (i.e., as a

disorder) is difficult to measure before the age of 6, but there are precursors of social anxiety that can be measured at an earlier age, such as shyness, stranger anxiety, and behavioral inhibition. Child behavioral inhibition has been identified as an important predictor of later social anxiety disorder; a recent meta-analysis found an OR of 7.59 for children high in behavioral inhibition (Clauss and Blackford 2012). In most of the studies on which this meta-analysis was based, the behavioral inhibition assessment included, or was restricted to, anxiety towards adult strangers. Indeed, anxiety for adult strangers may be the core component of the predisposition for social anxiety disorder, as the latter is defined as “persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people” (DSM-IV; American Psychiatric Association 2000). In line, social behavioral inhibition has been distinguished from non-social behavior inhibition (Dyson et al. 2011). In addition to observations of child social behavioral inhibition, parental reports of children’s shyness were obtained.

It was expected that an increase in child social anxiety from Time 1 to Time 2 would be predicted by overinvolvement, challenging parenting behavior, and, to a lesser degree, rejection. Specifically, we expected that more paternal challenging parenting behavior predicts less child social anxiety, whereas maternal challenging parenting behavior has a smaller or no effect on the development of social anxiety. Furthermore, it was expected that more parental overinvolvement and rejection predict more child social anxiety.

Methods

Participants

Participants were 94 families with two children (44 % girls). This study was part of a larger study on the relationship between temperament and parenting (see Majdandžić and Van den Boom 2007; Majdandžić et al. 2008). Families were recruited through birth records of the Municipal Health Service of Amsterdam, whose ethical committee permitted the study. Families with two biological children, the first child 4 years old and the second at least 2 years old, and who understood Dutch, were invited to participate. Participants received tickets to the local zoo after completing Time 1. For the present study, we used data on parenting behavior at Time 1 and child social anxiety at Time 1 and Time 2. The interval between Time 1 and Time 2 was approximately half a year. At Time 2, 89 families (95 %) still participated in the study. Sample size for questionnaire results is slightly lower (74 for paternal reports at Time 2, to 91 for maternal reports at Time 1) since some parents found this too time-consuming. At Time 1, mean age of the first child was 4.31 years ($SD=0.28$, range 3.62 – 5.20) and of the

second child 2.57 years ($SD=0.36$, range 2.03 – 3.34); at Time 2 mean age of the first child was 4.94 years ($SD=0.31$) and of the second child 3.20 years ($SD=0.35$). Mothers were on average 36.9 years old ($SD=3.82$) at Time 1 and fathers 39.7 years ($SD=5.19$). The majority of mothers (96 %) and of fathers (95 %) was of Caucasian origin. The mean education level of both parents was high: for mothers $M=5.65$ ($SD=0.75$) and fathers $M=5.57$ ($SD=0.92$) on a scale from 1=primary education to 6=higher vocational education/university.

Procedure

On each measurement occasion, the two children of a family visited the university research center once with their mother and once with their father. In the majority of families (70 %), the mother came first. In each visit, parenting behavior was assessed during three tasks in which both children participated: a puzzle task and two game tasks. Next, with each of the children separately, a set of episodes from the Laboratory Assessment Battery (Lab-TAB; Goldsmith et al. 1995) was conducted, an observation instrument to measure children’s temperament in the laboratory (see Majdandžić and Van den Boom 2007; Majdandžić et al. 2008). For this study, we used the data of the Stranger Approach task of this battery to measure child social behavioral inhibition. This task was always conducted at the first visit of the children to the university research center. Thus, in the present study, observed parenting data at Time 1 was used to assess parenting behavior of fathers and mothers, and Stranger Approach was used as a measure of observed child social behavioral inhibition at Time 1 and Time 2. Prior to conducting the tasks, they were explained to the parent, and informed consent was obtained. All tasks were videotaped from behind a one-way screen. The procedure was similar on both measurement occasions, but tasks were slightly modified to prevent recognition effects. Both parents filled out a set of questionnaires about each child at home, and were instructed to do this separately from their partner.

Measures

Parenting Behavior

Paternal and maternal parenting behavior was assessed at Time 1 with a 10 min puzzle task and two 7.5 min game tasks in which both children were present. In the puzzle task, each child was seated at a child-sized table with the parent in between, with all three persons facing the one-way window. Each child was handed a puzzle that was too difficult for his/her age, necessitating parental help. The experimenter explained to the parent beforehand how to solve the puzzles. In the game tasks, one child-sized table was used with the parent facing the one-way window and the children at the

two other sides of the table facing each other. The triad was handed a game that only one person at a time could play with. Two versions of these three tasks were counterbalanced across mothers and fathers. The first set consisted of two abstract jigsaw puzzles, an electronic toy disc man, and a toy phone. The second set consisted of two construction tower puzzles, a toy camera with kaleidoscope, and a hammer game in which animals can be caught by hitting them.

For coding, the tasks were divided in time intervals of 1 min (the last interval of the game tasks lasted 30 s). Parenting dimensions were scored per interval on a 5-point Likert scale. This meso-level of coding was based on the Meso Behavioral Rating System for Families with young children (MeBRF; Mahoney et al. 1998). A score of 1 reflected a low frequency and/or intensity of the behavior, and 5 a high frequency and/or intensity.

The three observed parenting dimensions used in the present study were overinvolvement, rejection and challenging parenting behavior. *Overinvolvement* is the extent to which the parent is needlessly helping the child or interfering in his/her behavior. A parent scoring high on overinvolvement helps the child in the absence of signs that the child actually needs help, and/or excessively interferes in finishing the puzzle or with the exploration of the games by the child, verbally and/or physically (e.g., “No, you should do it this way. Like this, press here, no press here! Yes, like that!”). This dimension was developed by the authors using behavior descriptions of the intrusiveness scale of Erickson (Erickson et al. 1985) and the involvement scales of Hudson and Rapee (2002), which have been shown to demonstrate links with anxiety. *Rejection* is the extent to which the parent communicates disapproval and hostility toward the child. This can be manifested in annoyance, disapproving, threatening, sarcastic or blaming comments, and criticism (e.g., “You act like a baby!”). It was based on the hostility dimension of the MeBRF (Mahoney et al. 1998). Moderate to high associations between the dimensions of the MeBRF, including hostility, and corresponding codes of parenting behavior using a validated microanalytic coding system provide support for its construct validity (Mahoney et al. 1998). *Challenging parenting behavior* concerns the extent to which the parent challenges the child in a playful manner to push his/her limits (e.g., “Show me if you can do that!”). The parent encourages the child to go outside of his/her comfort-zone, while taking into account the

limits of the child. This behavior can be of a physical nature, such as play fighting or tickling, but in the present study the social-emotional form occurred more often, such as teasing, inviting the child to compete, defeating the child, or proposing to use toys in an unconventional way (“Look what I can do with this toy!”). This construct was developed by our team and operationalized in line with the other dimensions. In an ongoing study in our lab, observational ratings of CPB similar to those used here correlated significantly with parents’ own ratings of their CPB towards their young children (Majdandžić et al. 2013), providing evidence for convergent validity of this construct. Because this is, to our knowledge, the first study investigating the influence of challenging parenting behavior on social anxiety development, and since there is some evidence that “negative” parenting (i.e., expressions of negative emotion and intrusiveness) of fathers actually turns out to have a positive effect on changing behavior inhibition in boys who are high in negative emotionality, between the age of 1 and 3 (Belsky et al. 1998), we deliberately refrained from choosing whether challenging parenting should be positive or negative.

The puzzle task was scored by four students. The two game tasks were scored by six students, in which one coder always rated both game tasks of one parent. Each coder rated either the father or the mother of a family and this parent’s parenting behavior towards one of the two children (i.e., mother-first child, mother-second child, father-first child, or father-second child; but all coders rated all possible parent-child combinations across families). To determine the interobserver reliability, 21 % of the parent-child couples were scored by all coders. Interobserver reliability was assessed with the intraclass correlation (ICC) (see Table 1). It was good for mothers’ and fathers’ overinvolvement and challenging parenting behavior, but poor for rejection, most likely due to low frequency and low variance (for mother-first child: $SD=0.03$, mother-second child: 0.02, father-first child: 0.02 and father-second child: 0.03). Therefore, rejection was not used in further analyses.

The three tasks were combined into one score for overinvolvement and for challenging parenting behavior of each parent (mother, father) towards each child (first child, second child). Coherence between the tasks was low to moderate for both overinvolvement (Cronbach’s $\alpha=-0.07$, 0.56, 0.14 and 0.22 for mother-first child, mother-second child, father-first child, and father-second child, respectively) and

Table 1 Interobserver reliability (intraclass correlation) of fathers’ and mothers’ parenting behavior

| Parenting dimension | Mother | | | Father | | |
|-----------------------|--------|--------|--------|--------|--------|--------|
| | Puzzle | Game 1 | Game 2 | Puzzle | Game 1 | Game 2 |
| Overinvolvement | 0.92 | 0.90 | 0.91 | 0.89 | 0.82 | 0.61 |
| Challenging parenting | 0.86 | 0.76 | 0.81 | 0.70 | 0.71 | 0.80 |
| Rejection | 0.00 | 0.08 | 0.54 | 0.66 | 0.31 | 0.00 |

challenging parenting behavior (Cronbach's $\alpha=0.20$, 0.05 , 0.13 and -0.05 , respectively). This can be partly explained by the use of only three tasks (since Cronbach's α depends on number of "items"), and by the different context of the puzzle task compared to the game tasks. However, because context-specificity is typical in observations of behavior in different contexts (Bögels et al. 1995; Majdandžić and Van den Boom 2007), standards for coherence across contexts are less high than for example internal consistency of questionnaires or for convergent validity. To counteract context-specificity, increasing robustness of the parenting measures in order to add power to the analysis, we choose to base the parenting measures on behavior combined across the three contexts.

Observed Child Social Behavioral Inhibition

Observed child social behavioral inhibition was assessed with the episode Stranger Approach from the Lab-TAB (Goldsmith et al. 1995), in which a male stranger engaged the child, who was alone, in a standard friendly conversation. This task has been shown to relate substantially to a number of parent rated measures of shyness (e.g., a correlation of 0.37 with the shyness scale of the Children's Behavior Questionnaire; Dyson et al. 2011), providing evidence for convergent validity. In addition, coherence among coded variables of this task has been shown to be acceptable (e.g., α is 0.56 ; Dyson et al. 2011) given the coding of different response channels (i.e., facial, bodily, vocal). The task was divided in 5 time intervals in which intensity of facial fear, intensity of bodily fear, intensity of verbal fear, withdrawal, gaze aversion, verbal hesitancy, and latency to first fear response were coded on 2 to 4 point scales (Majdandžić et al. 2008). Two students were trained to code this task. Each coded either the first or the second child of a family. Interobserver reliability between each coder and one of two master coders was calculated on 21 % of the children. Intraclass correlations were good for all coded variables, $M=0.89$, $SD=0.12$ for Time 1, and $M=0.91$, $SD=0.07$ for Time 2. The coded variables were standardized and averaged into a score for social behavioral inhibition at Time 1 and Time 2. Internal consistency across the coded variables, as assessed with Cronbach's α , was 0.66 for the first child at Time 1 and 0.54 at Time 2, and 0.65 and 0.65 for the second child.

Parent Reports of Child Shyness

Mothers' and fathers' reports of child shyness were obtained using the shyness scale of the Children's Behavior Questionnaire (CBQ; Rothbart et al. 2001), and the social fear scale of the Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith 1996). The CBQ has been shown to have

adequate internal consistency (α 's for the 15 CBQ scales range from 0.64 to 0.92 , with the highest α 's for the shyness scale) and good temporal stability (2-year stability estimates for maternal ratings from 5 to 7 years of age range from 0.50 to 0.79 , and for paternal ratings from 0.48 to 0.76 , with highest stability for the shyness scale; Rothbart et al. 2001). Substantial interparental agreement (ranging from 0.57 to 0.79 for the shyness scale across three samples) and associations between temperament ratings and child social behavior provide evidence for satisfactory convergent validity (Rothbart et al. 2001). Internal consistency of the TBAQ has been shown to be good (all α 's >0.77 , with α 's of 0.83 to 0.87 for the social fear scale; Goldsmith 1996) and temporal stability from 1.5 to 4 years generally good (ranging from 0.30 to 0.54 , but 0.06 for the social fear scale). Good parental agreement (ranging from 0.30 to 0.54 , and 0.43 for the social fear scale) and high correspondence with other temperament questionnaires (e.g., with the scales of the Infant Behavior Questionnaire (Rothbart 1981), ranging from 0.41 to 0.68 for corresponding scales, and 0.68 for the scales tapping shyness) provide evidence for sufficient convergent validity. The shyness scale of the CBQ consists of 13 items (e.g., "Acts shy around new people"), and the social fear scale of the TBAQ, consists of 19 items (e.g., "When your child was being approached by an unfamiliar adult while shopping or out walking, how often did your child show distress or cry?"). In both questionnaires, parents are asked to rate concrete descriptions of their child's behavior on 7-point scales (TBAQ: $1=never$, to $7=always$; CBQ: $1=extremely\ untrue\ of\ your\ child$, to $7=extremely\ true\ of\ your\ child$). Because the age-restrictions of these questionnaires (TBAQ: 18–36 months, CBQ: 3–7 years), parents of children 3 years and older (i.e., all first children at Time 1 and Time 2, and $n=48$ of second children at Time 2) filled out the CBQ, and parents of 2-year-olds (all second children at Time 1, and $n=30$ of second children at Time 2) filled out the TBAQ. For the group with different questionnaires across age, we converted CBQ Time 2 scores to corresponding TBAQ scores using linear equating (see Majdandžić et al. 2008). Internal consistency was good for both scales, and ranged from 0.78 to 0.95 . Parental agreement on child shyness was considerable, $r=0.76$ for first children at Time 1, 0.56 at Time 2, and $r=0.57$ and 0.62 for second children (all $p<0.001$). Therefore, father's and mother's judgment of their child's shyness were averaged to obtain one parental report measure of shyness.

Results

Descriptives

All final measures were checked for univariate outliers, using $z<-3.29$ or $z>3.29$ as the criterion, which were truncated to a

Table 2 Descriptive results of fathers' and mothers' parenting behavior

| Parenting dimension | Mother | | Father | | <i>t</i> (86) | <i>p</i> (two sided) |
|-----------------------|----------|-----------|----------|-----------|---------------|----------------------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | |
| First child | | | | | | |
| Overinvolvement | 1.22 | 0.19 | 1.22 | 0.21 | -0.12 | 0.902 |
| Challenging parenting | 1.03 | 0.04 | 1.04 | 0.05 | -1.45 | 0.152 |
| Second child | | | | | | |
| Overinvolvement | 1.32 | 0.28 | 1.25 | 0.17 | 2.36 | 0.020 |
| Challenging parenting | 1.03 | 0.04 | 1.04 | 0.05 | -2.41 | 0.018 |

value near the first non-outlier (Tabachnick and Fidell 2001). The order of the father versus mother visits at Time 1 (in 70 % of cases the mother came first) was unrelated to parenting behavior or observed social behavioral inhibition of the children. Table 2 shows descriptive results of the parenting variables. Parents did not differ significantly in parenting behavior towards the first child, but fathers were significantly more challenging towards the second child than mothers, and mothers more overinvolved than fathers. With respect to parenting differences related to the age of the children, mothers were more overinvolved towards their second child than towards their first child, $t(90)=-3.68, p<0.001$, but equally challenging, $t(90)=1.09, p=0.278$. Fathers were equally overinvolved ($t(89)=-1.19, p=0.237$), and challenging ($t(89)=-0.41, p=0.679$) towards their two children.

The correlation matrix of children's social anxiety at Time 1 and Time 2, and of paternal and maternal overinvolvement and challenging parenting behavior towards both children at Time 1 is presented in Table 3. The table shows (on the diagonal) a significant association between parenting behavior towards the first and second child: for fathers and for mothers, overinvolvement and challenging parenting behavior towards both children were associated. The degree of overinvolvement among fathers and mothers was significantly correlated for both the first (marginally) and second child, whereas the degree of

challenging parenting behavior of both parents was unrelated. Child social behavioral inhibition and parental ratings of child shyness were significantly correlated at Time 2 for the first child, and marginally for the second child. A significantly positive correlation emerged between maternal challenging parenting behavior and social behavioral inhibition of the first child at Time 2, and a significantly negative correlation of paternal challenging parenting behavior with parent-rated shyness at Time 1, and with social behavioral inhibition at Time 2. Moreover, a significantly negative association between paternal challenging parenting behavior and social behavioral inhibition of the second child at Time 1 emerged.

Parenting Behavior Predicting Development of Child Social Anxiety

To assess whether challenging parenting behavior and overinvolvement predicted change in child social behavioral inhibition, a regression analysis was performed for each child per parent, with child social behavioral inhibition at Time 1, parental overinvolvement and challenging parenting behavior as predictors, and child social behavioral inhibition at Time 2 as outcome measure (Table 4). Thus, four regression models were analyzed. With a sample size of 94 we had 88 % power to find a medium sized (f -square=0.15; Faul et al. 2007) joint

Table 3 Correlation matrix with child social anxiety, and parenting behavior

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------------------------|-------|---------|---------|---------|---------|--------|-------|---------|
| 1. Observed social BI Time 1 | 0.23* | 0.21+ | 0.18 | 0.14 | 0.03 | 0.01 | 0.13 | -0.31** |
| 2. Observed social BI Time 2 | 0.14 | 0.09 | 0.12 | 0.22+ | -0.14 | 0.01 | -0.05 | -0.05 |
| 3. Parent-rated shyness Time 1 | 0.10 | 0.35** | 0.26* | 0.68*** | 0.12 | 0.14 | 0.06 | -0.06 |
| 4. Parent-rated shyness Time 2 | 0.09 | 0.45*** | 0.85*** | 0.22 | 0.05 | 0.06 | -0.02 | -0.06 |
| 5. Overinvolvement M | -0.00 | 0.05 | -0.04 | 0.02 | 0.44*** | 0.24* | -0.03 | -0.01 |
| 6. Overinvolvement F | -0.13 | -0.02 | -0.04 | -0.01 | 0.20+ | 0.29** | 0.01 | -0.02 |
| 7. Challenging parenting behavior M | 0.08 | 0.23* | 0.00 | 0.02 | 0.10 | -0.03 | 0.25* | 0.08 |
| 8. Challenging parenting behavior F | -0.14 | -0.27* | -0.22* | -0.14 | 0.01 | 0.01 | 0.00 | 0.27* |

Correlations for the first child below the diagonal, for the second child above the diagonal and between the children on the diagonal

BI behavioral inhibition, M Mother, F Father

*** $p<0.001$. ** $p<0.01$. * $p<0.05$. + $p<0.10$

Table 4 Regression with social behavioral inhibition at Time 1, overinvolvement and challenging parenting behavior as predictors of social behavioral inhibition at Time 2

| | First child | | Second child | |
|-------------------------------------|----------------|----------------|----------------|----------------|
| | Mother β | Father β | Mother β | Father β |
| Social behavioral inhibition Time 1 | 0.11 | 0.06 | 0.22+ | 0.21+ |
| Overinvolvement | 0.04 | 0.00 | -0.15 | -0.03 |
| Challenging parenting behavior | 0.25* | -0.27* | -0.08 | 0.05 |

* $p < 0.05$. + $p < 0.10$

effect of three predictors ($\alpha = 5\%$). For the first child, paternal and maternal overinvolvement did not significantly predict change in social behavioral inhibition from Time 1 to Time 2. In contrast, challenging parenting behavior did predict this child’s change in social behavioral inhibition: more maternal challenging parenting behavior predicted an increase in social behavioral inhibition, whereas more paternal challenging parenting behavior predicted a decrease in social behavioral inhibition. For the second child, maternal and paternal parenting behavior did not predict social behavioral inhibition at Time 2, but social behavioral inhibition at Time 1 marginally predicted later social behavioral inhibition, in both the father and mother model.

Regression analyses were repeated with (combined) parent-reported shyness at Time 2 as outcome measures, and (combined) parent-reported shyness at Time 1 and observed overinvolvement and challenging parenting behavior at Time 1 as predictors. This was again done for mothers and fathers separately. As shown in Table 5, change of parent-reported shyness between Time 1 and Time 2 was not predicted by observed parenting behavior of the father and the mother for either child.

Discussion

The main finding of this longitudinal observational study is that, as expected, paternal challenging parenting behavior

decreased social behavioral inhibition in first born, 4-year-old children, half a year later. This is in accordance with theories that propose that the activation relationship between the father and his child (Paquette 2004) has the function to push the child’s limits and in this way can buffer the development of anxiety in the child (Bögels and Perotti 2011; Bögels and Phares 2008). Unexpectedly, maternal challenging parenting behavior appeared to increase social behavioral inhibition in 4-year-old children in the time span of half a year. An explanation is that challenging parenting behavior conflicts with the purported caring and supporting role of the mother (Paquette 2004), which results in the child feeling less safe and developing social anxiety. Because this is, as far as we know, the first study on maternal challenging parenting, more research is needed to assess the consequences of maternal challenging parenting on their children’s social development.

When child social anxiety was measured using parental reports, challenging parenting behavior did not predict a change in shyness, for either child. Parent-reported child shyness at Time 2 was for a large part predicted by parent-rated shyness at Time 1, leaving little room for additional variance to be explained by parenting behavior. This substantial stability of parents’ ratings of their children’s shyness is suggestive of bias in their ratings. In addition, convergence between parental reports and observations of child temperament is commonly found to be modest (e.g., Majdandžić et al. 2008), although in the present study there was some convergence at Time 2. The ecological validity of observational assessment of child social behavioral inhibition, and the different results we obtained using objective and parent-rated measures of it, underscore the need to use observations in research on social anxiety development, which still often relies solely on parental reports.

Contrary to expectations, overinvolvement of both parents did not affect later observed or parent-rated social anxiety in 2-year-old and 4-year old children. This contradicts with the demonstrated effects of overcontrol on child anxiety in general (McLeod et al. 2007; Van der Bruggen et al. 2008). McLeod et al. (2007) distinguished in their meta-analysis two subcomponents of overcontrol, of which ‘autonomy granting’ had a larger effect size ($d = 0.42$) than ‘overinvolvement’ ($d = 0.23$). This last component (defined

Table 5 Regression with parent-rated shyness at Time 1, and observed overinvolvement and challenging parenting behavior as predictors of parent-rated shyness at Time 2

| | First child | | Second child | |
|--------------------------------|----------------|----------------|----------------|----------------|
| | Mother β | Father β | Mother β | Father β |
| Shyness Time 1 | 0.84*** | 0.85*** | 0.67*** | 0.69*** |
| Overinvolvement | 0.01 | 0.05 | -0.00 | -0.02 |
| Challenging parenting behavior | 0.01 | 0.03 | -0.01 | -0.01 |

Parent-rated shyness is the average of mother’s and father’s rating

*** $p < 0.001$

as excessive parental interference with the child and excessive encouragement of dependence on the parent) corresponds most closely with our operationalization of overinvolvement. Thus, the absence of effects for overinvolvement we found may be due to differences in operationalization, and is in line with the lower effect size for the subcomponent overinvolvement reported by McLeod et al. (2007). A related explanation is that the structured context in which overinvolvement was assessed may have affected the extent to which involvement was appropriate versus excessive, especially given the young age of the children, although overinvolvement was coded relative to the amount of help the child apparently needed. The operationalization of the other subcomponent of overcontrol reported in McLeod et al., namely autonomy granting (defined as parental encouragement and acknowledgment of children's choices, solutions, and opinions and choices) overlaps more with our construct of challenging parenting behavior, which is in accordance with our findings regarding challenging parenting behavior. Of note, the positive associations between overinvolvement and child anxiety that were reported in the two meta-analyses (McLeod et al. 2007; Van der Bruggen et al. 2008), were almost entirely obtained from cross-sectional studies and not from longitudinal designs controlling for begin-level of child social anxiety, as we did. This suggests that challenging parenting behavior, and not overinvolvement, may cause or maintain child social anxiety.

In the second born 2-year-old children, in contrast to the 4-year-old children, parenting of neither parent influenced the development of social behavioral inhibition, whereas early social behavioral inhibition explained much of the variance half a year later. The most likely explanation is that social anxiety is subject to more change (and thus more sensitive to parenting effects) between the age of 4 and 5 than between the age of 2 and 3, because children are becoming self-conscious and are starting to develop shyness around the age of four (Colonesi et al. 2010). A second explanation is that parenting behavior has had more time to affect the development of social behavioral inhibition in the first than in the second child, suggesting an age bound increase in the relative influence of parenting behavior compared to temperamental factors. A third explanation concerns birth order, suggesting that first-born children may be more susceptible to parenting behavior than later-born children. Belsky's (Belsky 2005; Belsky and Pluess 2009) differential susceptibility theory proposes that children differ in their sensitivity to parenting behavior, both positively and negatively (e.g., Gilissen et al. 2008). According to Belsky (2005), from an evolutionary perspective, it is favorable for parents if their children differ in sensitivity to parenting because it is unknown a priori which behaviors produce the best reproductive outcome. It may be that first-born children are more susceptible to parenting behavior than their siblings, in line with evolutionary predictions of a parental preference for first-borns over later-borns (in

view of the fact that parents have already invested more in their first child), which is indeed supported by empirical evidence (Keller and Zach 2002). A final explanation is that at 4, children go to elementary school in the Netherlands; therefore, 4 to 5 is the age in which children are exposed to social novelty outside of the family, more than between 2 and 3. As fathers' specific function may be to help children with the transition to the outside world, his challenging role may be particularly important in this period of social transition, just as in later social transition phases such as when moving away from the family in young adulthood (see Bögels and Phares 2008, for a review of evidence for the role of the father in such developmental phases of social transitions).

Of note, fathers were found to be more challenging and less overinvolved than mothers towards their 2-year-old (but not their 4-year-old) child. These results to some extent support the theory that fathers form an activation relationship with their child in which they challenge their child to push his/her limits (Paquette 2004). The stronger interparental differences found for challenging parenting behavior towards the 2-year-old child corresponds with findings that fathers' physical play peaks in toddlerhood and declines thereafter (MacDonald and Parke 1986). The larger overinvolvement of mothers compared to fathers (at least towards their 2-year-old child) corresponds with the supporting and protective role that is attributed to mothers (Paquette 2004). The finding that fathers and mothers only differed in parenting behavior towards their second child might be explained by higher insecurity in the raising of a first-born child (Zajonc 2001), which may cause parents to attune their behavior to each other in the first child. A related explanation is that as parents get more experienced in parenting they develop their own specializations, which increases differences between parents. Alternatively, 2-year-old children may appeal more strongly to the different specializations of fathers' and mothers' parenting behavior, as they have a relatively higher need for physical contact and care and a lower perception of danger, which may induce strong nurturance in mothers and physical play in fathers.

Despite the longitudinal nature of the study, a design that enabled predicting change, and the use of both observational and questionnaire measures, several limitations need to be addressed. First, parenting behavior was measured in structured situations in a laboratory setting. We chose to measure if fathers and mothers showed different behaviors in the same structured situations, making the physical aspects of challenging parenting behavior, such as rough-and-tumble play, less likely to emerge. However, the tasks were appropriate to measure the verbal components of challenging parenting behavior, such as encouraging the child to compete. Our choice of structured tasks may have resulted in an underestimation of parental differences in challenging parenting behavior, and in its subsequent effect on child social

anxiety. A second limitation was the relative small number of tasks (3) to measure parenting behavior. Parenting behavior varied between tasks, as shown by the modest internal consistency. This ‘task specificity of behavior’ is often found in observational research (e.g., Bögels et al. 1995) and it is recommended to measure parenting behavior in multiple situations to obtain reliable estimates. A third limitation was that parenting was observed with the parent and both children at the same time, causing the parenting behavior towards one child being influenced by the other child. Thus, parents had to divide their attention between the siblings, and sibling dynamics may have affected the measures of parenting behavior. Observation of each parent with one child would yield purer measures of parenting influence. Yet, as most families have several children (e.g., $M=1.78$ in the Netherlands and 2.06 in the USA; Central Intelligence Agency 2012), the situation used in this study is a reflection of a common parenting situation, strengthening the ecological validity of our study. Fourth, due to low variance and poor reliability rejection was not analyzed. Rejection may be measured better with questionnaires or with unobtrusive observations, to reduce the role of social desirability. Fifth, parents were relatively highly educated, and we did not use a clinical population. Hence, it remains unclear if the findings can be generalized to a population with a more heterogeneous background, or to children with clinical levels of social anxiety.

Since this is to our knowledge the first study showing a protective effect of paternal challenging parenting behavior on the development of child social behavioral inhibition, the results need to be replicated in future studies before firm conclusions can be drawn. The results for social behavioral inhibition differ from those for parent-report measures, highlighting the need to use observational measures in addition to the commonly used questionnaires. Ideally, child social anxiety should be measured in multiple social situations, not only in response to an adult stranger, but also in the presence of unfamiliar peers, and while performing for others such as singing a song. Future studies should further use observational measures of (challenging) parenting behavior assessed in natural contexts, such as at home, in addition to structured situations in the laboratory, and both in the presence and absence of siblings. Moreover, it is important to investigate whether the protective effect found for paternal challenging parenting behavior extends to other types of anxiety than social anxiety. In view of the different results we found for children of different ages, it would be useful to unravel differences in parenting effects on social anxiety across toddlerhood into early school age. In addition, the influence of daycare experiences on the development of social anxiety in this age group should be addressed. Daycare experience has been found to affect the continuity of behavioral inhibition during the first four years of life, with some studies founding a

beneficial effect (e.g., Fox et al. 2001), and others a harmful effect (Volling and Feagans 1995); these inconsistent results point to daycare as a fruitful topic for future research.

The results of this study suggest that parents play a different role in the development of child social anxiety in a sensitive period for the development of social anxiety, between the age of 4 and 5. Fathers’ challenging parenting behavior has a protective effect, and mothers’ challenging parenting behavior potentially being a risk factor. These findings highlight the importance of involving fathers in research on the social development of children, and on interventions in child social anxiety. Specifically, fathers’ challenging parenting behavior may be a useful target for preventing child social anxiety.

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