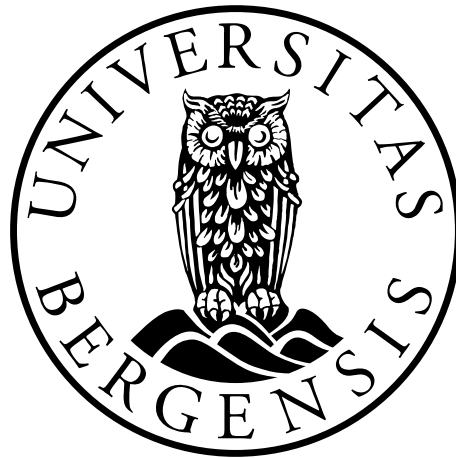


Early Father-Child Interaction in a Father-Friendly Context

*Gender Differences, Child Outcomes, and Predictive Factors
Related to Fathers' Parenting Behaviors with One-Year-Olds*

Kristin Berg Nordahl



Dissertation for the degree philosophiae doctor (PhD)

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Scientific environment

The work presented in the current thesis was conducted at the Norwegian Center for Child Behavioral Development (Atferdssenteret) in Oslo. This doctoral project was executed as part of the Behavioral Outlook Norwegian Developmental Study (BONDS), a longitudinal study of children's social development from six months. The study's main focus is on the developmental trajectories of children's social competence and externalizing behavior problems.

The extensive use of observational data in this thesis was accomplished based on collaboration with Dr. Emeritus Marion S. Forgatch and Dr. Emeritus Gerald R. Patterson, senior scientists at the Oregon Social Learning Center (OSLC) on adapting micro social coding methodology and structured interaction tasks, with Professor Daniel S. Shaw at the University of Pittsburgh on selecting structured interaction tasks, and with Professor Margaret Tresch Owen at the University of Texas at Dallas on adapting global rating scales.

The doctoral education was carried out within the institutional framework of the Graduate School of Clinical and Developmental Psychology and the PhD program at the Faculty of Psychology, University of Bergen. The scientific work involved in this thesis was mainly executed at the Norwegian Center for Child Behavioral Development, and partly during a research stay at the Oregon Social Learning Center, financially supported by the University of Bergen and the Norwegian Center for Child Behavioral Development.

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Atferdssenteret, 26.02.2014

Faithfully yours,

Kristin Berg Nordahl

Abstract

Today's generation of fathers is more involved in the daily care and upbringing of their children than has been the case in the past. This is particularly true in Scandinavia, where progressive family policies encourage fathers to spend time with their infants. As fathers' participation in early child care continues to increase, the need to understand more about fathers' parenting behaviors and early father-child interaction also grows. The overall aim of this thesis was to expand the current literature on early father-child relationships by investigating questions related to fathers' parenting behaviors with one-year-olds in the cultural context of Norway. To accomplish this, data from the Behavior Outlook Norwegian Developmental Study (BONDS), a longitudinal study tracking 1159 children's social development from six months, were utilized.

In Paper I, the aim was to investigate family concordance and gender differences in early parent-child interaction. Both fathers and mothers from 39 families were observed on separate occasions with their one-year-old children; 20 girls and 19 boys. Parents' and children's behaviors were recorded from video-taped observations of structured interactions by means of micro-social coding methodology. The results showed no within-family concordance between mothers' and fathers' behaviors with their child, whereas children's negative engagement with each parent was moderately correlated. Gender differences found in parent-child interaction at one year were few but noteworthy. For parents with boys, fathers were overall more positively engaged than mothers. Moreover, fathers of boys displayed higher levels of positive engagement than those of girls, whereas mothers of girls and boys displayed similar levels of positive engagement. In contrast to previous findings, mothers did not verbalize more than fathers. Girls were overall more positively engaged during interaction with both mothers and fathers as compared to boys.

The aim of Paper II was to investigate the impact of fathers' time at home with their infant the first year and observed fathering behaviors with one-year-olds on child outcomes at ages two and three. Data were drawn from all 1159 participating families, including micro and macro measures of fathers' parenting behaviors derived from 726 structured father-child interactions. Fathers' parenting behaviors were assessed by both micro and macro coding from direct observation of structured father-child interactions. Contrary to expectations, fathers' time with infants had no significant main effects on either mother-rated behavioral adjustment at age two, preschool teacher-rated externalizing behavior at ages two and three, or on father-rated social competence at age three. However, interaction effects indicated that more time with more sensitive and less coercive fathers predicted less externalizing behaviors at age two, and that more time with less intrusive and less coercive fathers predicted better social competence at age three.

In Paper III, the aim was to investigate potential predictors of fathers' parenting behaviors observed during 726 fathers' structured interactions with their one-year-olds (51.7% boys). Results revealed that fathers' globally rated sensitive parenting and micro coded negative reinforcement were not correlated and were mainly predicted by different factors, indicating that they are separate dimensions of parenting. Fathers' sensitivity was positively associated with children's activity level and sustained attention, and with fathers' verbal instructions, and negatively with children's communicative risk and fathers' lower education. Fathers' negative reinforcement was positively associated with children's developmental difficulties and communicative risk, and with fathers' extraversion. Further investigation showed that for fathers with depressive symptoms, children's emotional and active temperaments were associated with less sensitivity during interaction, while children's sociable temperament was related to less negative reinforcement. Moreover, fathers who reported lower partnership quality or more parental stress were less sensitive if their child's attention was less sustained during interaction. Finally, fathers' time at home with their infant during the first year was associated with lower levels of sensitivity for fathers with depressive symptoms.

Taken together, the results broaden our understanding of how fathers' early parenting behaviors with one-year-olds is related to mothers' and children's behaviors, to father and child characteristics and contextual factors, and to later child behavioral adjustment. In a sociopolitical context that facilitates early father-child relationships, fathers' and mothers' parenting behaviors with one-year-olds were mostly similar, however, with some notable exceptions. Furthermore, results suggest that the influence of fathers' time spent with their infant on child behavioral outcomes is contingent on the quality of fathers' parenting behaviors, thus, fathers' increased time spent with infants is not by itself sufficient to benefit child outcomes, both quantity and quality father involvement is necessary. Finally, multiple predictors related to different parenting dimensions pointed to factors that may enhance father-infant interaction and help identify fathers and children who may benefit from early intervention.

List of publications

Paper I

Nordahl, K. B., Janson, H., Manger, T., Zachrisson, H. D. (2014). Family Concordance and Gender Differences in Parent-Child Structured Interaction at 12 months. *Journal of Family Psychology*. Advance online publication. doi: 10.1037/a0035977

Paper II

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Paper III

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1. Introduction

1.1 Fathers' role in early child care

Comprehensive social and political changes during the twentieth century have profoundly impacted family structures and, consequently, altered the roles mothers and fathers play in their children's life (for history review, see e.g., Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb 2000; Lamb, 2010; Haas & Hwang, 2013). Following industrialization, the Second World War, wide-ranging technological advances, and a rapidly growing economy directed towards the issuant consumer society, there was an urgent demand for labor in most Western societies. Subsequently, women's entry into the labor market extensively contributed to changes in family functions. From previously mainly holding a role as breadwinners, fathers today are increasingly expected to provide physical and emotional care for their children as equal co-parents to mothers. However, cultural and political differences across counties and societies have directly and indirectly affected the pace and scope of the changes, and Scandinavian countries have with their family-friendly policies been pioneers in this development (Lamb, 2010; Haas & Hwang, 2013).

Coinciding with fathers' changing role in the family, there has been a substantial increase in research incorporating fathers in studies of parenting and early child care (Cabrera & Tamis-LeMonda, 2013). For several decades, theoretical analysis and empirical research have been conducted to investigate fathers and their significance to child development, and although dominated by social scientists, and in particular developmental psychologists, scholars in multidisciplinary fields have contributed to the growing body of fatherhood literature (Lamb, 2010). However, the vast majority of this research has been conducted in Anglo-American contexts, where the traditional breadwinning fathers and the home-making, child-rearing mothers in nuclear families have been championed as the ideal arrangement (Cabrera et al., 2000). As a consequence, the literature reviewed in this introduction will be heavily

based on such studies, although with notable exceptions from Sweden and a few other European countries.

In contrast to most Anglo-American contexts, Scandinavian social policies facilitate fathers' involvement in the daily care of children to a much greater extent (Haas & Hwang, 2013). The Scandinavian dual-earner and dual-caregiver model is grounded on women's prevailing entry into the labor market in response to the expanding welfare states' need for more workers. In turn, this led to the right to paid maternity leave for working mothers substantially subsidized by each county's government. As the first nation in the world, Sweden introduced a gender-neutral parental leave arrangement in 1974. Norway followed in 1978 by granting the fathers to share up to 12 of 18 weeks of parental leave with the mother (Haas & Hwang, 2013). When children included in the current thesis were born (2006 to 2008), parents were entitled to 10 months paid parental leave at 100% salary up to a level of approximately the national mean income, or 12 months leave at 80% salary for one of the parents. As part of this policy, fathers were granted a quota of 6 weeks of paternal leave as an individualized entitlement nontransferable to the mother. In the following years, this father's quota increased to 10 weeks (2009), and later to 12 weeks (2012).

Concurrently, mothers' are entitled to 3 weeks parental leave prior to due date as well as the first 6 weeks after birth, while the remaining leave period may be shared between the parents as they prefer. The right to parental leave is conditioned on both parents being employed for at least 6 of the 10 months prior to delivery date.

Between 2006 and 2009 about 78% of all fathers and 90% of all mothers in Norway with children younger than one year of age took paid parental leave, while about 25% of fathers took more than 6 weeks, and about 10% took less (Bringdal & Lappegård, 2012). Viewed against this background, it is not surprising that comparative studies across time and countries have shown that Norwegian fathers are more involved in child care and child rearing activities compared to fathers in other European countries (Hook & Wolfe, 2012; Sullivan, Coltrane, McAnnally, & Altintas, 2009).

The parental leave policies must be considered within the broader Norwegian sociopolitical context. Norway is a rich country among the top five countries in the OECD on overall social justice with a child poverty rate of 5.5% (Bertelsmann Stiftung, 2011), and was recently rated the best country in the world in which to be a mother (Save the Children, 2011). Norway is also regarded among the top 6 OECD countries for its early child service policies (UNICEF Innocenti Research Center, 2008). From children's age one, Norway provides public funding for universal early child care with regulated quality standards (Zachrisson, Janson, & Nærde, 2012). Furthermore, parents who decide to stay home are allowed a cash-for-care entitlement until the child is three years old.

The progressive Norwegian family policies are, subsequent to the aim of promoting mothers' participation in the labor market, intended to strengthen the relationship between fathers and children and thereby enhance positive developmental outcomes for children (e.g., Cools, Fiva, & Kirkebøen, 2011). Indeed, recent research confirms that fathers spend significantly more time with their children after the paternal quota was implemented (Rege & Solli, 2010). However, up until now the main focus has been on increasing the amount of time fathers spend with their infants, and not so much on the quality of parenting during this time (O'Brian, 2009). One of few studies investigating the impact of paternal leave on children suggested that such leave increased fathers' importance in relation to children's cognitive skills (Cools et al., 2011). The extension of paternal leave time in Norway is fairly recent, and research investigating associations between fathers' time spent with children in infancy, early father-child interaction, and later child outcomes, is still sparse. In the current thesis, the amount of time fathers spent at home with their infant the first year is included as a possible influential variable. Fathers' time in paid paternal leave is not measured as such, and the aim has not been to evaluate parental leave arrangements. Even so, the particular context for fathers and families in Norway necessarily needs to be considered when interpreting results and discussing generalization to other cultural contexts.

1.2 Fatherhood research

Nearly four decades have passed since Lamb referred to fathers' as "*the forgotten contributors to child development*" (Lamb, 1975), and declared that "*we can no longer accept the implicit assumption that fathers are simply occasional mother-substitutes; rather, they may have an important role to play in socialization which is independent of the mother's*" (Lamb, 1975, p. 251). Since then, substantial fatherhood research has shown, not only that fathers *do* matter, but to a large extent also *how* fathers contribute to their children's development. Studies addressing mechanisms by which fathers might influence child well-being and adjustment have come a long way in the past 40 years (Lamb, 2010). From an emphasis primarily on fathers' absence or presence in their children's lives, fatherhood research has moved on to more nuanced theories and models by which the multifaceted role fathers play are taken into account (Cabrera & Tamis-LeMonda, 2013; Day & Lamb, 2004; Lamb, 2010). However, this development has not been without scientific disputes. An extensively debated question has been whether fathers' parenting and contribution to their children's lives are substantially different from mothers', and if there is a need for measurement models and instruments specifically designed for fathers (Lewis & Lamb, 2003; Pleck, 2007). Lately, there has been more agreement that a broad and comprehensive view of both mothers' and fathers' parenting is necessary to understand the complex processes and mechanisms of paternal and maternal influences on child development, as pointed out in this quotation: "*Thus, we once studied primarily mothers and called their behaviors "parenting" without considering whether we had accurately portrayed fathers, but we now often study only fathers and call their behaviors "fathering" without considering whether the effects of those behaviors are similar when enacted by mothers*" (Stolz, Barber & Olsen, 2005, p.1076).

Another extensively debated fatherhood subject is which factors to include when attempting to measure fathers' contribution to their children's well-being. The concept of *father involvement* was introduced in 1985 by Lamb and Pleck (Lamb,

Pleck, Charnov, & Levine, 1985) to serve this very purpose. The original conceptualization of father involvement was proposed to include three components: (1) *engagement*: direct interaction with the child, in the form of care giving, play, or other activities, (2) *accessibility* (availability) to the child, and (3) *responsibility*: making sure that the child is taken care of, distinct from providing the care, as well as arranging for resources for the child (Lamb, 2010; Pleck, 2012). Although influential to the field of fatherhood research for decades, this conceptualization did not escape criticism regarding its weaknesses (Schoppe-Sullivan, McBride, & Ho, 2004). In the 1990's, scholars argued that the Lamb and Pleck conceptualization was limited and unidimensional, and that father involvement is a multidimensional construct which should include affective, cognitive and ethical components, as well as observable behavior components often studied in fatherhood research (Hawkins & Palkovitz, 1999). As a consequence, Palkovitz (2002) proposed a new model conceptualizing father involvement in three overlapping domains (i.e., cognitive, affective, and behavioral) including simultaneously and continuously occurring dimensions (e.g., time invested, degree of involvement, and proximity), and identifying 15 major categories of paternal involvement (e.g., communication, teaching, monitoring, care giving, and shared activities). Pleck (2007) later referred to this dissension as the “*father involvement wars*”, and claimed they “*are now over, and all sides won*” (Pleck, 2007, p. 197). Subsequently, a re-conceptualization of the original father involvement model was proposed to include: (a) positive engagement activities, (b) warmth and responsiveness, and (c) control, corresponding to the earlier accessibility and engagement categories, whereas the two auxiliary domains: (d) indirect care, and (e) process responsibility correspond to the original responsibility component (Pleck, 2010). This new operationalization better reflects the broader field of parenting research, in that it takes into account both the quality of fathers’ direct engagement, through clarifying that activities included need to be positive, and behaviors need to be warm and responsive, and by specifying the more indirect engagement, such as fathers’ economic support (Pleck, 2010).

Arguing that it is important for fatherhood research to expand from simple comparisons of mothers and fathers, and to include a more complex consideration of contexts, predictors and outcomes, Cabrera, Fitzgerald, Bradley and Roggman (2007a) proposed a framework for *modeling the dynamics of paternal influences on children over the life course*. Building on Lamb and Pleck (1985) and Palkovitz (2002), this model identifies sets of variables that (1) predict father involvement, (2) interact to predict involvement, and (3) influence father characteristics and thereby impact involvement. Including both variables considered central to fathers' contribution to child development and those traditionally considered as mothers' contribution, this model is not exclusive to fathers. Predictors of father involvement comprise fathers' own history, characteristics of fathers, mothers, and children, in addition to contextual factors. Both specific direct effects and indirect effects (e.g., via maternal behavior, peers, and activities) are included, and the mechanisms by which fathers influence their children may range from simple direct effects to complex mediated or moderated effects. The model by Cabrera et al. (2007a) is described as a *heuristic model*, because it offers a framework from which measurement models can be derived to address relevant research questions. For some studies, only a few components of the model may be relevant (Cabrera et al., 2007a).

It is beyond the scope of the current thesis to employ the full model of paternal influence as described by Cabrera et al. (2007a), or to include all possible dimensions of the father involvement concept, however, the thesis explores important aspects of these broader models. Guided by theory and former research, relevant components of father involvement frameworks are applied to investigate associations between fathers' parenting behaviors and the behaviors of mothers and children', subsequent child outcomes, and various father, child, and contextual variables.

1.2.1 Father involvement and child development

As studies rarely include all aspects of the comprehensive models, father involvement continues to be investigated in multiple ways. A meta-analysis of longitudinal effects

of father involvement on children's developmental outcomes found that fathers involvement measured as cohabitation with the child's mother was associated with less externalizing behavioral problems, and that fathers' involvement in active and regular engagement with the child predicted a range of positive outcomes (Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2007). For example, fathers' engagement was associated with reduced frequency of behavioral problems in boys and lower levels of psychological problems in girls. Moreover, father involvement was associated with enhanced cognitive development, and decreased delinquency in families with lower socio-economic status. Based on investigations of long term child outcomes from several large UK studies, father involvement (conceptualized in multiple ways; e.g., cohabitation with the child, parent reported or child reported activities) was associated with less severe behavior problems, better life satisfaction, more happiness, and higher academic motivation in adolescents (Flouri, 2005). Furthermore, father involvement in childhood was related to less trouble with the police for boys only, and lower levels of peer aggression for both girls and boys during adolescence.

Including studies with measures of direct and active paternal involvement when children were between 3 and 8 years, a recent meta-analysis investigated associations with children's early learning (McWayne, Downer, Campos, & Harris, 2013). Overall, results demonstrated a significant relation between direct father involvement and children's early learning. In particular, the quantity of positive engagement was related to children's cognitive and academic skills, their internalizing problems, and their self-regulation. Furthermore, the frequency of fathers' positive engagement activities was negatively associated with children's externalizing behavior problems. Conversely, negative parenting behaviors were positively associated with externalizing behavior problems and negatively associated with children's cognitive and academic skills. In a British study, father involvement at age seven, measured as activities with the child and interest in the child's education, was found to predict educational attainment by age 20 (Flouri & Buchanan, 2004). Using US data, another study showed that father involvement in early play activities predicted relative

decreases in externalizing and internalizing behaviors, and increases in social competence at school, but only when fathers reported supportive co-parenting behavior (Jia, Kotila, & Schoppe-Sullivan, 2012). Also from a US context, a third study found that father involvement measured as supportive parenting was associated with children's school readiness for both academic and social outcomes, but only when mothers showed lower levels of supportiveness. The results suggest that fathers' supportive involvement may buffer against mothers' unsupportive involvement (Martin, Ryan & Brooks-Gunn, 2010).

A significant dimension in the father involvement models, and a major focus of the current thesis, is early *father-child interaction*. With significant increases in father involvement from birth, the quality of fathers' behaviors during direct interaction with infants may become more salient to child development (Lamb & Lewis, 2013; Pleck, 2012). Accordingly, father-child interaction in infancy and early toddlerhood has been given increased attention over the last decades, and fathers' behaviors during interaction have been found to be associated with later child adjustment (for review, see Lamb, 2010). In particular, fathers' supportive parenting behaviors was found to contribute to young children's cognitive and socio-emotional development over and above those of mothers' (NICHD Early Child Care Research Network, 2004). Several studies have found that fathers' responsiveness and sensitivity observed during interaction with infants or toddlers are related to later child adjustment. For example, a German study found lower levels of father responsiveness during parent-infant interaction at 3 months to be associated with more externalizing behavior when the children were 8 and 11 years of age (Trautmann-Villalba, Gschwendt, Schmidt, & Laucht, 2006). Similarly, a UK study showed that disengaged and remote father-infant interaction observed at 3 months predicted externalizing problems at age 1 (Ramchandani, Domoney, Sethna, Psychogiou, Vlachos, & Murray, 2013). Two US studies showed that fathers' sensitivity and intrusiveness with children at ages two and three predicted children's cognitive and social development (Cabrera, Shannon, & Tamis-LeMonda, 2007b; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Associations between fathers play behaviors and

child social development have also been reported. One German study found fathers' play sensitivity with toddlers to predict internal working models of attachment at the age of 10 (Grossmann, Grossmann, Fremmer-Bombik, Kindler, & Scheuerer-Engelisch, 2002), while a US study found that children of fathers who sustain in physical play and who use less directive or coercive tactics are more popular with their peers (McDowell & Parke, 2009).

Even in contexts with generous paternal leave arrangements, research is still sparse on if and how the time fathers spend with infants during their paternal leave influences children's wellbeing and later development (O'Brien, 2009). Studies following Swedish families over time investigate the impact of fathers leave time on fathers' participation in child care, on how parents share child care responsibilities, and on the stability of father involvement, but they rarely include child measures (Haas & Hwang, 2008; Lamb, Chuang, & Hwang, 2004). So far, a few studies have shown significant benefits for children's cognitive outcomes, but weaker evidence with regard to social competence or behavioral adjustment (e.g., Cools et al., 2011; Huerta, Adema, Baxter, Han, Lausten, Lee, & Waldfogel, 2013). However, it has not been clearly evidenced that fathers' time with infants by itself is associated with children's development (Pleck, 2010). One study investigating how paternal leave taking might affect fathers' perception of the closeness of the relationship with their children suggested that fathers who took more days of leave were also more likely to report satisfaction with the amount of contact they had with their children (Haas & Hwang, 2008).

The reviewed research illustrate the many ways in which fathers' may be involved in their children's lives, and that such involvement may have beneficial impacts on multiple areas of child development and adjustment. Informed by earlier research and Norwegian paternal leave policies, the current thesis focuses on two specific dimensions of father involvement; (1) early father-child interaction (the quality aspect); and (2) the amount of time fathers' spend with their infants during the first year (the quantity aspect).

1.2.2 Predictors of father involvement

Factors associated with father involvement naturally differ dependent on the way involvement is operationalized. However, in keeping with the earlier described model of the dynamics of paternal involvement (Cabrera et al., 2007a), predictive factors may be organized under the following labels: (1) background factors (e.g., fathers' cultural and biological history); (2) father characteristics (e.g., age, education, or personality); (3) family characteristics (e.g., family structure or mother characteristics); (4) contextual factors (e.g., work related stress, parents' partner relationship quality, or paternal leave arrangements); and finally (5) child characteristics (e.g., gender, age, temperament, or behavior).

Fathers' perception of his own role as a father has been found to be a strong predictor of father involvement across domains; fathers who report less traditional perceptions of fatherhood tend to be more involved, as do fathers who report less interparental conflict (McBride, Schoppe, & Rane, 2004). As would be expected, the opportunity to take paternal leave has shown to be associated with the degree of father involvement. Using US data, Nepomnyaschy and Waldfogel (2007) reported that longer paternity leave from childbirth was associated with more child rearing activities nine months later. Similar results have been found in the UK (Tanaka & Waldfogel, 2007). In a Swedish study, paternal involvement at 16 months was determined by maternal and paternal work status, and the amount of maternity and paternity leave taken in the preceding months (Lamb, Hwang, Broberg, Bookstein, Hult, & Frodi, 1988). Supporting these findings, more recent work from Sweden found fathers to be more in sole responsibility for children when mothers worked longer hours, fathers worked fewer hours, and fathers took paternal leave. Yet, diary notes showed that the stability of father involvement across 15 years was only moderate, and that despite generous parental leave policies, there were few signs that men who took more than 2 weeks of paternal leave were otherwise more involved in child care 15 years later (Lamb et al., 2004). A Norwegian study of the impact of paternal leave and long term father involvement found that fathers spent significantly

more time with their children after the paternal quota was implemented (Rege & Solli, 2010).

Fathers' parenting behaviors are, as other dimensions of father involvement, also subject to a variety of factors related to the context and the qualities that parents and children bring to their interactions. Across studies, fathers' older age and higher levels of education are related to more sensitive parenting during play with two- and three-year-olds (NICHD Early Child Care Research Network, 2000; Cabrera et al., 2007b; Tamis LeMonda et al., 2004). A meta-analytic review found both fathers' and mothers' personality characteristics to be associated with parenting behaviors. In particular, extraversion was related to more warm and responsive parenting and neuroticism to less warm and more negative parenting (Prinzle, Stams, Dekovic, Reijntjes, & Belsky, 2009). Moreover, another meta-analysis reported that depression in both fathers and mothers was associated with lower levels of positive and higher levels of negative parenting behaviors (Wilson & Durbin, 2010). Fathers' parenting behaviors may also depend on stable child characteristics, such as gender and temperament. For example, fathers of boys have been found to be more sensitive with one-year-olds than those of girls (Nordahl, Janson, Manger, & Zachrisson, in press; Schoppe-Sullivan, Diener, Mangelsdorf, Brown, McHale, & Frosch, 2006). Related to both fathers' and mothers' parenting, children who are sociable and responsive also tend to elicit sensitive and positive parenting, while highly reactive, frustrated and irritable children seem to evoke harsher parenting (Holmes & Huston, 2010; Kiff, Lengua, & Zalewski, 2011). Children's social and communicative skills may also impact fathers' parenting. Indeed, socially responsive and communicative children are found to be related to more sensitive and responsive parenting behaviors among fathers (Holmes & Huston, 2010; Shannon, Tamis-LeMonda, & Cabrera, 2006). As mentioned, all family members influence each other's behaviors, and mother characteristics, such as age, education and employment status, or mothers' own parenting behaviors, have shown to be associated with fathers' parenting behaviors (Holmes & Huston, 2010). Other family factors, such as the presence of older siblings, may affect fathers' parenting. For example, in a study by Price (2008),

firstborns received 20-30 minutes more quality attention each day than a second-born child from the same family; on the other hand, younger siblings may benefit from a father with more parenting experience.

Extensive research has shown that contextual factors affect fathers' parenting behaviors. Out of space considerations, however, only the most relevant to this thesis will be mentioned here. For example, parenting stress related to fulfilling responsibilities as a father and mother has been associated with parenting practices for both fathers and mothers (Fagan, Bernd, & Whiteman, 2007; Ponnet et al., 2013). In contrast, social support has been shown to protect against effects of fathers' parenting stress by decreasing coercive and increasing prosocial parenting (DeGarmo, Patras, & Eap, 2008; Fagan et al., 2007). Moreover, fathers' higher levels of perceived marital intimacy are found to be related to more sensitive parenting behaviors with toddlers (NICHD Early Child Care Research Network, 2000; Lamb, 2010). Finally, how much time fathers' spend with their infants may be related to fathers' parenting behaviors; however, it does not necessarily by itself benefit father-child interaction (Pleck, 2010). A Swedish study found no significant difference in fathers' behaviors with their 16-month-old children based on fathers' involvement as primary caretakers for more than one month (Lamb, Frodi, Frodj, & Hwang, 1982). A more recent British study investigating differences in father-child interaction between primary and non-primary care giving fathers showed that fathers who spent more than 20 hours per week caring for their infant displayed more positive emotions during play than fathers who spent less time with their infant (Lewis et al., 2008).

Informed by the reviewed research, the studies conducted in this thesis include several of the above mentioned factors as covariates (in Paper II) or predictors (in Paper III), when exploring predictors and child outcome related to early father-child interaction.

1.2.3 Characteristics of early father-child interaction

“...we chart the development of father-child relationships, noting that, whatever the area of study – from interactions with newborn babies to relationships with teenagers – the evidence suggests that paternal styles closely resemble maternal styles.”

Lewis & Lamb (2003, p. 212)

Comparing early father-child interaction with mother-child interaction, researchers agree that most differences in parenting behaviors dependent on gender are small (Lewis & Lamb, 2003). Nevertheless, distinctive maternal and paternal parenting styles have been found, and they tend to be quite robust, even in contexts where fathers are highly involved in child care (Lamb, 2010). Barnett, Deng, Mills-Koonce, Willoughby and Cox (2008) found that mothers of six-month-old children demonstrated significantly higher levels of sensitive parenting behaviors than fathers. The finding has been supported in studies among 19 to 36 months old children (e.g. Kwon, Jeon, Lewsader, & Elicker, 2012; Lovas, 2005), while others reported that mothers and fathers of children of similar ages are equally sensitive and responsive when interacting with their children (Malmberg et al., 2007; Tamis-LeMonda et al., 2004). A meta-analysis of parents' talk with their children between one and two years of age found that mothers generally were supportive and gave play leads to a greater extent than fathers, whereas fathers were more directive and informative than mothers (Leaper, Anderson, & Sanders, 1998). This finding was supported by a study where mothers were found to verbalize more than fathers when interacting with their five-month-old infants (Gordon & Feldman, 2008). Furthermore, fathers have been found to engage in more physically stimulating and unpredictable play with their infants as compared to mothers (Lewis & Lamb, 2003). Studies of five-month-old babies (Gordon & Feldman, 2008), as well as of school aged children (Margolin & Patterson, 1975) have shown fathers to display higher levels of positive engagement during interaction than mothers.

Within families, the extent to which behaviors and engagement in father- and mother-child dyads are consistently related may affect children's behavior and development

in different manners (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). Specifically, parental concordance of positive engagement may enhance positive development more strongly than parental discordance (Barnett et al., 2008), and there may be considerable variability in fathers' and mothers' parenting behaviors within the same family (Barnett et al., 2008, Braungart-Rieker, Garwood, Powers, & Notaro, 1998). Current literature on behavior concordance in -father- and mother-child interaction at one year is nevertheless sparse and inconclusive. Although there are some studies with young infants and a few with toddlers, we were only able to find one British study involving 10 to 12 months-old children (Malmberg et al., 2007). The results indicated no significant overlap between fathers' and mothers' observed behavior during parent-child interaction or between children's expressed affect with their mothers and fathers. In contrast, one US study with two- and three-year-old children reported that the quality of fathers' engagement was associated with similar qualities in mothers' behaviors (Tamis-LeMonda et al., 2004), and yet another found 20-month-old children to display similar intensity of negative affect with both parents (Ekas, Braungart-Rieker, Lickenbrock, Zentall, & Maxwell, 2011).

As regards the importance of child gender, fathers of boys are found to be more involved in daily child care than fathers of girls, and fathers generally perceive themselves as playing the most vital role in the socialization of boys (Rouyer, Frascarolo, Zaouche-Gaudron, & Lavanchy, 2007). In line with this, studies with children four years and older have found fathers and mothers to be most engaged with, and responsive to, their same-gender children (Lindsey, Mize, & Pettit, 1997; Margolin & Patterson, 1975; Rouyer et al., 2007). A meta-analysis including 172 studies investigating parent's differential socialization of girls and boys (Lytton & Romney, 1991) found that fathers of children younger than six years differentiated more between girls and boys than mothers in showing more positive as well as negative engagement during interaction with boys compared to with girls.

While studies of gender differences in one-year-old infants' behaviors are sparse, existing studies report few dissimilarities in girls' and boys' behaviors at this early

age (e.g., Ekas et al., 2011; Lindsey, Cremeens, Colwell, & Caldera, 2009; Lovas, 2005). For example, studies of one-year-old infants during interaction found no significant differences either in boys' and girls' vocalizations (Snow, Jacklin, & Maccoby, 1983), persistence (Shaw, Keenan, & Vondra, 1994), activity level and difficultness (Maccoby, Snow, & Jacklin, 1984), or in their physically aggressive behavior (Hay et al., 2011). For older children, a meta-analysis of gender variation in language use found girls between one and three years to be more talkative than boys (Leaper & Smith, 2004). Moreover, preschool girls have been found to engage in more pretend play with their parents compared to boys, whereas preschool boys seem to engage in more physical play than girls (Flanders, Leo, Paquette, Pihl, & Seguin, 2009; Lindsey et al., 1997). One study found two-year-old children to be more responsive and involving with their mothers than with their fathers (Lovas, 2005). In a study by Lindsey, Cremeens, and Caldera (2010), toddlers aged 15-18 months were found to ignore mothers' initiations more than fathers', girls complied with parents' requests more than boys, and boys rejected fathers' initiations during play more often than girls. This may indicate that gender differences in children's behavior emerge at a later age, or that one-year-old children's behavior is more subtle and difficult to measure (Caldera & Lindsey, 2006; Lovas, 2005).

As this review shows, some characteristics of fathers' behaviors during early parent-child interaction may be unique compared to mothers' behaviors. Prior studies indicate that fathers are more engaged in physical and play-related activities, to a larger degree differentiate between girls and boys, and to verbalize less compared to mothers. Some studies also suggest that fathers are less sensitive than mothers, while girls' and boys' interactional behaviors at this early age seem to show less variation. In the present thesis, the issue of gender differences and similarities both within and across families will be addressed, as well as how fathers' parenting behaviors during father-child interaction are related to individual and contextual factors, and to later child behavioral adjustment. In particular, the current thesis expands previous research by investigating early father-child interaction in a context where fathers'

engagement with their infants is facilitated through generous paternal leave arrangements.

1.3 Theoretical framework

This thesis has been guided by two theoretical approaches on the association between early parenting behaviors and subsequent child behavioral and emotional outcomes; (1) social interaction learning (SIL) theory (Patterson, 1982); and (2) attachment theory (Bowlby, 1969; Ainsworth, Behar, Waters, & Wall, 1978). Although frequently presented as contradictory, social interactional and attachment theories are in substantial agreement about the fundamental importance of parental responsiveness and the centrality of contingencies in the socialization process from infancy (Patterson, 2002). Moreover, both theories are grounded in extensive observational research on parent-child interaction, and they complement each other in predicting associations between the quality of early parent-child interaction, contextual factors, and later child adjustment (Dishion & Patterson, 2006; Scaramella & Leve, 2004). In the following, each of these theoretical approaches will be presented in some detail.

1.3.1 The social interaction learning model

Based on two related theories; social interaction theory (Cairns, 1979) and social learning theory (Bandura & Walters, 1963), the social interaction learning (SIL) model provides a theoretical framework where *positive parenting practices*, such as skill encouragement and positive involvement, are seen as major influences on children's behavioral adjustment, while coercive parenting practices, such as aversive behaviors or negative reciprocity, may disrupt positive development (Forgatch & DeGarmo, 2002). *Coercion theory* is an important dimension within the SIL-model, describing how contingent negative patterns of family interaction shape the child's behavioral development, and how aversive behaviors can increase through reciprocal negative patterns of parent-child interaction (Patterson, 1982). These coercive

exchanges may generalize across social settings, and lead to later externalizing behaviors and other problems in children's social relationships. The term coercion refers to a person's contingent use of aversive behaviors to attain rewarding events or to avoid unpleasant events, and the idea of *contingency* is the essence of coercion theory (Reid, Patterson, & Snyder, 2002). For example, when a child throws a tantrum in response to a parental request, the child may experience this as functional if it terminates the parent's demands. This function reflects escape or avoidance conditioning in which coercive behaviors are shaped and maintained by negative reinforcement (Patterson, 1982). *Negative reinforcement*, which is another essential concept in coercion theory, takes place when the parent reinforces a child's aversive behavior, either by withdrawing from the situation, or by terminating an unpleasant initiation with a nonaversive response (Patterson, 1982). In these sequences, the child has the last aversive behavior in the chain of events. Thus, the child's negative behavior is rewarded when the parent puts an end to his or her initiated aversive behavior, and the child learns that negative behavior pays off, and is more likely to repeat the same types of behavior in future situations (Eddy, Leve, & Fagot, 2001; Patterson, 2002). Coercive behaviors may also be shaped and maintained by *positive reinforcement* when the child's aversive behaviors grant access to a desired activity or object, for example when a child makes a fuss in the grocery store and is "rewarded" (or bribed) with an ice cream to be quiet. Unfortunately, "*the matching law*" suggests that coercive behaviors will occur more frequently if they are experienced as more rewarding than prosocial behaviors (Snyder & Patterson, 1995). The coercion theory is developed from decades of direct observation of parent-child interactions in families from diverse populations, and from investigating the micro social level of the continuous family interaction (Reid et al., 2002).

According to the SIL-model, child and parent characteristics, such as children's temperament, parents' mental health, as well as other contextual factors, such as poverty, unemployment or partner relationship quality, influence child adjustment both directly and indirectly through parenting practices (Forgatch & DeGarmo, 2002; Forgatch & Patterson, 2010). Adverse contexts can exacerbate coercive parenting,

and positive contexts may amplify more positive parenting practices (Patterson, Forgatch, & DeGarmo, 2010). For example, parents with multiple health issues and frequent marital conflicts may be preoccupied with their own problems, and consequently exhibit more disengaged, harsh or inconsistent parenting practices. Conversely, parents who are overall healthy and are supportive of each other may find it easier to be positively involved and practice adequate limit setting with their children. Positive parenting practices can buffer the effects of harsh contexts on children; however, pernicious contexts such as divorce or major health issues are overwhelming, and are likely to have both direct and indirect effects on children's adjustment.

Coercive processes may develop from early in life (Shaw, Bell, & Gilliom, 2000; Patterson, 2005). Infants have a natural capacity for coercive behavior, which serves as a functional survival strategy. When babies are hungry or in other ways distressed, they cry, and toddlers who are denied what they desire, may try to take it, or make a fuss to get it (Patterson, 2002; Shaw et al., 2000). In this sense, coercive behaviors are not learned, they are natural and not inherently pathological; they simply represent one basic class of social-relational behaviors. In addition, infants also hold a range of natural positive social-relational behaviors to capture the caregiver's attention, such as smiling, mutual gaze and grasping. The parent's contingent or non-contingent responses to the infants' behavioral cues are salient factors in the socialization process. The built-in coercive and positive relationship repertoire increases or decreases in frequency and intensity during early childhood as a result of biological maturation, experiences in new social ecological contexts, and social learning processes (Dishion & Stormshak, 2007; Leve, Pears & Fisher, 2003). For most toddlers, coercive behaviors decrease over across childhood, coincident with language development and increased social skills (Tremblay, 2003). However, if a pattern of continuous aversive parent-child interaction leads to the child's predominant reliance on coercive behavior in relation to others, it may preclude the development of pro-social skills and obstruct access to supportive social

relationships, which in turn will increase the risk for negative developmental outcomes (Reid & Eddy, 1997).

If not addressed through appropriate socialization, coercive behavior in early childhood can potentially lead to a wide array of adjustment problems in later childhood and adolescence. This is often referred to as the *cascading effect* on development (Masten & Cicchetti, 2010; Reid et al., 2002). Children who transition into school with poor self-regulation and who are coercive and defiant with teachers generally suffer a slower progression in academic skills and are often rejected by peers (Reid et al., 2002). Although most often investigated with mothers and children beyond infancy, observational studies have shown that the SIL model and coercion theory is also applicable to fathers (DeGarmo & Forgatch, 2007; Dishion, Owen, & Bullock, 2004). In one study fathers' coercive discipline explained twice the variance in children's problem behaviors relative to mothers' (Patterson & Dishion, 1988). More recently, DeGarmo (2010) found that residential and nonresidential coercive fathering predicted 4-11 year old children's observed noncompliance over time. The SIL-model's perspectives on parenting practices and contextual factors influencing child adjustment, together with the negative reinforcement construct from coercion theory, have informed the research questions and observational measures of this thesis.

1.3.2 Attachment perspectives on child development

Attachment theory is rooted in evolutionary psychology and biology, and posits that the survival of infants depend on their ability to maintain proximity and contact with their primary caregivers (Bretherton, 1985; Bowlby, 1969). From an attachment perspective, the newborn infant holds a repertoire of species-characteristic behaviors that promote proximity to a care-giver, such as crying or fussing (Ainsworth, 1989). At first, these behaviors are simply emitted, but around half way into the infant's first year, along with emerging physical and social abilities, the proximity promoting behaviors become more active and goal oriented, and the child begins to discriminate

one person from another. As the child gradually attains the experience that the caregiver exists even when not present, the infant begins to form an inner representation of the caregiver, and with growing expectations of regularities in responses from the environment, the infant organizes what has been called *internal working models* of self in relation to others (Ainsworth et al., 1978; Bowlby, 1969). Gradually, infants adapt their own behaviors to elicit desired responses from the parent, resulting in parent-child attachment of varying quality (Scaramella & Leve, 2004).

Through the well-known “Strange Situation” procedure, certified and reliable coders classify children’s attachment patterns on the basis of their behavioral reactions to separation from and reunion with the caregiver (Ainsworth et al., 1978). Infants are classified as *securely attached* if they explore freely in the caregiver’s presence and use the caregiver as a source of comfort if distressed by separations; as *insecure-avoidant* if they explore without sharing affect with the caregiver and avoid physical contact or ignore the mother even during reunion episodes; as *insecure-ambivalent* if they are wary of the unfamiliar, show little exploration, and are ineffective in gaining comfort from the caregiver during reunions because of anger or resistance to contact; or finally as *insecure-disorganized* if they show overt displays of fear; contradictory behaviors or affects occurring simultaneously or sequentially; stereotypic, asymmetric, misdirected or jerky movements; or freezing and apparent dissociation (Ainsworth & Wittig, 1969; Main & Solomon, 1990).

Secure attachment relationships are understood as providing the infant with a “secure base” from which to explore the world, and a positive “internal working model” is seen as a key foundation for developing functional relationships with adults and peers. Moreover, a positive internal working model promotes emotional development, as well as social and cognitive development and skills (Bretherton, 1985). Contingent and appropriate responsiveness from the caregivers are assumed to foster secure attachment relationships, and lay the ground for advantageous child behavioral and emotional development (Shaw et al., 2000). Attachment theory

describes how parental sensitivity, responsiveness and attentiveness interact with the child's emotional responses to the parents' behaviors, and how this subsequently affects child behavioral adjustment (Ainsworth et al., 1978; Scaramella & Leve, 2004). The lack of this significant foundation may set the stage for struggles in other periods of development in self-regulation (Rothbart, Ellis, Rosario Rueda, & Posner, 2003) as well as correlated problem behaviors such as aggression (Olson, Sameroff, Kerr, Lopez, & Wellman, 2005).

The vast majority of studies regarding attachment relationships have been conducted with mothers and infants, and they find significant, but modest, associations between mothers' sensitivity and infant-mother attachment (DeWolff & van Ijzendoorn, 1997). A meta-analysis of existing research on father-child attachment found that fathers' sensitivity also shape their infant's attachment, but to a lesser extent than mothers' (Van Ijzendoorn & DeWolff, 1997). Moreover, the paternal behaviors predicting secure attachment have been found to match the maternal behaviors predicting secure attachment (Bretherton, 2010; Main & Weston, 1981; Lamb & Lewis, 2013). A meta-analysis investigating the potential change of the association between paternal sensitivity and infant-father attachment across time, implied that higher levels of paternal sensitivity were associated with better infant-father attachment security. Despite assumed changes in paternal role patterns, however, the results did not suggest stronger associations between paternal sensitivity and infant attachment in more recent studies (Lucassen et al., 2011). Empirical findings have shown that positive social and cognitive outcomes in children are related to the degree of fathers' sensitive and responsive parenting behaviors. Two US studies indicated that fathers' observed sensitivity and intrusiveness with children at ages two and three predicted their cognitive and social development at ages three and five (Cabrera et al., 2007b; Tamis-LeMonda et al., 2004).

In the present thesis, attachment based observational measures of sensitive and responsive parenting behaviors are applied to the father-child interactions during structured interaction tasks. The strange situation and the subsequent attachment

classification were not conducted as part of the BONDS study and are thus not subjects of investigation in the current work.

1.4 Direct observation of parent-child interaction

It is the observations that are closest to reality. The more one abstracts from them the more exciting indeed are the conclusions one draws and the more suggestive for further advances, but the less one can be certain that some widely different viewpoint would not do as well.

Sir George Thomson; The Inspiration of Science (1961, p.74)

In conformity with its theoretical frameworks, the current thesis is heavily based on data stemming from direct observation of parent-child interaction. When researching the mechanisms of social interaction, direct observation is a method of great value, and it plays a significant role in advancing our understanding of the dynamics of family interaction (Aspland & Gardner, 2003; Margolin et al., 1998). Direct observation can be conducted by being present in the situation or by means of video recording. It is especially suitable when investigating interaction involving children too young to otherwise provide relevant information regarding their own behaviors. As observational methods generally are expensive and time consuming, parent reports are frequently used to measure how children behave during interaction. However, parents often have limited experience in knowing what to look for, they have to rely on their memory, and when answering questions about their child's behavior, parents tend to be individually specific and also influenced by mood, attitude towards the child, and expectations regarding the study (Aspland & Gardner, 2003, Gardner, 2000, Patterson & Reid, 1984). Moreover, comparison between behavior observations and parent interview measures of parenting practices usually show low mutual agreement (Dishion & Patterson, 2006). By watching how parents and children actually interact with one another, rather than relying on parental descriptions of the interactional process, we may learn more about fundamental

dimensions of the interaction (Margolin et al., 1998). Data from systematic observation of interaction is generally regarded as more objective than data collected from questionnaires or interviews in retrospect, while combining observational data with data from questionnaires and interviews will provide a wide range of information and a broader foundation for data analysis (Bakeman & Gottman, 1997).

Observational data has been called “*a natural bridge between qualitative and quantitative research methods*”, because the raw material provides a close to limitless reservoir for descriptive complexity which simultaneously can be operationalized into quantitative constructs (Margolin et al., 1998). Direct observations of interactional processes constitute a rich source for generating research questions as well as testing hypotheses. Observational data may also offer a suitable means to study how family members’ behavior changes as a function of the ongoing interaction, and how behavioral sequences unfold across time. Dependent on the research question and the behaviors of interest, the employment of direct observation as a data assessment tool requires meticulous planning and a multitude of considerations (Margolin et al., 1998; Nordahl, 2012). The location and situation are two salient issues to consider when conducting direct observation, as these factors will strongly affect the behaviors emerging from the situation (Aspland & Gardner, 2003). To study interaction as it normally occurs in the home or in the day care center, it is essential to observe in those very same settings. On the other hand, if the goal is to compare behaviors across observations, it is necessary to minimize the influence of differences in the physical environment, and the observations are thus usually conducted in so called laboratory settings. Furthermore, the situation may be structured or not; specific tasks can elicit certain behaviors of interest. Decisions regarding task and setting also need to be made with sensitivity to questions of external validity (Gardner, 2000). For some research questions, the goal is to optimize generalizability to spontaneously occurring behaviors in the real world. For other types of research, the main purpose might be to test the limits of behavior rather than to elicit frequently occurring behaviors (Margolin et al., 1998).

1.4.1 Micro and macro perspectives

The interaction observed can be transformed into quantitative data from diverse perspectives; with a macro perspective, global impressions of behavior or interaction quality may be captured, while with a micro perspective, the moment-to-moment flow of behaviors can be recorded (Bell & Bell, 1989; Nordahl, 2012). With macro coding, coders make a direct inference about the value of the concept of interest from the family member's behavior. The measurement theory is implicit in the coding, and the coder makes the judgment, usually on a Likert rating scale, from descriptions in a manual and based on the observed behaviors. With micro coding, each explicit behavior of interest is coded, the codes are described in a manual, and they are mutually exclusive, and they can be clearly seen or heard. Little judgment is made by the coder about the value of the concept of interest, and the process of measuring the theoretical concept with a micro measure is thus more explicit and exact than using macro coding (Bell & Bell, 1989).

Applying both macro and micro measures to the same observations can help clarify theoretical concepts and strengthen measurement (Bell & Bell, 1989). Which method is preferred will depend among other factors on the research question. Whereas rating scales answer questions such as the degree to which the child is actively exploring the environment, more detailed methods of systematic observation is needed if we want to know how the child explores the environment, and whether the child's exploration changes based on the parent's behavior (Bakeman & Gottman, 1997; Nordahl, 2012). The micro social observational methodology and the recording of moment-by-moment interchanges between parents and children has been critical in developing and evaluating the SIL-model (Forgatch & DeGarmo, 2002; Patterson, 1982). Likewise, the development of global rating scales to capture parents' sensitivity and responsiveness to the child's signals and cues has been salient when investigating parental factors related to children's types of attachment relationships with their caregivers (Ainsworth et al., 1978; DeWolff & van Ijzendoorn, 1997). In the current thesis, both micro measures derived from social interaction learning theory, and

macro measures based on attachment theory, were applied to the observed parent-child interaction.

1.5 Aims of the thesis

The overarching aims of this thesis are to gain more knowledge about the characteristics of early father-child interaction, to explore associations between fathers' behavior during interaction with their one-year-olds and child behavioral adjustment at two and three years, and to investigate possible father, child, and contextual factors related to the quality of fathers' parenting behaviors. As noted in previous sections, the current thesis builds on a substantial and growing body of research regarding the many ways in which fathers of today are involved in their children's lives, and how father involvement affects children's daily lives and development. This thesis aims to expand this literature by exploring significant aspects of fathers' parenting during interaction with their *one-year-olds*, by employing *multiple observational methods* to video-taped structured interaction tasks derived from two *diverse theoretical frameworks*, and by conducting this research within a *cultural context* where fathers are encouraged and financially reimbursed to spend substantial time with their infants.

1.5.1 Research questions and hypotheses

Paper I

The aim in Paper I was to better understand the characteristics of parents' and one-year-old children's behaviors during interaction in a cultural context of family supportive social policies. Based on micro social measures of parents' and children's behaviors, the following research questions were investigated:

- 1) Is there within-family concordance in mothers' and fathers' behaviors with their child, and in children's behaviors with their mother and father? Mixed results from earlier research left us with no specific hypotheses for this research question.

- 2) Are there differences between mothers' and fathers' behaviors with their child, and do mothers' and fathers' behaviors differ dependent on child gender? On the basis of former results, we predicted that mothers would verbalize more than fathers (e.g., Leaper et al., 1998), that fathers would display more play-related behaviors than mothers (e.g., Lamb, 2010), and that fathers would differentiate more between girls and boys compared to mothers (e.g., Lytton & Romney, 1991).
- 3) Are there differences between girls' and boys' behaviors with their parents, and do girls' and boys' behaviors differ dependent on parent gender? For children's behavior at this age, we found little support in the literature for formulating hypotheses regarding gender differences.

Paper II

The aim in Paper II was to contribute to new knowledge about the relationship between fathers' time spent with infants during their first year, fathers' parenting behaviors during interaction with their one-year-olds, and children's later social competence and problem behaviors. Based on paternal leave policy intentions, and earlier research, the following hypotheses were tested:

- 1) Higher quantities of fathers' time spent with infants the first year will be associated with better child outcomes at ages two and three, controlling for mothers' time with the infant, socio-demographic characteristics, and child temperament.
- 2) Observed quality of fathers' behaviors during interaction with the child at age 1 will moderate the impact of time spent with the infant such that more time with positively engaged and/or sensitive fathers will benefit child behavioral adjustment, and conversely, more time with coercive and/or intrusive fathers will have a negative impact on later child adjustment.

Paper III

The aim in Paper III was to investigate predictors of fathers' sensitivity and negative reinforcement as observed during interaction with their one-year-olds by examining the following research questions:

- 1) Are the factors associated with fathers' sensitivity and negative reinforcement the same, or do they differ between parenting domains?
- 2) Are the associations between fathers' parenting behaviors and fathers' stress, support or depressive symptoms moderated by the children's temperament, observed behavior or gender?
- 3) Does the time fathers spent with their infant during the first year moderate the impact of paternal stress, support or depressive symptoms on their observed parenting strategies?

2. Method

2.1 The Behavior Outlook Norwegian Developmental Study

The data utilized in this thesis were drawn from the Behavior Outlook Norwegian Developmental Study (BONDS), a longitudinal study tracking children's social development from 6 months. The study is guided by Bronfenbrenner's social-ecological framework (Bronfenbrenner, 1979) and the social interaction learning model (Dishion & Patterson, 2006; Reid et al., 2002). The social-ecological framework addresses the interaction between individual, family, community, and institutional factors related to parenting and children's adjustment, and it takes into account the complex interactions between multiple individual and environmental circumstances. The social interaction learning model draws on ecological and transactional principles holding that children's behavioral adjustment is directly affected by parenting practices and by transactional patterns of family interaction. The BONDS was designed to include extensive and frequent multi-method, multi-informant measures of the main focal variables; children's behavior problems and social competence, extensive measures of related developmental processes, interpersonal interactions with parents and peers, and appropriate measures of a wide range of direct or indirect influences. (Nærde, Ogden, Janson, & Zachrisson, in press).

2.1.1 Participants

Recruitment of the BONDS' participants took place through child health clinics in five municipalities in 2006 - 2008. At the five-month check-up, the parent(s) were informed about the study and asked by the nurse if they would agree to be contacted by one of the study's interviewers. Norwegian child health clinics are public and free, and attended almost universally. The eligible families (child of approximately six months of age, and at least one parent able to participate and to speak Norwegian)

who agreed provided their contact information, and were later contacted by a locally hired interviewer who arranged for a personal interview when the child was six months. Parents of 1931 eligible children were informed about the study, of which 1465 (76%) agreed to be contacted, and subsequently 1159 (60%) agreed to participate and came to the six-month assessment (559 girls and 600 boys). The overall retention rate has been very high: 1137 (98%) of families attended the age one assessment and 1132 (97%) were still participating at the age three assessment.

Randomly drawn from the BONDS' larger sample, participants in Paper I's sample included mothers and fathers of 39 families (20 girls, 19 boys) from which both parents were asked to participate in structured interactions with their child. Mothers' mean age was 31.8 years (*SD* 4.7) and fathers' 33.5 (*SD* 4.9). Altogether, 25 (65%) mothers and 20 (52%) fathers had university or college education, and 33 (87%) mothers and 37 (95%) fathers were employed. The sample closely resembled two-parent families in the population with regard to age and employment status. However, a higher proportion of parents had college or university education compared to the general population (Statistics Norway, 2012). Comparing demographic variables, families with girls did not differ significantly from those with boys, and mothers did not differ from fathers. Paper II was based on the original BONDS sample, and made use of all available data from all participating children at six months ($N = 1159$). We compared participating parents with anonymous records of all eligible families on key demographic variables (i.e., child's gender and birth order, parents' birth country, parents' age at child's birth, marital status and education) and found the only difference was that mothers in the sample had higher education. Finally, Paper III's sample consisted of father-child dyads who participated in structured interaction tasks at the one-year assessment. A total of 839 fathers came to the assessment, a total of 750 (89%) participated in structured interactions. Compared to nonparticipant fathers, fathers who agreed to participate in father-child interactions were typically older, better educated, lived in better housing, and spent more time with their infant during the first year. Twenty-four of the parent-child interactions could not be coded due to

poor technical quality or incomprehensible language. Thus, the final sample in Paper III consisted of 726 fathers and their one-year old children (52% boys).

2.1.2 Data collection procedures

The BONDS study is conducted with father- and mother focused data collection waves. At six months both parents were invited to the interview, at one and three years fathers were invited in particular, and at two years mothers were invited to participate. The data included in this thesis were assessed by personal interviews with the parents when the children were six months, and one, two and three years old, by video-taped observations of father-child interaction when the children were one year, and by preschool teachers' ratings of the children's behavior in the day-care centers at two and three years. In paper I, observational data from the one-year video-taped structured interactions and demographic variables from the six-month and one-year interviews were included. In Paper II, data from all the above mentioned data waves, assessment methods, and reporters, were included, whereas Paper III utilized data from parent interviews at six months and one year, and observational measures from the father-child interactions at one year. An overview of the variables included in the current thesis is provided in Appendix A, Table 1.

2.2 Observational methods

The current thesis rests heavily on variables derived from observational data and a more detailed description of the structured interaction tasks, coding schemes and procedures than provided in the separate papers is therefore needed. The meticulous process involved in selecting appropriate tasks, selecting and adapting adequate coding systems, training and managing coders, and in general making the observational assessment approach suitable, manageable and feasible, calls for some elucidation (Margolin et al., 1998; Nordahl, 2012). In collaboration with international researchers holding expertise in observational methodology and child developmental research, the structured interaction tasks and coding strategies were selected and

adapted to fit the main research questions of the BONDS as well as the participating children's age. The observational methodology was conducted for the BONDS' parent-child interactions when the children were one, two, and three years. This thesis makes use of observational data from the one-year assessment, and thus, descriptions in the following specifically concern children this age. Due to financial and practical limitations, we were only able to observe the children with one parent at each assessment, and father-child dyads were the target group at one year.

2.2.1 Selecting setting and tasks

To comply with the BONDS' main aims both the observational setting and the activities were set up to enable comparisons between families and relevant groups. Thus, a video-observation room ("laboratory setting") was provided at each of the four study sites, to minimize behavior variation arising from differences in the physical environment. By far most families attended the study's locations for their assessment; however, if particular circumstances prevented them from coming, observations were conducted in the family's home. This was not ideal for data validity, but it was one of many necessary efforts to retain as many families as possible in the study.

Following literature review and discussions with international observational experts, structured interaction tasks were chosen based on empirical evidence demonstrating their capacity to elicit variation in parent and child behaviors associated with later child social adjustment (e.g., Gross et al, 2008; Hollenstein, Granic, Stoolmiller, & Snyder, Stoolmiller, Wilson, & Yamamoto, 2003; Shaw, Lacourse, & Nagin, 2005). In particular, toys and equipment were selected to be age appropriate and indifferent to stereotypic gender preferences. A pilot study ($N=30$) was conducted to ensure the tasks' feasibility, the suitability of the toys, and the appropriateness of the instructions to the parents.



Structured interaction tasks included in the one-year assessment (15 minutes):

(1) Free play task (4 minutes)

In this task, parents were asked to play with their child as they liked with a provided set of toys. This task is suitable for “warming up” in front of the camera, there is no pressure to achieve, and parents and children generally find this task pleasant. The task elicits variation in behaviors such as play initiatives and give-and-take interaction. For example, parents may be positively engaged in play interactions, or they may sit and watch while the child plays.

(2) Clean up task (2 minutes)

In this task, parents were given a big empty box, and instructed to put the toys away. They were told that their child could help but was not required to. This task is more demanding as it elicits variation in whether and how parents choose to involve the child, and it may elicit the child’s frustration when the toys are put away and thereby also affect the parent’s response to the child’s frustration. For example, parents may put the toys effectively away, and spend the remaining time preventing the child from taking the toys out of the box, or they might involve the child in playful interaction while cleaning up the toys.

(3) Structured play task (2 × 3 minutes)

In this task, parents were presented with two sets of toys, a shape sorter box and a set of stacking rings. They were asked to help the child as much as they thought necessary with one toy at a time. After 3 minutes, the interviewer enters the room and says: “*you may now change toys*”. Although the parent is told in advance that there is

no need to complete the assignment (i.e., get all the blocks into the box or all the rings stacked correctly), this task involves a mild pressure to achieve. With intent, both toys are somewhat difficult to complete for most one-year-olds. Consequently, it elicits variation in whether and how the parents chose to help the child master the task, it may produce variance in children's motor skills and sustained attention, as well as frustration or resistance from both parent and child. For example, if the child attempts to take the lid off the putting box instead of putting the blocks through the holes, the parent may hold on to the lid to prevent the child from taking it off, or they may let the child explore the lid and then try to reengage the child in the task.

(4) High chair task (3 minutes)

In this task, the child was placed in a high chair with no toys to play with while the parent answered a questionnaire regarding the child's sleep during the last 24 hours. The high chair was faced away from the parent and towards the camera, and so far away that the parent had to leave his/her chair to touch the child. The parent is told that he/she may say or do anything to comfort his child if he or he/she gets upset, except giving the child anything to play with. The parent is also reminded that he may choose to discontinue the task at any point. This task may elicit variation in children's reaction to being constrained with no toys, in their ability to regulate emotions, and in the parents' way of attending to the child's signals and needs. For example, parents may talk calmly to the child about what they are doing to keep the child from getting frustrated, they may be inattentive to the child's fuss, or they may be anxious and tense and talk about what a terrible situation this is. Altogether seven parents (fewer than 1%) chose to remove their child from the chair and discontinue this task.

To elicit behaviors of interest and to ensure minimal environmental influences, both the structure of the tasks and the instructions given to the parents are of vital importance. Prior to conducting the observations the interviewers were trained via practice and role play in how to conduct the tasks, and set up equipment and toys, as well as how to provide standardized directions to all participating families, and to

make the family members feel welcome and safe. For more details on instructions to interviewers, see assessment protocol in Appendix B. Immediately following the tasks, the child received a gift toy, and the parent was given the opportunity to debrief the tasks, make comments, or to ask questions to the interviewer.

2.2.2 Selecting coding strategies

A fundamental decision when selecting a coding strategy is whether an existing coding system adequately addresses the study research questions or whether it is necessary to develop a new system (Bakeman & Gottman, 1997; Margolin et al., 1998). When using a system already developed, advantages may be that the reliability of the system is established, that new findings may be understood in the context of previous findings, and that validity data, if relevant to current research questions, simplify validation in the new study (Margolin et al., 1998). The decision to utilize two substantially different coding strategies from diverse theoretical frameworks in order to capture the behaviors of interest from the BONDS' structured interactions was informed by study aims, former research and expert advice. A micro social coding strategy derived from SIL-theory and developed at Oregon Social Learning Center (OSLC) was selected to capture the moment-to-moment behaviors during interaction in real time. This coding strategy corresponds with the theoretical framework of the BONDS, and is well suited for recording behaviors and interactional processes salient to children's behavioral adjustment (Patterson, 1982; Bakeman & Gottman, 1997), however, it had to be adjusted to the BONDS' children's age. Micro social coding allows for a variety of ways to represent the data, from simple frequencies and duration, to more sophisticated sequential measures.

The global rating scales were selected after evaluating several coding schemes based on their clarity in defining the dimensions of parent, child and mutual behaviors, and how well the manual described behaviors within each dimension and distinct scoring criteria. The rating scales of parent-child interaction from 3-15 months from the US National Institute of Child Health and Development's (NICHD) Study of Early Child

Care and Youth Development (SEED) met the criteria (Cox & Crnic, 2003). These scales are also widely used with this age group. In the following, the adaptation of the two coding strategies is described in the order they were adopted and applied; for a full description of codes and rating scales, see coding manuals in Appendix B.

Adapting and adjusting the micro social coding strategy from OSLC

The micro social coding strategy applied to the BONDS' observed parent-child interactions was adapted and revised from the Family and Peer Process Code (FPPC; Stubbs, Crosby, Forgatch & Capaldi, 1998). The FPPC was developed at OSLC, where observational research on coercive family process and children's aggressive behaviors has been conducted for several decades (Reid et al., 2002). This coding system consists of four dimensions, three of which are simultaneously recorded at all times: (1) activity, which refers to the setting, (2) content, which records the individual's behavior, and (3) the observed expression of the individual's affect. There are 24 content codes, eight positive, nine negative, and seven neutral. They are further divided into verbal, vocal, nonverbal, physical, and compliance behaviors. Affect is recorded with every content code and has six ratings: happy, caring, neutral, distressed, aversive, and sad. The different codes are thoroughly described in a coding manual (Stubbs et al., 1998). Coders receive extensive training before they are allowed to code study data, and are continuously checked for inter-rater agreement. The FPPC has been used to record data from parent-child and peer interactions in numerous studies, and there are extensive data on the reliability and validity of the single codes and constructs derived from this coding system (e.g., Forgatch & DeGarmo, 2002; Forgatch, DeGarmo, & Beldavs, 2005; Patterson, 1982).

In adapting and revising the FPPC into the Toddler and Parent Interaction Coding System (TOPICS; Nordahl, Duckert, & Bjelland, 2007) to comply with the BONDS' children's age, the basic structure from FPPC was maintained in dividing codes into positive, neutral and negative categories, and also maintaining the verbal, nonverbal and physical aspects. Content and affect are still applied categories, and activity codes are used to indicate whether the participants are following instructions of the

given task. The changes made to the coding system were mainly in the definitions of the content and affect codes, in order to be applicable with the behavior and affective expressions of a one-year-old child. Compared to the FPPC target age group (children 4-12 years old), one-year-olds typically communicate by various nonverbal behaviors such as pointing, touching and non-verbal utterance, instead of using verbal language, which in most one-year-olds is not yet developed. To deal with this issue, more specific descriptions of nonverbal communication and give-and-take interaction were incorporated into the code descriptions. Moreover, the parent behaviors were further exemplified to cover behaviors occurring during interactions. More specific physical content codes were added, and this coding system includes more positive codes, both due to the children's age and to the BONDS' study aims, which in addition to investigating the development of externalizing problem behavior also implies investigating the development of social competence. To attain reliable coding for the TOPICS, coders trained in FPPC with older children performed trial coding of pilot study interactions until establishing stable and acceptable inter-coder reliability within the team. Construct validity was checked by comparing observed measures with parent reports of similar measures.

The Toddler and Parent Interaction Coding System (TOPICS)

The TOPICS includes 27 mutually exclusive behavior codes classified as verbal (e.g., parents' talk or children's babbling), nonverbal (e.g., play with toys, gestures such as "give-me-five"), or physical (e.g., parent holding child, child crawling away) behaviors. Across these categories, behaviors are defined as positive (e.g., praise, offer a toy to the other, give a hug), neutral (e.g., vocal uttering with no meaningful words, solitary play, parent picking up child), or negative (e.g., verbal disapproval, take a toy from the other, physical aggression). Expressed positive, neutral or negative affects are coded for each behavior based on tone of voice (e.g., warm, neutral, harsh), facial expressions (e.g., smile, flat, frown) and body language (e.g., relaxed, calm, tense). Interactions are coded in real time, providing information on initiator, behavior (or content), recipient, and expressed affect in five digit codes. For example, the code "17122" translates: boy initiates positive nonverbal to father with

positive affect (the boy probably holds out a toy to his father while looking content). The next code might read “20111”, which translates: father gives positive response to boy with happy affect (the father probably takes the toy that he is handed while smiling). The exclusive behavior codes can subsequently be combined into sequential behavior chains including both child and parent behaviors. For more details, see TOPICS coding manual in Appendix B.

For the TOPICS coding, a team of 5 coders, mostly students, were recruited to work 10-15 hours weekly, and trained for 4-6 months before obtaining the required inter-rater agreement (75% agreement; Cohen’s Kappa $\geq .70$) and allowed to code study data. Coders were kept blind to other information about the families. One experienced coder was appointed team leader, and left in charge of distributing coding assignments, conducting inter-coder reliability checks, and managing biweekly team meetings. At these meetings, reliability between coders was monitored by watching tapes, discussing single codes with low agreement from last week’s coding assignments, and deciding on the appropriate code in each case. During the coding period three coders had to be replaced, and the training of new coders during two separate time periods delayed the completion of the micro coding. All together eight coders (one male/seven females; age range 23-30 years) were involved in the TOPICS coding of the parent-child interaction with one-year-olds, which started early February 2009 and was completed by October 2010.

Adapting the global rating scales from the NICHD SECCYD

For global measures of the interaction at one year, the *Qualitative Ratings for Parent-Child Interaction at 3-15 Months of Age* (Cox & Crnic, 2003) was adapted and applied. After evaluating several coding schemes were found to meet the proposed criteria. Permission from the authors to use the instrument was obtained, and collaboration regarding reliability and validity prior to coding study data was established. Initial training tapes were transcribed and coded in collaboration with the NICHD SECCYD collaborators before arranging training sessions for Norwegian coders. This rating system includes 7 parent scales (i.e., intrusiveness, detachment,

sensitivity/responsiveness, positive regard, negative regard, animation, stimulation of development), 4 child scales (i.e., positive affect, negative affect, activity, sustained attention) and one dyadic scale (dyadic mutuality). Scores are based on both quantity and quality of observed behaviors and rated on a Likert scale ranging from 1 (*not at all characteristic*) to 5 (*highly characteristic*). For more details, see manual for NICHD global ratings in Appendix B. The construct validity of these global measures, especially the parent scales, has been tested in several studies over more than a decade; the measures have been applied to children aged 3 to 15 months, with mothers and fathers, and within samples from both at risk and general populations (NICHD Early Child Care Research Network, 2000; Cabrera et al., 2007b). In the current study, however, the tasks are different from those generally conducted in other studies (three different toys; 10 minutes play); thus, measures have not been previously validated with the current tasks.

The global ratings were obtained during two separately rated segments (a total of 12 minutes): 1) the free-play and clean-up tasks (6 min), and 2) the structured play task (6 min). Six coders were trained until reliability criteria were met; subsequently reliability was monitored in biweekly team meetings. Intra-class correlations (ICC) for single scales included ranged from .65 to .74. Trial ratings with the global scales were performed in the late fall of 2010. A coding team consisting of three coders from the TOPICS team and three additional coders was established in January 2011. Inter-rater reliability was at first hard to establish, as the coders were accustomed to the accuracy of micro codes and the global ratings implied judgments. The global ratings for parent-child interactions at one year were completed by February 2012.

Reliability between coders

For both the TOPICS micro social coding and the NICHD global ratings, reliability was carefully monitored in biweekly meetings, and reliability checks were randomly drawn from different coding periods to ensure stability in coding. Inter-coder reliability for the micro measures was measured by *percent agreement* (the percent of codes two coders agree on) and *Cohen's Kappa* (a measure which takes into account

the possibility of agreement by chance), both calculated within a 6 second time frame. The meaning of Kappa varies as a function of the base rate of the key behavior (Yoder & Symons, 2010). In the current study, overall coder agreement for 20% of the interactions randomly selected for reliability checks was 77%, and the Cohen's Kappa was .74. According to generally accepted guidelines, Kappa's from .40 to .60 are considered fair, Kappa's from .60 to .75 are considered good, while Kappa's above .75 are considered excellent (Fleiss, 1981). Inter-coder reliability for the global ratings was measured by *Intra-class Correlations* (ICC). This measure provides score of the relative variance within and between subjects (Yoder & Symons, 2010). In the current study, ICCs for 15% of the interactions on single scales included ranged from .65 to .74. As a benchmark, coefficients greater than .60 are considered acceptable, and a coefficients of .70 as very good, consistent with previous reports of satisfactory levels of inter-rater reliabilities (Mitchell, 1979).

2.3 Measures

An overview of all included variables in Papers I, II, and III, is provided in Appendix A, Table 1.

2.3.1 Observed behavior variables

As outcome variables in Paper I, data derived from the TOPICS micro coding of parent-child interaction were analyzed as summarized frequencies of specific behaviors for *parents* and *children* separately. In order to investigate the overall occurrence of the behaviors of interest, data were aggregated across all tasks. Two composite variables were calculated to measure the affective quality of engagement. *Positive engagement* included all positive behaviors with positive or neutral affect and all neutral behaviors with positive affect. For example, offering a toy (positive nonverbal behavior) with a neutral facial expression (neutral affect) was regarded positive engagement, as was picking up the child (neutral physical behavior) with a smile (positive affect). *Negative engagement* included all negative behaviors

irrespective of affect, and all positive or neutral behaviors with negative affect. For example, offering a toy (positive nonverbal behavior) with an angry facial expression (negative affect) was regarded negative engagement, as was verbal disapproval (negative verbal behavior) with a neutral voice (neutral affect). In addition, three variables representing the sum of all behaviors within distinct domains were calculated: *verbal behavior*, *nonverbal behavior*, and *physical behavior*.

Fathers' positive engagement was also utilized as a predictor variable in Paper II. For description and examples, see above paragraph. As predictor variable in Paper II and outcome variable in Paper III, *fathers' negative reinforcement* was a theoretically based micro-social sequential score defined by the frequency of a father-initiated negative behavior (e.g., takes away toy, physically prevents child from moving, says "don't do that") that is reciprocated by a child negative behavior (e.g. throws toys, fusses, kicks, cries) within a 6 second time frame and subsequently is followed by at least 12 seconds of no aversive exchanges. In these sequences, the child has the last aversive behavior in the chain of events. Thus, the child's negative behavior is rewarded when the father terminates his initiated aversive behavior (Patterson, 1982). The negative reinforcement variable was obtained from the TOPICS coding and based on prior research (DeGarmo, 2010; DeGarmo & Forgatch, 2007). The negative reinforcement score was significantly skewed and therefore log-transformed ($M = 0.59$, $SD = 0.56$, $Skew = 0.41$, and $Kurtosis = -0.88$). For Paper III, a micro coded measure of observed father behavior was included as a predictor variable. *Fathers' verbal instructions* were calculated as the total number of utterances with an instructive, teaching or labeling content across all tasks. To ease interpretation, scores were centralized and divided by 10 so that one unit change indicates an increase of 10 instructive utterances from the mean.

Derived from the NICHD global ratings of parenting dimensions (rating tasks 1-3 in 2 separate segments), *father sensitivity* was a composite score derived from the NICHD global rating scales (Cox & Crnic, 2003), and entered as predictor variable in Paper I and outcome variable in Paper III. Based on prior studies (NICHD Early

Child Care Research Network, 2000; Cabrera et al., 2007b), Exploratory Factor Analyses and subsequent Confirmatory Factor Analyses were conducted for the 7 global parent scales to investigate the basis for constructing one measure of sensitive parenting for the purpose of our study (for each coded segment: a principal components eigenvalue with varimax rotation = 3.24 and 3.22; respectively, Cronbach's $\alpha = .83$ and $.80$; for the comprised scale: a principal components eigenvalue with varimax rotation = 3.41; respectively, Cronbach's $\alpha = .85$). The global ratings showed good fit for a 4-item sensitivity measure comprised of *sensitivity/responsiveness* (sensitive to child signals, responsive to child cues), reversed *detachment/disengagement* (lack of engagement with child), *positive regard for the child* (physical affection, warm voice, smiles), and *stimulation of development* (engage in age-appropriate behaviors that foster cognitive and physical development): CFI = 1.00, TLI = .99, RMSEA = .012. Utilized as a single scale and entered as a predictor variable in Paper II, *father intrusiveness* rating which was correlated .55 across the coded segments. Two globally rated variables measuring child behavior during father-child interaction were included as predictors in Paper III. *Child activity level* measures the extent to which the child exhibits motor activity during observation and includes judgment of the speed (moving fast, squirming), the frequency (spending a lot of time in high-energy activities), the intensity (shaking, bouncing or kicking vigorously), and the duration of motor activity (persisting in energetic activity longer than other children). *Child sustained attention* during interaction were rated based on both intensity and duration, this scale measures to which extent the child exhibits thorough, sustained exploration of an object or activity, or appears clearly involved, interested and focused with people or objects.

2.3.2 Relations between observed behavior variables

In accord with the literature (Hadley, Stewart, Hunter, Affleck, Donenberg, DiClemente, & Brown, 2012; Waller, Gardner, Dishion, Shaw, & Wilson, 2012), as an initial strategy to check the construct validity of the observational data, Pearson's correlations were conducted *between observational measures* from the two coding

systems to investigate if they were related as would be expected from code and construct definitions. As shown in Appendix A, Table 2, correlations between measures derived from micro and macro coding showed multiple significant correlations in the expected direction, which lends some support to the validity of both systems. Correlations across measures were low to moderate. All correlations were in expected directions. For the *child measures* 13 out of 20 correlations were significantly correlated ranging from $r = .08$ to $r = .46$. All child measures were correlated with two or more child measures from the other coding system, except child positive engagement. However, child positive engagement was correlated with 5 of 6 parent global scales in the expected direction. A total of 26 of 42 *parent measures* were significantly correlated across systems from $r = .08$ to $r = .42$. All parent measures from both coding systems were significantly associated with two or more parent measures from the other, except micro coded parent nonverbal behavior. The micro based sequential score *fathers' negative reinforcement* was significantly correlated with 3 of 4 micro child scores, and with 2 of 6 micro parent scores. Composite variable *fathers' sensitive parenting* was significantly correlated with 3 of 5 micro child scores, and with 5 of 7 micro parent scores.

2.3.3 Father characteristics

In Paper II, we used as a predictor variable, the measure of *fathers' time with their infant* a composite score assessing the amount of time spent with the child during the first year of life, based on two father-reported items at the 1 year assessment: (1) “How many months have you spent at home with your child until now?” and (2) “How many hours per week are you alone with your child?” The composite score was the annualized time with child multiplying reported hours per week times total months during year 1. The mean reported hours alone per week was 13.73 ($SD = 13.23$), the mean number of months was 2.60 ($SD = 2.35$), and the mean annual hours was 38.21 ($SD = 59.45$). The weighted score was significantly skewed and kurtotic, we therefore log transformed the final composite variable which was normally distributed ($M = 3.02$, $SD = 1.25$, $Skew = -0.12$, and $Kurtosis = -0.37$). Also used as a

predictor variable in Paper III, the measure of *fathers' time with their infant* was the number of months he had spent at home with his child during the first year, reported by fathers at the 12-month interview. A cut point was set at below (0) and above (1) 1.5 months (approximately the father-quota weeks).

Fathers' education as predictor variable in Paper III was a measure of their completed education level reported at the 6 or 12 month interview on a 6-category scale: 9-year primary/secondary school; <3-year high school; 3-year vocational high school (12 y); 3-year high school general studies (12 y); 4-year technical college or university degree (16 y); >4 years of technical college or university. The first two categories were merged (few had 9 years of schooling) and five dummy variables were generated. As a control variable in Paper II, *fathers' education* measured years of formal schooling reported when the child was one year old.

Fathers' personality was reported by fathers at the 6-month interview using the 30-item short version of Eysenck Personality Questionnaire (EPQ-I; Eysenck & Eysenck, 1975; Eysenck & Tams, 1990). The EPQ-I measures level of *extraversion*, *neuroticism* and *psychoticism* by summing up 10 dichotomous items (yes/no) for each scale, and these categories were entered as predictor variables in Paper II.

Fathers' age at the 12-month interview was entered as a centralized predictor variable in Paper III; fathers' age in years was calculated by subtracting the interview year from his birth year, which was centralized to the mean age. *Fathers' unemployment* status when the child was 1 year old, coded 0 (*employed*) and 1 (*unemployed*), was used as a control variable in Paper II.

2.3.4 Child characteristics

As an age 2 child outcome variable in Paper II, a mother-reported latent construct of the child's *behavior adjustment* was comprised of three indicators, *Physical Aggression*, *Self-Regulation*, and *Soothability*. The aggression indicator included 7-items measured on a scale from 1 (*never/not in the past year*) to 7 (*more than three*

times daily). Sample items included: *Hits you, Bites other, Kicks other, and Pulls hair* (Cronbach's $\alpha = .76$). The self-regulation indicator was 4 items from the Ages and Stages Questionnaire (ASQ-SE; ASQ; Bricker, & Squires, 1999; Janson, 2003), and included: *Calms down within time period, Cries for long period of time, Has tantrums, Hurts others, and Has preservative behaviors*. Items were measured on a scale from 1 (*most of the time*) to 3 (*rarely or never*). Soothability was a 5-item scale from the Early Child Behavior Questionnaire (ECBQ; Putnam, Gartstein, & Rothbart, 2006) rated from 1 (*never*) to 7 (*always*). Sample items included: *When upset, how often did your child stay upset for more than 10 minutes? Following an exciting activity or event, how often did your child calm down quickly? When upset, how often did your child become easily soothed?* ($\alpha = .61$).

As an age 3 child outcome variable in Paper II, the latent variable construct of father reported *social competence* was comprised of six subscales from the *Social Competence in Preschoolers* questionnaire specifically developed for Norwegian preschool children (Lamer & Hauge, 2006). In total, 31 items are rated from 1 (*very rarely*) to 5 (*very often*). Subscale indicators were: *Empathy and role-taking* (5 items, $\alpha = .78$), *Pro-social behavior* (5 items, $\alpha = .81$), *Self-control* (6 items, $\alpha = .70$), *Self-assertion* (6 items, $\alpha = .60$), *Play, pleasure and humor* (5 items, $\alpha = .79$), and overall *Social adjustment* (4 items, $\alpha = .70$).

After construct evaluation, two indicators defined the child care teacher reported latent construct of children's *externalizing behaviors* entered as age 2 and 3 child outcome variables in Paper II; *Physical Aggression*, and *Noncompliance*, at ages 2 and 3, respectively, each rated at a 7-point scale from 1 (*never/not in the past year*) to 7 (*more than three times daily*). The 7 items measuring physical aggression at both time points were identical with those included in maternal report above ($\alpha = .82$ and $.78$, at age 2 and 3, respectively) except that *Hits siblings* was substituted with *Hits other children*. Noncompliance was measured with nearly identical items, including 7 items at age 2 and 10 items at age 3, rated from 1 (*never/not in the past year*) to 7 (*more than three times daily*). Sample items included: *Is very loud, shouts and*

screams, and *Does not follow rules in the child care center* ($\alpha = .79$ and $.85$, at age 2 and 3, respectively).

A *child temperament* construct reported by mothers at *6 months* was included as a control variable in Paper II. Following data reduction, the child temperament construct was comprised of two indicators from the Infant Behavior Questionnaire (IBQ-R; Gartstein & Rothbart, 2003). *Distress to Limitations* and *Soothability*, each including 7 items, were rated on a modified three-point response format: 1 (*most of the time*), 2 (*sometimes*), or 3 (*rarely or never*), in addition to a *does not apply* option ($\alpha = .77$ and $.76$, respectively, excluding *does not apply*). A third indicator was the *Self-Regulation* subscale from the Ages and Stages Questionnaire (ASQ; Bricker, & Squires, 1999; Janson, 2003). *Self-Regulation* (reversed scale, 5 items), sample item included: *When your child is distressed, is he/she capable of soothing itself within half an hour?* Mothers responded to the items on a 3-point scale scored 0 (*not yet*), 5 (*sometimes*), or 10 (*yes*).

Fathers reported on their *child's temperament* at the *12-month* assessment using the EAS Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984), which includes four dimensions of temperament: (1) Emotionality (5 items) - the tendency to become aroused easily and intensely; (2) Activity (4 items) - preferred levels of activity and speed of action; (3) Sociability (4 items) - the tendency to prefer the presence of others to being alone; and (4) Shyness (4 items) - the tendency to be inhibited and awkward in new social situations. Items were rated on a 5-point scale from 1 (*not characteristic or typical of your child*) to 5 (*very characteristic or typical of your child*); scores were summed to form the four temperament indicators (Mathiesen & Tambs, 1999), and were entered as predictor variables in Paper III.

An indicator of children's *communicative risk* was entered as a predictor in Paper II. At the 12-month assessment, fathers reported on 5 of the original 6 items from the communication subscale of the Ages and Stages Questionnaire (ASQ; Bricker, & Squires, 1999; Janson, 2003). The items were scored on a 3-point scale (*not yet*; *sometimes*; *yes*). The score has been transformed to the traditional 0-60 scale, and a

cut point indicating *risk for communicative delay* was set at 15 points following the manual recommendations (Bricker, & Squires, 1999; Janson, 2003).

A measure of *child gender*, coded 0 (*girl*) and 1 (*boy*), was entered as predictor variables in Paper I and III, and as a control variable in Paper II. The multiple regression analyses in Paper III were adjusted for *child age* in months during observations (centralized to mean), *twin* (1), *low child birth weight* (<2,499 g), as well as *child developmental difficulties*, reported at 6 and 12 months, including hearing, vision or motion impairments (N = 21), other congenital disabilities (N=2), or preterm birth >3 weeks (N = 62).

2.3.5 Family characteristics

As control variables in Paper II, *mothers' education* (years of formal schooling reported when the child was one year old) and *mothers' months with infant* (number of months spent at home with the child the first year). When children were 6 months, fathers reported whether the child was his *firstborn* (1) or not (0). This variable was used as a predictor variable in Paper III.

2.3.6 Contextual factors

Fathers' reported on their *depressive symptoms* at the 12-month interview using the 13-item-version of the Hopkins Symptom Check List (SCL-13), based on the 25-item SCL scale (Derogatis, Rickels, Uhlenhuth, & Covi, 1974; Tambs, & Moum, 1993). Responses range from 1 (*not at all*) to 4 (*extremely*). A mean score was computed (Cronbach's alpha was 0.89), and a cut point was set at ≥ 1.75 , indicating risk for depression, and this measure was entered as a predictor variable in Paper III. Also utilized as predictor variables in Paper III, three self-reported scales captured fathers' perceived *stress and support*. At 6 months, the *Social Support* Scale included 5 items on scales ranging from 1-6 (Dalgard, Bjørk & Tambs, 1995). At 12 months, the *Parental Stress* Scale included 18 items on a 5-point scale (Berry & Jones, 1995), and the *Partner Relationship* Scale included 10 items on a 6-point scale of which 7 were

derived from the Relationship Satisfaction Scale by Blum & Mehrabian (1999; see Røysamb, Vittersø, & Tambs, 2010, for more information).

2.3.7 Relations between observed and parent reported variables

As a second approach to investigate the construct validity of the observational measures, the observed variables and constructs were compared to similar measures derived from other reporters (Hadley et al., 2012; Waller et al., 2012). Pearson's correlations were used to examine associations among *observed behavior* variables and several *parent-reported variables* assumed to be related to the constructs. See Appendix A, Table 3. As expected, correlations were fewer and in a lower range compared to between observed variables from different systems, which is in line with earlier research (Conger, Conger, Elder, Lorenz, Simons, & Whitbeck, 1992; Hadley et al., 2012). For the child observational measures, associations with child gender, temperament, communicative skills, and developmental difficulties, were investigated. For the global rating scales, 3 of 5 child scales were significantly correlated with parent reported child characteristics. All of the micro child variables were correlated with one or more of the parent reported variables. None of the observed variables correlated with child sociability. A total of 8 out of 42 micro scores, and 7 out of 35 macro scores were significantly correlated with a parent reported variable, ranging from $r = .08$ to $r = .20$. Associations between father behavior measures and self-reported reported measures of fathers' age, education, personality, poor housing and if the child was fathers' firstborn were investigated. For the parent behavior measures depicted in Appendix A, Table 4, seven of 42 micro scores were significantly correlated with self-reported measures, and 12 of 56 possible correlations. As the highest number, 7 out of 14 observed behavior measures were associated with fathers' education, while none of the observational measures were correlated with fathers' neuroticism. Correlations ranged from $r = .08$ to $r = .19$.

2.4 Statistical methods

In **Paper I**, initial bivariate correlations were performed to determine whether parent or child behaviors covaried with parents' age, education or employment status. Parents' verbal behavior and length of education correlated positively ($r = .23, p < .05$), whereas children's nonverbal behaviors were negatively correlated with parents' employment ($r = -.24, p < .05$). Further analyses were performed without and with controls for confounders by means of partial correlations and ANCOVAs. As the results were substantially identical, we report results from the unadjusted analyses. Parents' and children's behavior concordance within families and within dyads were investigated by conducting bivariate correlations. We did not correct significance levels for multiple tests out of concern for statistical power and a too increased risk of false negative findings (Type I error). Seven of the 20 correlations we tested were statistically significant at $p < .05$; many more than expected by chance (i.e., about 1 of 20 correlations at $p < .05$). To investigate possible gender differences in parents' and children's behaviors we employed two-way ANOVA's with a 2×2 factorial design. We conducted separate analyses for all parent and child behavior variables with both parent and child gender as independent variables, and tested the possibility of an interaction between parent \times child gender. As a measure of effect size we calculated Cohen's d for group differences. Again, we did not correct significance levels for multiple tests out of concern for statistical power and an increased risk of false negative findings. Three of the 10 ANOVAs were statistically significant at $p < .05$; more than the chance expected finding (i.e., about 1 of 20 tests at $p < .05$). All analyses were performed with SPSS, Version 20.

In **Paper II** the main study hypotheses were tested with *structural equation modeling* (SEM) in the MPlus7 program (Muthén & Muthén, 1998-2012). SEM is a model testing approach whereby the theoretical model's implied variance and covariance matrix' are compared to the variance and covariance from the observed data (Bollen, 1989). In structural equation models with latent variables, the measurement model and the structural (regression) model are compared, and several different indices of

model fit are available. Fit indexes indicate the degree of fit between the hypothesized and actual variance and covariance in the data, and are vital for evaluating the adequacy of the model. It is recommended that adequate model fit for large sample sizes be indexed by a root mean square error of approximation (RMSEA) close to or below .06, a standardized root mean square residual (SRMR) below .08, and a Tucker Lewis index (TLI) of greater than .90 (Hu & Bentler, 1998). Main effects hypotheses were tested by regressing latent variables for child outcomes on father involvement and fathers' parenting behaviors.

Given the probability of missing data were related to the observed variables, the mechanism of missing data is considered as missing at random (MAR) or ignorable missingness with inclusion of key covariates (Enders, 2010). Following recommendations for the MAR data mechanism (Jeličić, Phelps, & Lerner, 2009), The SEM models were estimated with full-information maximum likelihood (FIML) which uses all available information from the observed data in handling missing data. FIML estimates are computed by maximizing the likelihood of a missing value based on observed values in the data. Furthermore, for data reduction and latent variable construct building, we employed factor analyses in structural equation modeling with model trimming criteria (Eddy, Dishion, & Stoolmiller, 1998). Constructs were required to have internal consistency of scale items with alphas above .60, item-total correlations above .20, scale convergence in the structural equation model greater than .35, and acceptable fit. To specify tests of fathering behavior as a moderator of father involvement, variables were entered in the multivariate model as centered first order terms and centered cross products of fathers' time with infants and the respective observed parenting scores (Cohen, Cohen, West, & Aiken, 2003).

In **Paper III** we conducted bivariate and multiple regression analyses to investigate predictors of fathers' sensitivity and negative reinforcement during interaction with one-year-olds. All analyses were performed with SPSS, Version 20, and missing data were imputed using the expectation maximization (EM) algorithm. Missing data for each variable and descriptives before and after data imputation are displayed in the

paper's Table 1. As the EM algorithm does not impute categorical values, system-missing values were coded as 0 before the imputation for 15 children on the premature measure used in the developmental difficulties measure and for 6 fathers on the SCL scale. Initially, a correlation analysis was conducted to investigate the relation between outcome variables. To ease interpretation of the results, both outcome variables were Z-transformed prior to the regression analyses. Since the continuous predictor variables do not have meaningful scales, z-scores were also computed before conducting regression analyses for child temperament, observed activity and sustained attention, for father stress and support scales and for personality measures. Thus, the parameter estimates (B) can be interpreted as the percent-wise change in standard deviations on the outcome variable per standard deviation change on the independent variable(s). All analyses were performed separately for the two outcomes. The multiple regression analyses first included the covariates, then the child predictors, and at last the father predictors. We examined the interaction terms separately, controlling for child age, twin status, birth weight and developmental risk.

2.5 Ethical considerations

"Mom, are you sure you are really allowed to do that?" The question came from my at the time 11-year-old daughter who heard some of the one-year-olds cried in the high chair task. She was now seriously worried that we were tormenting the poor infants, and with a reproachful look she demanded an answer. The self-appointed defender of the young research subjects was rightfully complimented for her eagerness to stand up for the babies in distress, and subsequently informed about existing guidelines for research ethics, and about ethical considerations researchers have a responsibility to consider before conducting a research project within the social sciences. Her question was timely; guidelines for research ethics generally urge researchers to show extra caution when observing people's behavior through video observation for research purposes because being subject to observation and

interpretation by others can be experienced as degrading (The National Committee for Research Ethics in the Social Sciences and the Humanities, 2006).

Several actions were taken to ensure that ethical guidelines were followed in the BONDS study, and that study participation felt safe to the families. The participating parents were entitled to desist from participating in the structured interactions at any time, without giving a reason, and without withdrawing from the rest of the study's assessments. At the one-year interview, parents were repeatedly informed that they could choose to discontinue the interaction tasks at any time. Immediately following the tasks, the parents were given the opportunity to debrief the experience, and to ask questions or comment on their experience. The Behavior Outlook Norwegian Developmental Study (BONDS) was reported to the Norwegian Social Science Data Services and approved by the Regional Committee for Medical and Health Research Ethics. The project is based on informed consent of parents, who may withdraw participation and ask for deletion of collected data at any time. The parents were given a NOK 200 compensation for each interview.

3. Results

3.1 Paper I

In this study, we investigated family concordance and gender differences in parents' and one-year-old children's behaviors in a sample of 39 families (20 girls). There were no significant correlations between fathers' and mothers' behaviors for any of the included variables, indicating little within-family concordance in parents' behaviors. However, for children's behaviors, there was a positive association between the negative affective engagement with their respective parents ($r = .45, p < .01$). Moreover, children's behaviors with their mother and father were positively correlated for verbal and physical behaviors (verbal behaviors $r = .40, p < .05$; physical behaviors $r = .42, p < .01$). Children's positive engagement and nonverbal behaviors with their mother and father were not correlated. Mothers' and children's positive engagement, as well as mothers' and children's negative engagement was positively correlated (positive engagement $r = .55, p < .001$; negative engagement $r = .43, p < .01$), as was parents' and children's nonverbal behaviors within both mother- and father-child dyads (mother-child nonverbal $r = .71, p < .001$; father-child nonverbal $r = .64, p < .001$). We found few but noteworthy differences in mothers' and fathers' positive engagement. For the parent behavior variables, there was a main effect for parent gender on parents' positive engagement ($F[1, 74] = 12.31, p < .001, d = 0.68$), indicating that fathers displayed overall more positive engagement than mothers. However, an interaction between parent and child gender revealed that the difference between mothers' and fathers' positive engagement was present merely for parents with boys ($F[1, 74] = 18.54, p < .001$). A test of the simple effects showed that fathers with boys were more positively engaged during interaction than fathers with girls ($F[1, 74] = 19.34, p < .001, d = 1.30$), whereas mothers with girls did not differ in their positive engagement from those with boys. Furthermore, a main effect

for parent gender emerged on the parents' nonverbal behavior ($F[1, 74] = 4.22, p < .05, d = 0.46$), indicating that fathers displayed overall more nonverbal behavior than mothers. Differences in girls' and boys' behaviors were less salient. For the child behavior variables, the only main effect was for child gender on children's positive engagement ($F[1, 74] = 5.30, p < .05, d = 0.53$), suggesting that girls displayed overall more positive engagement than boys.

3.2 Paper II

In this study, we examined the associations between fathers' time at home with the infant the first year, fathers' parenting behaviors during father-child interaction at age one, and the interaction between the two, and child behavioral outcomes rated by multiple informants at ages two and three. Paper II included baseline measures of the full sample ($N=1159$), as well as father-child observations at 12 months ($n=726$) and outcomes at ages two and three years from multiple raters. By using Full Information Maximum Likelihood Estimation (FIML), we estimated models based on the total sample. Contrary to expectations, we did not find main effects of fathers' time with the infant the first year or fathers' parenting behaviors during father-child interaction at one year on later child behavior. However, supporting our second hypothesis, across domains and raters, and controlling for child temperament and gender, parents' education, fathers' employment status and mothers' time at home the first year, for two of the four statistical models we found that the association between fathers' time at home and child adjustment was contingent on fathers' parenting behaviors. Specifically, we found that fathers' sensitivity, measured by global ratings, moderated the quantity of involvement on teacher-rated externalizing at age 2 ($\beta = -.12, p < .05$). Fathers' globally rated intrusiveness moderated time spent with the child on father-reported social competence at age 3 ($\beta = -.09, p < .05$), and micro measures of fathers' negative reinforcement significantly moderated time with the child on teacher-rated externalizing at age 2 ($\beta = .13, p < .01$), and marginally moderated time on father-rated social competence at age 3 ($\beta = -.08, p < .10$). The age 2 teacher-rated model explained 8 percent of the variance and showed good fit to

the data (RMSEA = .02, SMRS = .04, TLI = .95). For the age 3 father-rated model, explained variance was 9%, and the model had adequate fit indices (RMSEA = .03, SMRS = .04, TLI = .90).

3.3 Paper III

The aim of this study was to investigate child and father factors related to fathers' sensitivity and use of negative reinforcement observed during structured father-child interactions ($N = 726$) at one year. We found no correlation between the two parenting dimensions, even though they were measured in the same setting ($r = -.05$, $p = .175$). Results from all regression analyses are displayed in Tables 2 and 3 in Paper II. Multivariate regression analyses showed that fathers' sensitivity and negative reinforcement were predicted by different factors with few exceptions. Accounting for all included factors in our multivariate models, fathers' sensitivity was associated positively with children's activity level ($B = .08$, $p < .05$) and sustained attention ($B = .24$, $p < .001$) during interaction, as well as fathers' verbal instructions ($B = .17$, $p < .001$), and negatively with children's communicative risk ($B = -.26$, $p < .05$) and fathers' lower education ($B = -.34$, $p < .05$). In comparison, fathers' negative reinforcement was associated positively with children's developmental difficulties ($B = .32$, $p < .05$) and communicative risk ($B = .29$, $p < .05$), and fathers' extraversion ($B = .09$, $p = .05$).

Subsequently, we questioned whether child characteristics or fathers' time with their infant the first year would moderate associations between father predictors and fathers' parenting behaviors. For fathers' sensitivity, there were first two negative interactions between fathers' depressive symptoms and children's temperament for two of the Temperament Survey for Children (EAS) scales; emotionality (intercept $B = .06$, $p = .151$; depressive symptoms $B = .12$, $p = .535$; emotionality $B = .03$, $p = .509$; interaction term $B = -.31$, $p = .037$) and activity (intercept $B = .06$, $p = .150$; depressive symptoms $B = -.18$, $p = .317$; activity $B = -.03$, $p = .408$; interaction term $B = -.34$, $p = .041$). This indicates that fathers who scored above the cut point on the

Hopkins Symptom Check List (SCL) scale displayed less sensitivity if they had children with higher scores on the EAS emotionality or activity scales than if they had children with lower scores on these scales. Moreover, fathers with depressive symptoms who spent more than 1.5 months at home with their infant the first year were less sensitive during interaction than fathers with depressive symptoms who spent less time with their infant (intercept $B = -.03$, $p = .686$; depressive symptoms $B = .58$, $p = .094$; time with infant $B = .13$, $p = .105$; interaction term $B = -.85$, $p = .031$). For father's sensitivity, we also found a negative interaction between fathers' self-reported partner relationship and the child's observed sustained attention (intercept $B = .06$, $p = .105$; partner relationship $B = .06$, $p = .131$; sustained attention $B = .23$, $p = .000$; interaction term $B = -.08$, $p = .025$). Finally, we found a positive interaction for fathers' perceived parental stress and children's observed sustained attention (intercept $B = .05$, $p = .242$; parental stress $B = -.06$, $p = .089$; sustained attention $B = .25$, $p = .000$; interaction term $B = .11$, $p = .002$). Thus, fathers who reported lower partner relationship quality or higher levels of parental stress displayed less sensitive parenting if they had a child with lower sustained attention. For negative reinforcement, fathers' with depressive symptoms showed less negative reinforcement if their child had higher compared to lower EAS sociability scores, but no gap was found for fathers without depressive symptoms (intercept $B = -0.00$, $p = .965$; depressive symptoms $B = -.34$, $p = .055$; sociability $B = .03$, $p = .406$; interaction term $B = -.40$, $p = .033$).

4. Discussion

4.1 Summary of findings

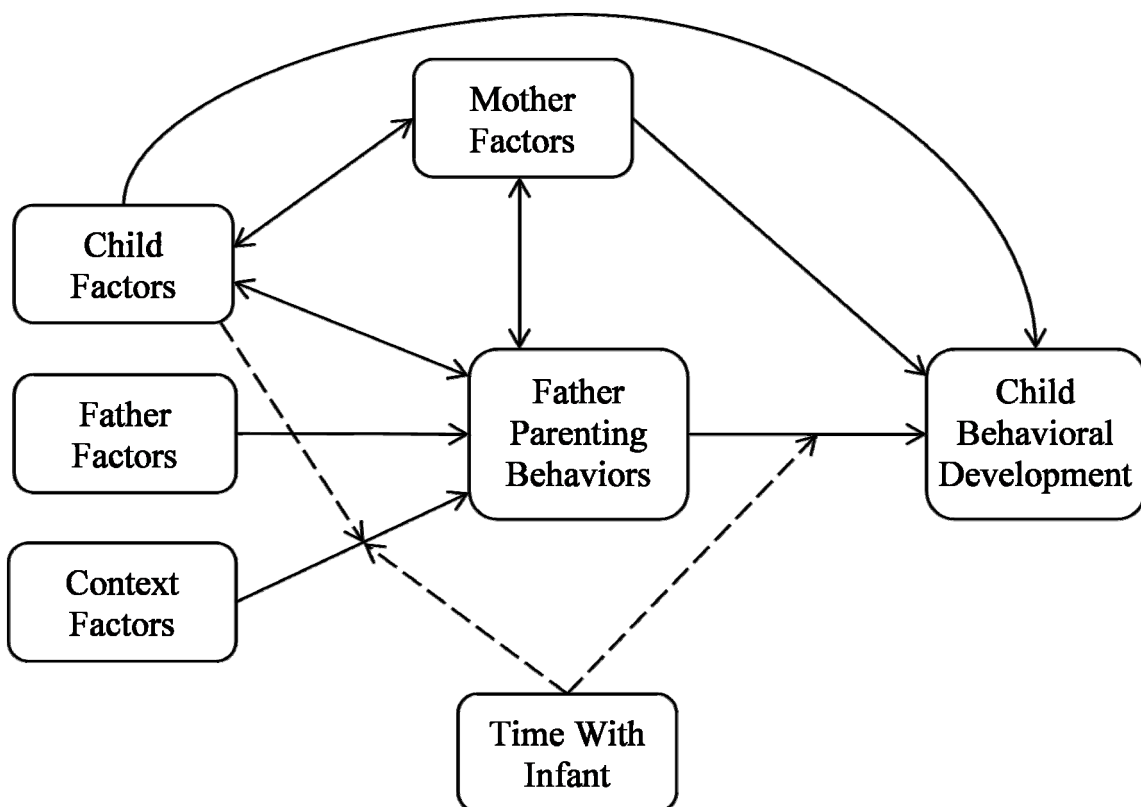
The overall aim of this thesis was to contribute to the understanding of early father-child interaction in a cultural context facilitating fathers' time with their infants. Fathers' parenting behaviors with one-year-olds were investigated in relation to mothers' and children's behaviors, to later child behavioral outcomes, and to father, child and contextual factors.

In Paper I, family concordance was found in children's levels of negative engagement with both parents, while no concordance was found in mothers' and fathers' behaviors with their child. Between dyads, higher levels of parents' positive and negative engagement were associated with equivalent levels in children's positive and negative engagement within the mother-child dyads, but not within the father-child dyads. Fathers with boys displayed higher levels of positive engagement compared to mothers with boys, and also compared to fathers with girls. Girls were found to display more positive engagement than boys. In paper II, there was no main effect of fathers' time with their infant on later child behavior adjustment. However, more time with sensitive and less coercive fathers was associated with lower child externalizing at age two, and more time with less intrusive and coercive fathers was associated with higher social competence at age three. In Paper III, fathers' sensitivity was associated positively with children's activity level and sustained attention, and with fathers' verbal instructions, and negatively with children's communicative risk and fathers' lower education, whereas fathers' negative reinforcement was associated positively with children's developmental difficulties and communicative risk, and with fathers' extraversion. For fathers with depressive symptoms, child temperament and fathers' time with infant moderated the relationship with fathers' parenting behaviors, and for fathers who reported higher levels of contextual stress, children's observed behaviors moderated this relationship.

4.2 Discussion of main findings

Taken together, this thesis' papers constitute three consecutive steps towards understanding the father's role and early parenting behaviors in a sociopolitical context facilitating father-child relationships. The large sample of fathers and children constitutes an exceptional opportunity for investigating fathers' parenting and early father-child interaction. To illustrate the associations between the results from all three papers, a conceptual model informed by Cabrera et al. (2007a) and Forgatch and DeGarmo (2002) is depicted below.

Figure1. Conceptual Model of Results from Papers I, II and III



This model provides an overview of factors included in all three papers (boxes), as well as main results from each paper (arrows). The model is oversimplified to illustrate the overall context. In Paper I, fathers', mothers' and children's behaviors

were included, and the reciprocal associations between these factors are displayed as two-headed arrows. Aspects of all factors included in the model (except context) were investigated in Paper II. Interaction effects of fathers' time with their infant and fathers parenting behaviors on child behavioral outcomes are shown as a stippled arrow, and direct associations for mothers' time and child temperament and gender are shown as solid arrows. In paper III father, child, and contextual factors were included to investigate relations with fathers' parenting behaviors. Again, direct associations found are displayed as solid arrows, whereas interaction results are shown as stippled arrows.

The research questions investigated and the results presented in this thesis embrace only a part of the total factors and conditions influencing fathers' parenting and child behavioral adjustment. Nevertheless, the connection between the papers' results adds to our understanding of how child, father and family characteristics and contextual factors operate together in a multidimensional system that affects children's well-being. In particular, the results shed light on the transactional nature of associations between factors included in this thesis, and on how these factors are related, directly and indirectly, both concurrently and across time. For example, for associations between child factors and fathers' behaviors, concurrent relations were found across coding systems in the association between child and father behavior during interaction in Papers I and III, and across raters in the association between child developmental risk factors and father behavior in Paper III. Longitudinal relations were found in Paper II between fathers' behaviors and children's behavioral outcome one and two years later for fathers who spent more time with their infants. Moreover, child factors, such as children's behaviors or skills, were both concurrently and longitudinally associated with fathers' parenting behaviors. For example, children's communicative skills and observed behaviors were related to fathers' parenting behaviors at one year, and for fathers who spent more time with infants, their parenting behaviors also related to children's later externalizing behavior and social competence, indicating longitudinal associations.

Overarching these dynamics, as a contextual factor impacting multiple aspects of father involvement, is the broader sociopolitical and cultural context (e.g., Cabrera & Tamis-LeMonda, 2013; Haas & Hwang, 2013; Lamb, 2010). The Norwegian welfare state with father-friendly parental leave policies including a non-transferable fathers' quota intended to promote gender equality and enhance early father-child relationships, provided the BONDS' fathers with greater opportunities to spend time with their infants than fathers in most Western societies (Hook & Wolfe, 2012; O'Brien, 2009; Rege & Solli, 2010). In this context, Norwegian fathers also generally experience greater social expectations and more support to engage in early child-care and to be an equal co-parent to mothers (Cools et al., 2011). Most studies investigating the impact of paternal leave and fathers' time with infants have focused on fathers' participation in child care activities, or fathers' perception of the father-child relationship, and fewer have included child developmental outcomes (O'Brien, 2009). Moreover, few studies addressing the influence of father involvement within a context of generous paternal leave arrangements have applied measures from direct observation of early father-child interaction. Including multiple observational measures of parent and child behaviors during structured interaction tasks, the BONDS' study is the first of its kind within a Norwegian context.

Given this context, are Norwegian fathers' early parenting behaviors comparable to those of fathers from contexts where early father-child relationships are not enhanced through extensive paternal leave arrangements? In the following, main results from the current thesis will be discussed in relation to this context. Do the associations found in the current thesis between fathers' behaviors and other factors, including later child outcomes, differ from those in contrasting sociopolitical contexts? Or do the current results relate only to results from similar Scandinavian contexts?

Contradicting one of the basic assumptions behind Norwegian generous paternal leave policies, that fathers' time with children enhances father-child relationships and subsequently is beneficial to child well-being (e.g., Cools et al., 2011), results from Paper II and III showed no direct associations between the time fathers' spent at

home with their infants the first year and fathers' parenting behaviors, or with child behavioral outcomes one and two years later. However, the results are in line with international fatherhood research emphasizing the importance of parenting quality during the time spent with the child (e.g., Cabrera et al., 2007a; Lamb, 2010). On the other hand, comparing the current results to research addressing the impact of paternal leave, the picture becomes more multifaceted. International studies have found significant benefits of paternal leave time for children's cognitive outcomes, but weaker evidence for their social competence or behavioral adjustment (e.g., Huerta et al., 2013). This may relate to the sociopolitical context in several ways. The number of fathers who take time off work and the amount of time they spend at home is greatly influenced by leave entitlements. Recent comparative studies show that fathers from a wider range of the population take time off work to care for their infants when paternal leave is statutory, of extended duration, has high income replacement, and is non-transferable to mothers (Huerta et al., 2013; O'Brien, 2009). Conversely, in countries where paternal leave arrangements are less generous, fathers who take time off tend to be highly educated, full-time employed, married, and have high income, and the beneficial influence of fathers' leave time on child developmental outcomes seems to be more evident in such contexts (Huerta et al., 2013). This contrasts the Nordic countries, where the vast majority of eligible fathers take at least some time off work with their infants (Bringdal & Lappegård, 2012; Haas & Hwang, 2013). Not surprisingly, the results in the current thesis are more consistent with findings from Denmark, where no significant differences in education, employment, or income were observed between fathers who took leave and those who did not, and no clear link between paternal leave time and child outcomes was found (Huerta et al., 2013).

The failure to find a significant association between fathers' time spent with their infants and outcome variables in Papers II and III does not denote that this time is without importance. On the contrary, in both papers fathers' time with infants was associated with outcomes through interacting with other father variables. The results indicated that the impact of fathers' parenting behaviors in Paper II and fathers'

depressive symptoms in Paper III were significant only if fathers spent more time with the infant (more time than average in Paper II and more than the provided father's quota of 6 weeks in Paper III). Moreover, the impact of fathers' time with their infant appeared to be particularly detrimental in relation to fathers' negative reinforcement. In Paper II, more time with fathers who displayed higher levels of fathers' negative reinforcement was associated with more externalizing and less social competence in children, and in Paper III, more time with their infant was associated with more negative reinforcement for fathers who reported depressive symptoms.

The lack of direct associations between the quality of fathers' parenting behaviors and child behavioral adjustment was somewhat surprising. This discrepancy with earlier fatherhood and parenting research (e.g., Ramchandani et al., 2013; Tamis-LeMonda et al., 2004) may be explained by other contextual factors than the characteristics of paternal leave arrangements. For example, in our population-based sample, few fathers displayed aversive behaviors with their child, and the variability in fathers' parenting behaviors may have been more limited than in the above mentioned studies with low-income (Tamis Le-Monda et al., 2004) or clinical (Ramchandani et al., 2013) samples. The discrepancy may also have to do with the children's age. In toddlerhood children develop rapidly, and predictions over time may thus be especially hard to detect. It is also possible that mothers' time at home at the same time as the fathers could affect the results. Fathers' time with the infant spent with the mother also present may differ from fathers' time spent in solo care of their child. For some fathers, the mother's presence may mean the father is not the main care provider during that time, while in other families, parents share responsibilities more equally. Nevertheless, the results indicate, as Lewis and Lamb (2003) also suggested, that with more time spent with their infants, fathers' behaviors may have greater impact on child behavioral adjustment.

As the results in Paper I regarding gender differences in parents' behaviors largely resembled findings across differing sociopolitical contexts, they may indicate that

some aspects of maternal and paternal behavior styles are consistent across these contexts (e.g., Lamb, 2010), such as fathers' more positive and play-related activities, while others are more sensitive to contextual influence, such as mothers' verbalization. On the other hand, studies from Sweden have shown that mothers who work longer hours display more positive engagement and play related-activities compared to mothers who spend more time at home with their infant (e.g., Lamb, 2010). However, working mothers generally tend to hold more resources (e.g., have higher education, live in better neighborhoods) than non-working mothers, and thus, they may be a selected group (Zachrisson & Dearing, 2014). Moreover, greater resemblance was found between mothers' and fathers' behaviors when fathers are primary care takers, and traditional fathers have been found to play more with their infants than primary caretaking fathers (Hwang, 1986). Viewed together, these findings suggest that parents who work outside the home play more with their infant during interaction compared to parents who spend more time at home with their child, and that differences and similarities in parents' behaviors may be more dependent on the parent role and child-rearing responsibilities than on their gender.

The within dyad concordance both in positive and negative engagement found for the mother-child dyads, but not for the father-child dyads, may reflect that Norwegian fathers most often utilize their father's quota at the end of the child's first year. Mothers are usually the primary caretakers during the infant's first months, and mothers and infants generally have had more time to adapt and adjust to each other's behaviors and to become more affectively coherent (Barnett et al., 2008; Ekas et al., 2011). Again, this may relate more to the parent role and time spent with the child in child-rearing activities than to a unique male or female parenting style. Following more than a century of studying mother-child relationships, and decades of investigating fathers' unique contribution through father involvement, the parenting discipline is currently moving into a broader and more comprehensive view where parenting and parent-child relationships increasingly are investigated based on the united knowledge from both fathering and mothering research (Easterbrooks, Barrett, Brady, & Davis, 2007; Pleck, 2012).

It is difficult to argue that the finding that girls were more positively engaged than boys in Paper I should be related to the cultural context and paternal leave policies. However, the finding is interesting, and may be seen as related to fathers' ratings of girls as more socially competent at age three in Paper II. Positive child engagement during interaction included a range of positive social initiatives and responses, and could reflect early indicators of social competence. As opposed to US studies finding that fathers prefer to spend time with boys compared to with girls (e.g., Yeung, Sandberg, Davis-Kean, & Hofferth, 2001), there was no difference in the amount of time the BONDS' fathers spent at home with their infant the first year dependent on child gender. A Swedish study found fathers to be more involved with girls at 16 and 28 months compared to with boys (Lamb et al., 1988), and this may to some extent reflect the Scandinavian sociopolitical context's emphasis on gender equality.

The risk and protective factors found to be associated with fathers' parenting in Paper II largely resemble findings from former studies (e.g., NICHD Early Child Care Research Network, 2000; Holmes & Huston, 2010), which indicates some stability across sociopolitical contexts. Moreover, factors related to fathers' parenting behaviors found in the current study largely overlap factors related to mothers' parenting behaviors with toddlers (e.g., Smith, 2010), which suggests stability also across gender. However, associations with fathers' parenting behaviors are often found to be weaker than equivalent associations for mothers' (e.g., Van Ijzendoorn & DeWolff, 1997). Even in our sample of fathers derived from the general population in a rich welfare state, there were associations between known risk factors and lower quality parenting behaviors similar to those found in more diverse samples (Tamis LeMonda et al., 2004). For example, fathers' lower education, depressive symptoms, and perceived levels of stress appear to be common risk factor across both gender and contexts (e.g., Holmes & Huston, 2010; Ponnet et al., 2013; Wilson & Durbin, 2010), which further indicates that they may be particularly salient factors to address through preventive parenting interventions.

With observational methods and measures derived from SIL- and attachment developmental models, results from this thesis provide expanded detail to the understanding of fathers' negative reinforcement and sensitive parenting with one-year-olds, and to the relation between these constructs. Results from Paper II support the significance of both fathers' sensitivity and negative reinforcement in that they matter to later child behavioral adjustment if fathers spend more time with their infants. These results lend support to the theoretical models' unanimous postulation that parents' behaviors and children's subsequent responses contribute to child social and behavioral adjustment (Ainsworth et al., 1978; Patterson, 1982). The failure to find a significant association between fathers' sensitivity and negative reinforcement suggests that these constructs may be separate dimensions of parenting, not simply polar opposites of each other. Consequently, some fathers may be sensitive and responsive throughout most of the interaction, and yet display short episodes of negative reinforcement, while other sensitive fathers may not initiate any negative reinforcement. Similarly, fathers who display little sensitivity may display little or no negative reinforcement, or they may show high levels of reinforcement. As examples of differing parenting styles, and possibly associated with different background factors, these parenting styles may be related to child outcomes in more complex ways than investigated in the current thesis. The predictive and moderating factors related to fathers sensitivity and negative reinforcement found in Paper III, indicate an interplay between child, father, and contextual factors, which in particular is supported by the SIL-model's focus on environmental influences on parenting and child behavioral adjustment (Forgatch & DeGarmo, 2002). Moreover, findings from Paper II regarding how negative reinforcement interact with fathers' time with their infants and influences children's later behavioral adjustment, and from Paper III regarding significant predictors of negative reinforcement, provide some evidence that coercive processes can begin in infancy (Patterson, 2005). Taken together, the results support the dilated value of including multiple measures of different parenting dimensions when investigating how individual differences in parenting behaviors relate to other factors.

4.3 Reliability and validity of observational measures

Inter-coder reliability

Tracking and measuring the reliability among coders recording observational data is of great importance to the validity of the results (Bakeman & Gottman, 1998). The overall inter-coder agreement and reliability for the micro codes were satisfactory to good, both according to general guidelines (Fleiss, 1981; Yoder & Symons, 2010), and compared to other studies (Eddy et al., 2001; Forgatch & DeGarmo, 2002). A Cohen's Kappa for the sequential construct negative reinforcement was unfortunately (for technical reasons) not possible to provide for the current study. The intra-class correlations (ICC) for the global rating were fair to good according to general guidelines (Mitchell, 1979; Yoder & Symons, 2010). However, general guidelines or benchmarks should be used with some care (Yoder & Symons, 2010), and compared to other studies, ICCs were the low to moderate range (e.g., NICHD Early Child Care Research Network, 2000; Smith, 2010). Multiple factors may influence inter-coder reliability, such as the variability within the scores (Mitchell, 1979), whether the coders know that they are being checked, and who they are checked against (Reid, 1970; Romanczyk, Kent, Diament, & O'Leary, 1973), and whether reliability checks are conducted before coding study data or as spot checks throughout the entire process (Mitchell, 1979). To strengthen the validity of the data, for both coding procedures coders were randomly checked during the coding period and kept blind to information regarding reliability assignments. The population based sample may have contributed to lower ICC's viewed against more diverse samples. Comparing the inter-rater reliability across coding strategies, results support the literature holding that reliability among coders is more easily achieved when recording micro measures of distinct behaviors that are either present or not (e.g., holding up a toy, picking up the child) compared to global ratings of more complex constructs evaluating the quality and quantity of several observed behaviors over a period of time (e.g., children's activity level; Bell & Bell, 1989).

Construct validity

Construct validity refers to the degree to which the operationalization of constructs utilized in the study adequately measure the theoretical constructs on which the operationalizations were based (Shadish, Cook, & Campbell, 2002). More simply put: Do we measure what we intended to measure? Is there empirical evidence to support our constructs? Cronbach & Meehl states that *"the best construct is the one around which we can build the greatest number of inferences, in the most direct fashion"* (1955, p. 288). Former research has demonstrated construct validity for the observational measures from both coding systems utilized in this thesis (e.g., Cabrera et al., 2007b; Forgatch & DeGarmo, 2002). Yet, it is salient to note that single studies do not evidence construct validity once and for all. Establishing validity is rather a continuous process of evaluation, based on the accumulation of information from numerous studies using the instrument being evaluated (Messick, 1995).

For the purpose of the present thesis the convergent validity (the degree to which the construct is related to other operationalizations that it based on theory and empirical evidence should be associated with), and the discriminant validity (the degree to which the construct diverges from other operationalizations that it based on theory and empirical evidence should be dissimilar to) of the observational measures derived from micro and macro coding of the parent-child interactions were tested by means of Pearson's correlations. The correlation analyses between the observational measures from the micro coding and the observational measures from the global ratings suggested adequate convergent validity with appropriate measures. Based on manual descriptions, all significant correlations were in expected directions (Nordahl et al., 2007; Cox & Crnic, 2003). Micro measures of child behaviors were associated with global child measures for 13 of 17 variables, and suggest convergent validity for those measures. The lack of significant correlations between micro coded child positive engagement and the globally rated child measures may indicate evidence of discriminant validity. Although child positive engagement includes single behaviors similar to those listed in the manual for positive mood, the positive engagement score is intended to measure a broader range of positive initiations and responses, which is not similar to positive mood. Thus, a weak correlation might be expected; as, they are

intended to be distinct measures. Moreover, child positive engagement was related to 5 of the 6 global father scales in the expected direction, which suggests convergent validity for this measure. Fathers' micro coded nonverbal behavior was the only father measure that did not correlate with any globally rated father or child measure. Nonverbal behaviors include positive, neutral and negative behaviors, and if these behaviors were not predominantly one or the other, and the lack of correlations was to be expected and indicates discriminant validity. The results further suggest that fathers' verbal behaviors were mainly positive, which is to be expected with one-year-olds, while fathers' physical behaviors were regarded more intrusive and less sensitive, which may be reasonable across tasks. The lack of an association between the sequential micro measure of fathers' negative reinforcement and the composite variable of sensitive parenting used in Papers II and III indicates discriminant validity, and has been discussed earlier in this section.

In line with previous studies, correlations across methods and raters were low to moderate, and most probably reflects the different methods of data collection (Conger et al., 1992; Patterson & Forgatch, 1995; Waller et al., 2012). However, that the significant correlations were in directions supported by earlier research lends some support to the convergent validity of the observational data derived from our sample of fathers from the Norwegian general population. For example, higher levels of macro coded activity and micro coded physical behaviors were related to boys, and these observed behaviors were both related to father ratings of a more active temperament, as would be expected (Mathiesen & Tambs 1999). That fathers' education was positively related to globally rated sensitivity and positive regard, and negatively related to micro coded negative engagement and globally rated intrusiveness is in keeping with earlier research (Cabrera et al., 2007; Tamis LeMonda et al., 2004), and supports the convergent validity of the observational measures. Fathers' self-reported extroversion, which is generally perceived as a positive and sociable personality trait, was related to both micro and macro measures of negative and less sensitive parenting in our data. Nevertheless, since extraversion also has an assurgency component, which can appear dominating and insensitive in

early parent-child interaction (Glidden, Bamberger, Turek, & Hill, 2009), this association may yet reflect convergent validity.

The observational measures' predictive validity (the constructs' ability to predict outcomes they based on theory and empirical evidence should be able to predict) may to some extent be evaluated from the results in Paper II. Observational measures of fathers' negative reinforcement, sensitivity and intrusiveness moderated the impact of fathers' time with their infant; all in the expected direction, which provide partial evidence to the predictive validity of these variables (Forgatch & DeGarmo, 2002; Scaramella & Leve, 2004; NICHD Early Child Care Research Network, 2000; NICHD Early Child Care Research Network, 2004). It must be noted that the amount of explained variance in the statistical models was low. This suggests that there are other factors that predict children's behavioral adjustment at ages two and three to a greater extent than the variables included in Paper II. Factors such as mothers' parenting behaviors, parents' relationship quality, or perceived parental stress, may explain more of the variance in children's behavioral adjustment.

In Paper I, the micro measure of fathers' *positive engagement* distinguished between mothers and fathers in the expected direction, however, this measure did not predict future outcomes as shown in Paper II. Contrary to the micro coded sequential construct negative reinforcement, fathers' positive engagement was a frequency score including father behaviors only, and it was not to the same extent theoretically based or empirically tested. Micro based positive engagement scores have earlier been difficult to construct (Patterson, 1982), and positive engagement was therefore more exploratory than the other conceptual measures included. It could be that a proportion score based on the frequency of positive engagement relative to the frequency of negative engagement, or the proportion of positives relative to all other codes, would have been more relevant measures. Based on the results from the current investigation, positive engagement needs to be evaluated and reconstructed to better capture the reciprocal nature of the interaction. As mentioned above, construct validation is a continuous ongoing process which is expanded by each new study

(Messick, 1995). Although the current thesis provides some support to the construct validity of the observational measures from TOPICS micro coding and NICHD global ratings with fathers and one-year-olds, future research should re-examine the relationship of the current observational measures to other measures and their utility in longitudinal studies and sensitivity in exploring the impact of interventions.

4.4 Limitations

There are several limitations to the research presented in this thesis. First, the sample size in Paper I was relatively small and therefore vulnerable to Type II errors, that is, failing to detect meaningful effects due to low statistical power. However, the sample size is comparable to the sample size in other studies using similar coding strategies (e.g., Kwon et al., 2012). Related to the samples in all three papers, selection bias may have affected the results and reduced the overall representativeness of the results since participating fathers were more educated, older, and spent more time with their infants than the non-participants. Another limitation in Paper II and III related to our sample was that father initiated negative reinforcement was a low base rate event and many fathers never engaged in it. Fathers from the general population are generally positive during interaction with their one-year-olds, and especially when being observed. This potentially makes it more difficult to detect associations that would have been more conspicuous in a sample targeted particularly to study coercive family processes.

Moreover, the composite score of fathers' time with their infant in Paper II was not optimal. Calculated by multiplying reported hours per week (period not specified) with the total number of months spent at home with the child during the first year as the *annualized months at home with child*, this may not be the best estimate of the time fathers' actually spent with their child during this time. In Paper III the measure used was *fathers months at home with the child during the first year*, and thus, the differing measures ($.62, p < .001$) must be taken into account when comparing results across studies. Thesis measures fathers' time at home with their infant the first year,

not how much of this time was paid paternal leave. However, close to all included fathers were employed (95 %), and since probably few fathers would take time off work to stay at home with their infant without utilizing their legal right to financial reimbursement, it seems reasonable to assume that for most fathers in this study the reported time at home with infant was paternal leave time.

Furthermore, due to the BONDS study design with alternating focus on mothers and fathers across waves of data collection, we were not able to include mother-child interaction in Papers II and III. However, we did control for mothers' time at home with their infant and mothers' education in Paper II. Finally, other factors not included in the current study, such as mothers' personality, family income, or coparenting qualities, may be associated with fathers' early parenting behaviors and could have contributed to explaining the relationships investigated in this thesis.

4.5 Implications

This research was informed by several interrelated fields of research, including (1) parenting literature with the SIL-model, attachment theory, and direct observation of parent-child interaction, (2) fatherhood research with the father involvement construct, and (3) social policy related research addressing the impact of paternal leave. The results of this doctoral project contribute to the literature in several ways. Taken together, the combined results of all three papers broaden our understanding of how fathers' early parenting behaviors together with child, father, and contextual factors relate to each other in a multidimensional and transactional system where all factors influence each other and in turn, affect children's well-being. Specifically, this thesis adds to the literature by utilizing multiple data collection methods including observational micro and macro measures derived from direct observation, and measures of child, father, mother and contextual factors derived from multiple reporters. Moreover, by employing measures of parenting behaviors from diverse theoretical perspectives, results from these studies support two distinct and developmentally significant theoretical models, and may broaden our understanding

of the relation and distinction between SIL- and attachment- based parenting dimensions. Finally, across studies and results, this thesis provides concurrent knowledge of early father-child interaction in a large normative sample of fathers with one-year-olds within in a sociopolitical context facilitating and supporting father-child relationships.

Although it is beyond the scope of the current thesis to fully evaluate paternity leave and its effects on child development, the current results illuminate important aspects related to fathers' increased time with infants. The most salient results for *policy implications* from this thesis evidence that facilitating fathers' time with infants is not enough to promote sensitive and responsive father-child relationships, or to benefit later child behavioral adjustment. On the other hand, results also imply that in order for fathers' parenting behaviors to be of significance to children's later behavioral adjustment, fathers need to spend more time with their infants than the average father. In other words, as pointed out by previous research (Cabrera et al., 2007a; Lamb, 2010; Pleck, 2007), both quantity and quality father involvement is necessary to impact children's development. In particular, this thesis investigated fathers' time with infants in relation to children's behavioral outcomes at ages two and three. However, there may be other beneficial outcomes influenced by fathers' time at home with infants, such as children's later school achievement, mothers' increased participation in the work force, and more equally shared responsibility for child rearing (Cools et al, 2011; Haas & Hwang, 2013), factors that were not investigated in the current thesis. Since fathers' expanded paternal leave is a relatively new arrangement in Norway, longitudinal associations related to family functioning or child development has not yet been possible to investigate.

Despite policy goals and intentions, our results suggest that in addition to facilitating father-child relationships by generous paternal leave policies, more complex policy guidelines may be needed to ensure that fathers' leave time benefits children's well-being. As the results in Paper II indicate, attention should be given to the marginal group of fathers who negatively affect their children's development with increased

time. The current results highlight the need to intervene early to promote sensitive parenting and prevent coercive family processes, and that father-infant interaction may be a critical factor to address. The findings in Paper III call attention to specific factors that enhance father-infant interaction, and in turn, this can identify children and fathers who may benefit from early preventive intervention. Practitioners, such as child health nurses and doctors, who often see families during the infants' first weeks, are in a unique position to provide fathers, as well as mothers, with knowledge and skills regarding how sensitive parenting may positively impact their child's development. Even in Norway, where pre- and post- natal nurse visits and infant health check-up programs are public and free, such services are mainly directed towards mothers, and they may need to include fathers on a more regular basis. Recent research from Sweden has shown that encouraging fathers' participation in what has been regarded mother-infant activities, such as infant health check-ups and parent-groups, resulted in more actively engaged fathers who enjoyed sharing perspectives on fatherhood with other fathers (Wells & Sarkadi, 2012).

Results from Papers I and III emphasize the significance of children's own behavior during interaction with their parents. This lends support to brief interventions with small non-clinical samples suggesting that the use of video feedback from direct observation of father-child interaction may be an effective tool when fathers (and also mothers) need to strengthen their ability to read their child's signals and engage in sensitive interactions (Benzies, Magill-Evans, Harrison, MacPhail, & Kimak, 2008; Lawrence, Davies, & Ramchandani, 2013).

The current thesis results, along with former studies, suggest that further investigation of associations between fathers' time spent with their infants during the first year and later child outcomes need to be conducted, preferably with more diverse samples and long term relations. The longitudinal associations related to family functioning and child development and the Norwegian extensive paternal leave programs are yet to be explored. Extensive Swedish research over several decades has provided useful knowledge on multiple aspects related to generous paternal leave arrangements (e.g.,

Haas & Hwang, 2008; Lamb et al., 2004; Wells & Sarkadi, 2012). Nevertheless, the Norwegian nontransferable father's quota encourages fathers to take longer leave and makes it more practicable for parents to share responsibilities for child-rearing than for Swedish fathers and mothers, where the decision is left to the parents, and future research needs to investigate the consequences of this particular arrangement (Haas & Hwang, 2008). Other measures of child outcome, such as transition to school, academic achievement, and peer relationships can be included in future studies as the children grow older.

Findings from the current thesis highlight the importance of examining how multiple predictors relate to different parenting dimensions and point to factors that may enhance father-infant interaction and identify fathers and children who may benefit from early intervention. Observational studies may investigate in more detail how these parenting dimensions from different theoretical models are related, both for fathers and mothers, and how the interplay between these factors relate to child behavioral adjustment. Future studies should apply a broader family perspective to investigate how mother, father, child, and contextual factors contribute, separately and simultaneously, to child development and adjustment.

4.6 Conclusions

In this thesis, data from a large population based study of children's social development was utilized to provide new knowledge of fathers' early parenting behaviors and father-child interaction within in a sociopolitical context facilitating and supporting father-child relationships. Overall, the results broaden our understanding of how fathers' early parenting behaviors with one-year-olds are related to mothers' and children's behaviors, to family characteristics and contextual factors, and to later child behavioral adjustment, within a multidimensional and transactional system. Specifically, the findings suggest that that fathers' increased time spent with infants is not by itself sufficient to benefit child outcomes, and policy makers should note that both quantity and quality father involvement is necessary. Clinicians and health care personnel may enhance father-child relationships by

including fathers when possible, also in activities that have been regarded mothers' domain. Future studies should apply a broader family perspective to investigate how mother, father, child, and contextual factors contribute, separately and simultaneously, to child development and adjustment.

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PAPER I

Brief Report

Family Concordance and Gender Differences in Parent-Child Structured Interaction at 12 Months

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This observational study examined family concordance and gender differences in early parent-child interaction in the family supportive sociopolitical context of Norway. Mothers and fathers from 39 Norwegian families were observed on separate occasions with their 12-month-old children (20 girls and 19 boys). Data were recorded from observations using microsocial coding methodology based on social interaction learning theory. We found no within-family concordance between mothers' and fathers' behaviors with their child. The children's negative engagement with each parent was moderately correlated. For parents with boys, fathers were overall more positively engaged than mothers. Moreover, fathers of boys displayed more positive engagement than those of girls, whereas mothers of girls and boys displayed similar levels of positive engagement. In contrast to previous findings, mothers did not verbalize more than fathers. Girls were overall more positively engaged during interaction with both mothers and fathers than boys. Thus, in a sociopolitical context that facilitates early parent-child relationships and gender equality, there were few but noteworthy gender differences in parent-child interaction at 12 months.

Keywords: parent-child interaction, fathers, family concordance, gender differences, cultural context

The purpose of this study was to expand the current literature on parent-child interaction at 12 months by investigating family concordance and gender differences in parents' and children's behaviors in the cultural context of Norway, where gender equality and father involvement is facilitated through public policy. Literature on social learning models and early attachment has paid extensive attention to parent-child interaction in toddlerhood (e.g., Lamb & Lewis, 2011; Reid, Patterson & Snyder, 2002). Yet, Lamb and Lewis (2010) recently underscored the importance of descriptive research on maternal and paternal behaviors with young children and an urgent need for new studies in different cultural

contexts. Comprehensive research has shown that parent-child interaction plays an important role in later child development (e.g., Hollenstein, Granic, Stoolmiller, & Snyder, 2004; Kochanska, Aksan, Prisco, & Adams, 2008; Shaw, Lacourse, & Nagin, 2005; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Traditionally, most observational studies in this area have included mothers only (Lamb & Lewis, 2010; Reid et al., 2002). However, all members of a family system influence each other reciprocally, and the extent to which behaviors and engagement in mother- and father-child dyads are consistently related may affect children's behavior and development in different manners (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). Specifically, parental concordance of positive engagement may enhance positive child development more strongly than parental discordance (Barnett, Deng, Mills-Ounce, Willoughby, & Cox, 2008).

Over the last decades, following increased paternal involvement in daily child care, there has been a growing emphasis on the fathers' role in children's development, and fathers are more frequently included in studies of family interaction (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). The cultural and sociopolitical context in which parenting takes place influences both expectations and opportunities for fathers' engagement with their children (Lamb & Lewis, 2010). While most studies of parent-child interaction stem from an Anglo-American context, other countries provide very different contexts for fatherhood

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(Haas & Hwang, 2013). Northern Europe and particularly Scandinavia is conspicuous in facilitating fathers' involvement to a greater extent (Norwegian Ministry of Children, Equality, & Social Inclusion, 2010). In Norway, most mothers are employed, and parents are provided with a full year of paid parental leave, including a nontransferable 12-week fathers' quota (as of 2012; Haas & Hwang, 2013). Studying mothers' and fathers' behaviors with their 12-month-olds in this context contributes to understanding the role of sociopolitical conditions' influence on parenting.

Family Concordance and Gender Differences

The current literature on behavior concordance in mother- and father-child interaction at 12 months is sparse and inconclusive. Although there are some studies with young infants and a few with older toddlers, we were only able to find one study with 10- to 12-month-old children. This British study observed no significant overlap between mothers' and fathers' behavior during interaction, or between children's expressed affect with their mothers and fathers (Malmberg et al., 2007). In contrast, one U.S. study with 24- and 36-month-old children found that the quality of fathers' engagement was associated with similar qualities in mothers' behaviors (Tamis-LeMonda et al., 2004), and another found 20-month-old children to display similar intensity of negative affect with both parents (Ekas, Braungart-Rieker, Lickenbrock, Zentall, & Maxwell, 2011). As children develop rapidly during infancy and toddlerhood, our study may contribute to a better understanding of family concordance at this particular age.

Researchers agree that most differences between mothers' and fathers' parenting behaviors are small (Lewis & Lamb, 2003). However, a review of cultural diversity in gender differences during early family interaction concluded that North American and British fathers engaged in more playful activities than mothers, whereas Swedish parents displayed more similar levels of play behaviors (see Lamb & Lewis, 2010). Furthermore, primary caretaking fathers and mothers were found to behave in a more similar way than primary and secondary caretaking fathers. Recent Anglo-American studies have reported contradictory results. Some studies found that mothers' and fathers' interaction styles were largely similar (Lewis & Lamb, 2003; Malmberg et al., 2007; Tamis-LeMonda et al., 2004). Others observed that mothers demonstrated significantly higher mean levels of sensitive parenting behaviors than fathers (Kwon, Jeon, Lewsader, & Elicker, 2012; Lovas, 2005). Likewise, a meta-analysis of parents' talk with their children between 12 and 24 months of age found that mothers tended to talk more than fathers (Leaper, Anderson, & Sanders, 1998). Another meta-analysis, investigating parents' differential socialization of girls and boys, found that fathers of children under the age of 6 differentiated more between girls and boys than mothers did, and showed both more positive and negative engagement during interaction with boys compared to with girls (Lytton & Romney, 1991). A study investigating differences in father-child interaction between British primary and nonprimary caregiving fathers showed that fathers who spent more than 20 hours per week caring for their infant displayed more positive emotions during play than fathers who spent less time with their infant (Lewis et al., 2009).

The majority of studies including 12-month-old toddlers report no significant differences in boys' and girls' behaviors with their

parents (e.g., Ekas et al., 2011; Hay et al., 2011; Shaw, Keenan, & Vondra, 1994). However, a meta-analysis of gender variation in children's language use between 12 and 36 months found girls to be more talkative than boys (Leaper & Smith, 2004), and a study of gender differences in parent-toddler dyads observed that girls were more responsive and involving with both parents compared to boys (Lovas, 2005).

The Current Study

To better understand the characteristics of parents' and 12-month-old children's behaviors during interaction in a cultural context of intended supportive family policies, we investigated the following research questions: (1) Is there within-family concordance in mothers' and fathers' behaviors with their child, and in children's behaviors with their mother and father? (2) Are there differences between mothers' and fathers' behaviors with their child, and do mothers' and fathers' behaviors differ dependent on child gender? (3) Are there differences between girls' and boys' behaviors with their parents, and do girls' and boys' behaviors differ dependent on parent gender? Mixed results from earlier research left us with no specific hypotheses for family concordance. On the basis of former results, we predicted that mothers would verbalize more than fathers (Leaper et al., 1998), that fathers would display more play-related behaviors than mothers (Lamb & Lewis, 2010), and that fathers would differentiate more between girls and boys compared to mothers (Lytton & Romney, 1991). For children's behavior at this age, we found little support in the literature for formulating hypotheses regarding gender differences.

Method

Participants

This study's sample included mothers and fathers of 39 families (20 girls, 19 boys) from *The Behavior Outlook Norwegian Developmental Study* (BONDS); a longitudinal study tracking the social development of 1,159 children from the general population. We used a randomly drawn subsample of 39 families from which both parents were asked to participate in structured interactions with their child. Mothers' mean age was 31.8 years (SD 4.7) and fathers' 33.5 (SD 4.9). Altogether, 65% of the mothers and 52% of the fathers had university or college education, and 87% of the mothers and 95% of the fathers were employed. The sample closely resembled two-parent families in the population with regard to age and employment status. However, a higher proportion of parents had college or university education compared to the general population (Statistics Norway, 2012). Comparing demographic variables, families with girls did not differ significantly from families with boys, and mothers did not differ from fathers. The quota of mandatory parental leave for fathers in the present study was 5 weeks if his child was born before July 2006 ($n = 1$) and 6 weeks if his child was born after this date ($n = 38$).

Procedure

Laboratory observations of parent-child interaction were conducted when the children were 12 months old. Mother- and

father-child dyads were videotaped on separate occasions in structured interaction tasks for a total of 15 minutes. The tasks were selected based on prior research that has shown their capacity to elicit variation in parent and child behaviors associated with later child social adjustment (e.g., Gross et al., 2008; Hollenstein et al., 2004; Shaw et al., 2005). Tasks included: *free play*, parents were asked to play with their child as they liked with a set of toys (4 min); *clean up*, parents were asked to put the toys away and told that their child could help but was not required to (2 min); *structured play*, parents were presented with a shape sorter box and a set of stacking rings, and asked to help the child as much as they thought necessary with one toy at a time (2 × 3 min); and a *waiting task*, the child had to remain in a high chair with no toys while the parent answered a questionnaire (3 min).

Measures

A microsocial coding methodology based on social interaction learning (SIL) theory was applied to capture content and valence of discrete behaviors during parent-child interaction (Patterson & Reid, 1984; Reid et al., 2002). The Toddler and Parent Interaction Coding System (TOPICS) (Nordahl, Duckert, & Bjelland, 2007) was adapted from the Family and Peer Process Code (Stubbs, Crosby, Forgatch, & Capaldi, 1998). Data were recorded as 5-digit codes in real-time from videotaped interactions. Each code provided information for initiator, respondent, behavior, and expressed affect. TOPICS included 27 mutually exclusive behavior codes classified as verbal (e.g., parents' talk or children's babbling), nonverbal (e.g., play with toys, gestures such as "give-me-five"), or physical (e.g., parent holding child, child crawling away) behaviors. Across these categories behaviors were defined as either positive (e.g., praise, offer a toy to the other, give a hug), neutral (e.g., vocal uttering with no meaningful words, solitary

play, parent picking up child), or negative (e.g., verbal disapproval, take a toy from the other, physical aggression). Eight different affect categories indicated happy, caring/content, neutral, discontent, angry, sad, anxious, and frightened, and were coded based on tone of voice (e.g., warm, neutral, harsh), facial expressions (e.g., smile, flat, frown) and body language (e.g., relaxed, calm, tense). Six coders were trained for 4–6 months and required to obtain an interrater reliability level of $\kappa = .70$ before coding study data. Different coders were assigned parent-child dyads from the same family, and all coders were blind to other information regarding the families. A total of 20% of the tapes were coded by two different coders with an overall interrater reliability of $\kappa = .74$.

Data were analyzed as summarized frequencies of specific behaviors for parents and children separately. In order to investigate the overall occurrence of the behaviors of interest, data were aggregated across all tasks. Two composite variables were calculated to measure the affective quality of engagement. *Positive engagement* included all positive behaviors with positive or neutral affect and all neutral behaviors with positive affect. For example, offering a toy (positive nonverbal behavior) with a neutral facial expression (neutral affect) was regarded positive engagement, as was picking up the child (neutral physical behavior) with a smile (positive affect). *Negative engagement* included all negative behaviors irrespective of affect, and all positive or neutral behaviors with negative affect. For example, offering a toy (positive nonverbal behavior) with an angry facial expression (negative affect) was regarded negative engagement, as was verbal disapproval (negative verbal behavior) with a neutral voice (neutral affect). In addition, three variables representing the sum of all behaviors within distinct domains were calculated: *verbal behavior*, *nonverbal behavior*, and *physical behavior* (for examples, see previous paragraph).

Table 1
Means and Standard Deviations for Parent and Child Engagement and Behavior Variables

	<i>n</i>	Engagement quality		Behavior domains		
		Positive <i>M (SD)</i>	Negative <i>M (SD)</i>	Verbal <i>M (SD)</i>	Nonverbal <i>M (SD)</i>	Physical <i>M (SD)</i>
Parents						
Mothers	39	189.0 (45.3)	7.4 (5.2)	168.6 (51.2)	86.4 (23.9)	38.0 (15.3)
Fathers	39	226.0 (61.7)	5.9 (4.3)	151.5 (55.6)	99.8 (33.3)	35.0 (12.1)
Parents with girls ^a	40	197.4 (47.7)	6.7 (4.8)	167.1 (56.0)	93.7 (23.0)	35.9 (13.8)
Parents with boys ^b	38	218.2 (64.1)	6.6 (4.8)	152.7 (51.2)	92.5 (35.5)	37.2 (14.0)
Mothers with girls	20	201.7 (51.6)	7.7 (5.2)	180.4 (57.9)	90.1 (23.0)	40.2 (15.9)
Mothers with boys	19	175.6 (34.0)	7.0 (5.3)	156.3 (41.2)	82.5 (24.7)	35.7 (14.9)
Fathers with girls	20	193.0 (44.4)	5.6 (4.3)	153.9 (51.9)	97.4 (22.9)	31.7 (10.0)
Fathers with boys	19	260.7 (58.8)	6.3 (4.4)	149.1 (60.5)	102.4 (42.1)	38.6 (13.4)
Children						
Girls	20	79.6 (22.0)	41.2 (22.0)	57.3 (21.0)	204.0 (38.7)	20.0 (13.2)
Boys	19	69.0 (18.1)	46.5 (27.1)	62.3 (24.2)	198.8 (38.1)	26.3 (18.5)
Children with mothers	39	71.5 (18.4)	40.7 (19.4)	60.3 (22.4)	205.1 (40.9)	22.2 (14.7)
Children with fathers	39	77.3 (22.8)	46.9 (28.6)	59.1 (23.1)	197.9 (35.6)	24.0 (17.7)
Girls with mothers	20	77.0 (19.4)	38.3 (17.0)	57.1 (22.3)	212.6 (43.5)	18.2 (11.4)
Girls with fathers	20	82.1 (24.7)	44.2 (25.9)	57.6 (20.1)	195.5 (32.0)	21.9 (14.9)
Boys with mothers	19	65.7 (15.8)	43.3 (21.9)	63.8 (22.6)	197.2 (37.5)	26.5 (16.7)
Boys with fathers	19	72.3 (20.1)	49.6 (31.7)	60.7 (26.3)	200.4 (39.8)	26.2 (20.5)

^a Parents ($n = 40$) refers to Mothers with girls ($n = 20$) and Fathers with girls ($n = 20$). ^b Parents ($n = 38$) refers to Mothers with boys ($n = 19$) and Fathers with boys ($n = 19$).

Results

Descriptive statistics for all parent and child dependent variables are presented in Table 1. Results are presented separately for mothers ($n = 39$), fathers ($n = 39$), and children ($n = 39$); for girls ($n = 20$), and boys ($n = 19$); for parents (mothers and fathers) with girls ($n = 40$), and for parents (mothers and fathers) with boys ($n = 38$). Initial bivariate correlations were performed to determine whether parent or child behaviors varied as a function of parents' age, education or employment status. Parents' verbal behavior and length of education correlated positively ($r = .23$, $p < .05$), whereas children's nonverbal behaviors were negatively correlated with parents' employment ($r = -.24$, $p < .05$). Further analyses were performed without and with controls for these confounders by means of partial correlations and ANCOVAs. As the results were substantially identical, we report results from the unadjusted analyses. In the following, we report only significant results unless otherwise described, and refer the reader to tables for effect sizes.

First, we investigated parents' and children's behavior concordance within families and within dyads by conducting bivariate correlations. The results are displayed in Table 2. We did not correct significance levels for multiple tests out of concern for statistical power and a too increased risk of false negative findings (Type I error). Seven of the 20 correlations we tested were statistically significant at $p < .05$, many more than expected by chance (i.e., about 1 of 20 correlations at $p < .05$). There were no significant correlations between fathers' and mothers' behaviors for any of the included variables, indicating little within-family concordance in parents' behaviors. However, for children's behaviors, there was a positive association between the negative affective engagement with their respective parents. Moreover, children's behaviors with their mother and father were positively correlated for verbal and physical behaviors. Children's positive engagement and nonverbal behaviors with their mother and father were not correlated. Next, we examined correlations within mother-child and father-child dyads. Mothers' and children's positive engagement, as well as mothers' and children's negative engagement was positively correlated, as was parents' and children's nonverbal behaviors within both mother- and father-child dyads.

To investigate possible gender differences in parents' and children's behaviors we employed two-way ANOVAs with a 2×2 factorial design. We conducted separate analyses for all parent and

child behavior variables with both parent and child gender as independent variables, and tested the possibility of an interaction between parent \times child gender. As a measure of effect size we calculated Cohen's d for group differences. The results are presented in Table 3. Again, we did not correct significance levels for multiple tests out of concern for statistical power and a too increased risk of false negative findings. Three of the 10 ANOVAs were statistically significant at $p < .05$, more than the chance expected finding (i.e., about 1 of 20 tests at $p < .05$). For the parent behavior variables, there was a main effect for parent gender on parents' positive engagement, indicating that fathers displayed overall more positive engagement than mothers. However, an interaction between parent and child gender revealed that the difference between mothers' and fathers' positive engagement was present merely for parents with boys. A test of the simple effects showed that fathers with boys were more positively engaged than fathers with girls, $F(1, 74) = 19.34$, $p < .001$, $d = 1.30$, whereas mothers with girls did not differ in their positive engagement from those with boys. Furthermore, a main effect for parent gender emerged on the parents' nonverbal behavior, indicating that fathers displayed overall more nonverbal behavior than mothers. For the child behavior variables, the only main effect was for child gender on children's positive engagement, suggesting that girls displayed overall more positive engagement than boys.

Discussion

The current study investigated family concordance and gender differences in early parent-child interaction within a sociopolitical context facilitating gender equality and father involvement. We found no family concordance in mothers' and fathers' behaviors with their child. However, children's frequencies of negative behaviors with one parent were associated with their frequencies of negative behaviors with the other parent. Corresponding associations were found for children's verbal and physical behaviors with their respective mother and father. Within mother-child dyads, higher levels of mothers' positive and negative engagement were associated with equivalent levels in children's positive and negative engagement with their mother. We found no such associations within the father-child dyads. Partly supportive of our hypotheses, we found few but noteworthy differences in mothers' and fathers' positive engagement. In families with boys, fathers were more positively engaged than mothers. Fathers of boys also displayed more positive engagement compared to fathers of girls. In contrast,

Table 2
Bivariate Correlations of Engagement and Behavior Variables Within Families and Dyads

	Within families		Within dyads	
	Mother to child with father to child	Child to mother with child to father	Mother to child with child to mother	Father to child with child to father
Engagement quality				
Positive	-.22	-.03	.55***	.27
Negative	-.07	.45**	.43**	.09
Behavior domains				
Verbal	-.22	.40*	-.05	-.06
Nonverbal	-.08	-.06	.71***	.64***
Physical	.12	.42**	.19	.21

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Two-Way ANOVA *F*-Test and Effect Size for Hypothesized Gender Differences on Engagement and Behavior Variables

	Engagement quality				Behavior domains						
	Positive		Negative		Verbal		Nonverbal		Physical		
	<i>F</i>	<i>d</i>	<i>F</i>	<i>d</i>	<i>F</i>	<i>d</i>	<i>F</i>	<i>d</i>	<i>F</i>	<i>d</i>	
Parents' behavior											
Parent gender	12.31****	0.68	1.71	0.31	1.95	0.32	4.22*	0.46	0.83	0.22	
Child gender	3.66	0.37	0.00	0.02	1.42	0.27	0.36	0.04	0.95	0.09	
Parent × child gender	18.54****		0.39		0.63		0.90		3.35		
Children's behavior											
Child gender	5.30*	0.53	0.89	0.21	0.91	0.22	0.36	0.14	2.98	0.39	
Parent gender	1.62	0.28	1.21	0.25	0.06	0.05	0.64	0.19	0.21	0.11	
Child × parent gender	0.03		0.00		0.12		1.38		0.32		

Note. *df* = 1,74.

* *p* < .05. ** *p* < .01. **** *p* < .001.

mothers of girls and boys were equally positively engaged. Fathers displayed more nonverbal behavior than mothers, and finally, girls displayed more positive engagement with both parents than boys.

The absence of within-family concordance in parents' behaviors is in line with one of few previous studies with 12-month-old children (Malmberg et al., 2007). This supports the assumption that mothers and fathers have different interaction styles (e.g., Lamb & Lewis, 2010). The contrasting findings to another study (Tamis-LeMonda et al., 2004) may be related to the difference in children's age, or a discrepancy in observational measures. In line with Ekas et al. (2011), we found that children's negative engagement with both parents was moderately consistent. The discrepancy with Malmberg et al. (2007), who found no overlap in expressed affect with mothers and fathers, may be related to differences in observational measures, as the first study used second-by-second ratings, whereas the second study used a global rating scale. Our measures of negative and positive engagement are broad and include both behaviors and expressed affect. More detailed exploration of the interactional process is needed to explain the consistency in negative engagement and the lack of equivalent consistency in children's positive engagement with their parents. The concordance in children's verbal and physical behavior may be partly explained by the child's general competency in these domains influencing on their interactional style.

That parents' and children's positive and negative engagement was positively associated within mother-child dyads, but not within father-child dyads, is in line with Malmberg et al.'s (2007) results, and may reflect a difference in the mutuality of affective engagement. Even in Norway, mothers and infants in general spend more time together during the first year, and hence have more experience with one another compared to fathers and infants. Thus, emotional responses may be more organized and coherent within mother-child dyads at 12 months (Barnett et al., 2008; Ekas et al., 2011). The strong positive association between parents' and children's nonverbal behaviors may indicate reciprocity in play activities in both mother- and father-child interaction. Nonverbal behaviors included both initiatives and responses in give-and-take situations, and dyads in which both parents and children displayed high frequencies of nonverbal behaviors may be engaged in more mutual play.

Supporting our hypothesis, and in line with studies from countries with a more traditional family policy (see Lamb & Lewis,

2010), our results suggest that child gender plays a greater role for fathers' than for mothers' positive engagement. These findings are in line with Lytton and Romney's meta-analysis (1991) where fathers were found to differentiate more between girls and boys than mothers do, and to show more positive engagement with boys compared to girls. Yet, the literature is sparse when it comes to explaining why fathers of boys appear more engaged than fathers of girls. Some speculate that fathers may identify more with sons, and that they perceive themselves as more important role models to boys than to girls. Others suggest that fathers expect more of sons and thus are more positive and encouraging and that fathers may be more protective of daughters and therefore less expressive (e.g., Lamb & Lewis, 2010). Further research is needed to investigate how mothers' and fathers' different behavior styles with girls and boys influence on their children's development (Lamb & Lewis, 2011). As may be expected of parents with 12-month-old children from a general population, frequencies of negative engagement were low. Thus, since small mean differences are not likely to emerge in our relatively small sample, this may explain the absence of gender differences in mothers' and fathers' negative engagement.

Contrary to earlier findings (Leaper et al., 1998), and to our hypothesis, mothers in our sample did not verbalize more than fathers. This may be attributed to observational measures, such as rating statement frequency as opposed to meaning, or by sample differences, as the parents from our population-based sample were highly educated. Moreover, it is possible that fathers who have spent more time with their infants the first year talk more with their children. That fathers displayed more nonverbal behaviors compared to mothers may be viewed as partly supportive of our hypothesis. Most nonverbal behavior codes included some aspect of handling toys, either as a shared activity or alone, and the finding may indicate that fathers involve in more play-related activities than mothers. This is in line with previous research from various cultural contexts (e.g., Lamb & Lewis, 2010; Lewis et al., 2009), and suggests that there may be distinctive maternal and paternal behavior styles which are consistent over different socio-political conditions.

Considering that differences in 12-month-old girls' and boys' behaviors have rarely been observed, it was surprising to find that girls in our sample displayed more positive engagement than boys. The variability in children's behavior at this age may be subtle and

hard to code (Caldera & Lindsey, 2006); nevertheless, microsocial measures may have detected differences global ratings missed. However, as positive engagement included both initiatives and responses, our finding may be considered in line with Lovas (2005), who found that slightly older girls were more responsive and involving with both parents than boys.

Strengths and Limitations

To the best of our knowledge, the current study is the first to explore family concordance and gender differences in early parent-child interaction within a Scandinavian sociopolitical context facilitating father involvement and gender equality in early child care. Furthermore, the results of this study expand the current knowledge of parent-child interaction at 12 months by including both mothers and fathers and simultaneously employing detailed microsocial measures of parent and child behaviors across multiple types of interaction tasks. However, several limitations to this research should be addressed. Although comparable to other studies in the field (e.g., Kwon et al., 2012), our sample size was relatively small and therefore vulnerable to Type II errors, that is, failing to detect meaningful effects due to low statistical power. Moreover, parents in our sample were more educated than average Norwegian parents, and a more diverse sample may have produced different results. Finally, our current analyses do not reveal the transactional nature of the interactional process. Future studies employing sequential analyses of more specific reciprocal behaviors are needed to explore the contingent relations of the ongoing interaction.

Implications

As our results were largely consistent with findings across different cultural contexts (e.g., Lamb & Lewis, 2010), they may indicate that some aspects of maternal and paternal behavior styles are consistent across contexts, while others are more sensitive to contextual influence. The clinical and political implications of the study may be carefully drawn, due to the commented limitations. However, our results indicate that preventive parenting programs may need a special focus on facilitating fathers' positive engagement with girls. Moreover, differences in mothers' and fathers' positive behavior styles may give children a wider relational experience, and thus provide a richer social environment for developing interactional skills. Further research needs to investigate in more detail what these differences consist of, and how they relate to child outcomes. More specific knowledge about if and how parents' differential engagement influence girls' and boys' later adjustment may facilitate the planning of future family policy and intervention programs.

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PAPER II

Father Involvement in Infancy and Early Behavioral Outcomes in a Context of Extensive
Paternal Leave

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Abstract

Progressive paternal leave policies encourage Scandinavian fathers to spend time in early child care. This study investigated the impact of fathers' time with infants and fathering behaviors with 1-year-olds on child outcomes at ages 2 and 3 in a Norwegian population-based sample of 1159 children. Fathers' time with infants did not have significant main effects on mother-rated behavioral adjustment at age 2, teacher-rated externalizing behavior at ages 2 and 3, or father-rated social competence at age 3. However, interaction effects indicated that more time with coercive or less sensitive fathers predicted more externalizing at age 2, and more time with less intrusive or coercive fathers was associated with higher social competence at age 3. Results suggest that the influence of fathers' time at home with their infant the first year on child outcomes is contingent on the quality of fathers' parenting.

Key words: fathers' time with infants, father-child interaction, paternal leave

Father Involvement in Infancy and Early Behavioral Outcomes in a Context of Extensive Paternal Leave

Comparative studies across time and countries show that fathers today spend more time taking care of children than has been the case in the historical past (Hofferth, Stueve, Pleck, Bianchi, & Sayer, 2002; Sullivan, Coltrane, Mcannally, & Altintas, 2009). This is particularly true for Norwegian fathers who are more involved in childcare compared to fathers in other European countries (Hook & Wolfe, 2012; Sullivan et al., 2009). The aim of the current study was, within a context of progressive paternal leave policy, to investigate the independent and interactive associations between fathers' time spent with infants, fathers' observed parenting behaviors with 1-year-olds, and children's behavioral outcomes at ages 2 and 3, relying on mothers', fathers' and teachers' reports.

Fathers' Time with Children

According to a widely used construct of paternal involvement, fathers' *accessibility* or availability to the child is one of three interrelated components of importance to later child development and adjustment, along with *engagement* and *responsibility* (Lamb, Pleck, Charnov, & Levine, 1985). The accessibility component was originally proposed to capture fathers' time in activities in which the child was present but not necessarily actively interacting with the father. Compared to its counterparts, the original definition of accessibility has been given little attention in fatherhood research (Pleck, 2012). Notably, accessibility has in some studies been defined by the parent's cohabitation, that is, a father residing in the home (Pleck, 2010). For example, a systematic review of publications in Western countries found that fathers' accessibility conceptualized as cohabitation was associated with reductions in children's behavioral and psychological problems (Sarkadi, Kristiansson, Oberkleid, & Bremberg, 2007). However, the use of cohabitation as a proxy for accessibility does not take into account whether the father is in fact emotionally or behavioral

available to the child (Pleck, 2010). In a context of generous parental leave policies where fathers are financially compensated to spend more time with infants, it seems adequate to utilize a more direct measure of accessibility. While fathers' amount of time spent in various child care activities has been largely documented (e.g., Hook & Wolfe, 2012; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001), fewer studies have looked at amount of time spent with infants in relation to later developmental outcomes. As more countries implement paternal leave as family policy, international studies have documented associations between paternal leave and fathers' participation in child care. Using US data, Nepomnyaschy and Waldfogel (2007) found that longer paternity leave at the time of childbirth was associated with more child rearing activities nine months later. Similar results were found in UK (Tanaka & Waldfogel, 2007) and Sweden (Haas & Hwang, 2008).

Research is still sparse on if and how the time fathers spend with infants during paternal leave influences children's wellbeing and later development (O'Brien, 2009). So far, a few studies have shown significant benefits for children's cognitive outcomes, but weaker evidence for their social competence or behavioral adjustment (e.g., Cools, Fiva, & Kirkebøen, 2011; Huerta, Adema, Baxter, Han, Lausten, Lee, & Waldfogel, 2013). However, it has not been clearly evidenced that fathers' time with infants by itself is associated with children's development (Pleck, 2010). In this study we investigate the independent impact of fathers' time with infants on later child behavioral adjustment and social competence.

Although availability is commonly regarded as beneficial, fathering experts argue it is necessary to study both the amount of time and the quality of father-child interactions (Cabrera, Fitzgerald, Bradley, & Roggman, 2007a; Pleck, 2012). For example, research with residential and nonresidential fathers during latency and adolescence has demonstrated that fathers' parenting behaviors can condition the impact of time spent with children (DeGarmo, 2010; Jaffee, Moffitt, Caspi, & Taylor, 2003) such that more time is beneficial for children's

behavioral outcomes unless fathers exhibit antisocial or coercive parenting. These findings are consistent with the position that quality of father involvement, not merely quantity, is key in determining child outcomes (Wood & Repetti, 2004).

Fathers' Parenting Behaviors

Related to accessibility, the father involvement construct *engagement* includes quality aspects of fathers' direct interaction with the child (Pleck, 2012). Father-child interaction in infancy and early toddlerhood has been given increased attention over the last decades, and fathers' behaviors during interaction have been found to influence later child adjustment (for review, see Lamb, 2010). For example, a UK study showed that disengaged and remote father-infant interaction observed at 3 months predicted externalizing problems at age 1 (Ramchandani, Domoney, Sethna, Psychogiou, Vlachos, & Murray, 2013). Similarly, a German study found lower levels of father responsiveness during parent-infant interaction at 3 months to be associated with more externalizing behavior when the children were 8 and 11 years of age (Trautmann-Villalba, Gschwendt, Schmidt, & Laucht, 2006). With demographic increases in father involvement from birth, the quality of fathers' behaviors during direct interaction with infants may be more salient with child development (Lamb & Lewis, 2013; Pleck, 2012). Yet, even though literature on father-child interaction is growing, few have studied fathers' parenting behaviors with 1-year-olds by multiple observational methods, and no study to date has tested the impact of fathering behaviors in the context of subsidized paternal leave.

Theoretical Perspectives

The current study is based on two influential theoretical approaches on why fathers' parenting behaviors are associated with child behavioral outcomes; *social interaction learning theory* (Patterson, 1982) and *attachment theory* (Ainsworth, Behar, Waters, & Wall, 1978). Both are grounded in observational studies of parent-child interaction, and although

they utilize quite different observational methods, micro measures versus global ratings, they complement each other in describing associations between the quality of early parent-child interaction, context and later child development (Scaramella & Leve, 2004).

Developmental studies of parent-child interaction have been largely informed by social learning models describing how children's behavioral development is directly affected by the continuous interaction between children and their parents (Lamb & Lewis, 2013; Reid et al., 2002). In particular, Patterson's (1982) coercion model holds that through a process of mutual reinforcement, parents inadvertently reinforce children's aversive behavior, and vice versa. These coercive exchanges may generalize across social settings, and lead to later externalizing behavior problems (Patterson, 1982). It is assumed that the coercion process starts at around 10-18 months of age, although research from this early developmental period is sparse (Patterson, 2005). Patterns of ongoing interaction are most adequately assessed by observing distinct behaviors of interest at a micro level (Patterson, 1982), and observational studies have shown that the coercion model is particularly relevant for fathers (DeGarmo & Forgatch, 2007; Dishion, Owen, & Bullock, 2004). In one study, relative to mothers', fathers' inept discipline explained twice the variance in children's problem behaviors (Patterson & Dishion, 1988). More recently, DeGarmo (2010) found that residential and nonresidential coercive fathering predicted children's observed noncompliance over time.

According to attachment theory, parents' sensitivity to the infant's emotional cues and responses is a salient parenting dimension in predicting secure attachment relationships and subsequent child development and adjustment (Ainsworth et al., 1978). Moreover, a growing body of research has shown a nearly equally strong associations between early father sensitivity and later child adjustment as for mother sensitivity (e.g., Lamb & Lewis, 2013; Bretherton, 2010). Two recent US studies showed that fathers' observed sensitivity and intrusiveness with children at ages 2 and 3 predicted children's cognitive and social

development (Cabrera, Shannon, & Tamis-LeMonda, 2007b; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Based on these frameworks, the current study expands prior involvement research by employing observational measures of both micro social fathering behaviors as well as global ratings of paternal sensitivity and intrusiveness.

Paternal leave and Family Policies in Norway

To what degree fathers spend time with their infants and take their share of responsibility for early child care depends among other factors on leave policies (Huerta et al., 2013). In contrast to the US, Scandinavian sociopolitical contexts facilitate fathers' involvement in the daily care of children to a greater extent (Haas & Hwang, 2013). Paternal leave is part of the broad and progressive family policies in Norway, and the arrangement is intended to strengthen the relationship between fathers and children and thereby enhance positive developmental outcomes for children (e.g., Cools et al., 2011). When children in the current study were born (2006 to 2008) parents were granted 10 months paid parental leave at 100% salary up to a level of approximately the national mean income, or 12 months leave at 80% salary for one of the parents. As part of this policy, fathers were granted a quota of 6 weeks of paternal leave as an individualized entitlement nontransferable to the mother. After data for the current study was collected, father's nontransferable quota increased to 10 weeks in 2009 and 12 weeks in 2012. Mothers are entitled to 3 weeks leave prior to due date, and the first 6 weeks after birth, while the remaining leave period may be shared between the parents as they prefer. The right to parental leave is conditioned on both parents being employed for at least 6 of the 10 months prior to expected delivery. Between 2006 and 2009 about 78% of all fathers and 90% of all mothers in Norway with children under age 1 took paid parental leave, while about 25% of fathers took more than 6 weeks, and about 10% took less (Bringdal & Lappegård, 2012).

These parental leave policies must be considered within the broader Norwegian sociopolitical context. Norway is a rich country rated among top five countries in the OECD on overall social justice and with a child poverty rate of 5.5% (Bertelsmann Stiftung, 2011), and the best country in the world in which to be a mother (Save the Children, 2011). Norway is also rated among top 6 OECD countries for its early child service policies (UNICEF Innocenti Research Center, 2008). From age 1, Norway provides public funding for universal early child care with regulated quality standards (See Zachrisson, Nærde, & Janson, 2012, for further information). Furthermore, parents who decide to stay home are allowed a cash-for-care entitlement until age 3.

Paternal leave policies potentially have implications for child well-being (Han, Ruhm, & Waldfogel, 2009). A Norwegian study of the impact of paternal leave and long term father involvement found that fathers spent significantly more time with their children after the paternal quota was implemented (Rege & Solli, 2010). Results from another study suggested that paternal leave increased fathers' importance in relation to children's cognitive skills (Cools et al., 2011). However, the extension of paternal leave time in Norway is recent, and there are few studies on how fathers' time in paternal leave impacts later child outcomes.

Present Study Hypotheses

In this study we expand prior research by focusing on quantity and quality aspects of early father involvement and behaviors within the context of paternal leave. Specifically, we hypothesize: 1) Higher quantities of fathers' time spent with infants in their first year will be associated with better child behavioral outcomes at ages 2 and 3, controlling for mothers' time with the infant, socio-demographic characteristics, and child temperament; 2) Observed quality of fathers' behaviors during interaction with the child at age 1 will moderate the impact of time spent with the infant such that more time with positively engaged or sensitive

fathers will benefit child behavioral adjustment, and conversely, more time with coercive or intrusive fathers will have a negative impact on child adjustment.

Method

Participants

The sample consisted of 1159 children and their families from the *Behavior Outlook Norwegian Developmental Study* (BONDS), a longitudinal study tracking children's social development from 6 months. The parents of 1931 eligible children were informed about the study, of whom 1465 (76%) agreed to be contacted, and 1159 (79%, or 60% of those originally informed) approved to participate. Recruitment took place through child health clinics in five municipalities in 2006 - 2008. Norwegian child health clinics are public and free, and attended almost universally. Inclusion criteria were the child being of the appropriate age and one parent being able to participate in interviews without translation. We compared key demographic variables reported by participating parents (i.e., child's gender and birth order, parents' birth country, age at birth, marital status and education) to anonymous records of all eligible families, and found that the only distinction was that mothers in the sample had higher education. The overall retention rate was very high: 97% of families were still participating at the age 3 follow-up (i.e., 1132 out of 1159 children).

Data Collection and Assessment Procedures

Personal interviews with the parents took place when the children were 6, 12, 24 and 36 months. This study was conducted with father- and mother focused data collection waves. At 6 months both parents were invited to the interview, at 1 and 3 years we invited the fathers in particular, and at 2 years mothers were invited to participate. Videotaped observations of father-child interaction were executed when the children were 1 year old. Parents of 1139 children participated in this wave, 839 fathers came to the assessment, and a total of 750 fathers participated in structured interaction tasks with their child (51% boys). A comparison

of participants and non-participants showed that fathers who participated in the structured interactions were typically older, had more education, reported better housing, and spent more time with their infant the first year than fathers who did not participate. Structured tasks were selected based on prior research showing their capacity to elicit parent and child behaviors associated with later child adjustment (e.g., Shaw, Lacourse, & Nagin, 2005; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003). Tasks included: *free play*, fathers were asked to play with their child as they liked with a provided set of toys (4 min); *clean up*, fathers were asked to put the toys away and were told that their child could help but was not required to (2 min); *structured play*, fathers were presented with two different sets of toys, a shape sorter box and a set of stacking rings, and were asked to help the child as much as they thought necessary with one toy at a time (2×3 min); and a *waiting task*, in which the child had to remain in a high chair with no toys while the father answered a questionnaire (3 min). Toys were selected to be age appropriate and indifferent to stereotypic gender preferences. Fathers were informed that they could choose to discontinue the tasks at any time.

Fathering behaviors were obtained from the interactions utilizing both micro-social coding of discrete behaviors and global ratings of parenting qualities. A micro-social observational coding methodology was applied to capture discrete behaviors and the moment-to-moment dynamics of parent-child interaction during all four tasks. The Toddler and Parent Interaction Coding System (TOPICS; Nordahl, Duckert, & Bjelland, 2007) was adapted from the Family and Peer Process Code (FPPC; Stubbs, Crosby, Forgatch, & Capaldi, 1998) to be suitable for interactions with 1 year old children. This coding strategy is based on social interaction learning theory and is designed to measure individual elements of behavior from explicit descriptions of overt, distinguishable behaviors (Patterson, 1982; Reid et al., 2002). Data were recorded as a single stream in real-time from videotaped interactions, and provided information for initiator, respondent, behavior, and expressed affect. There

were 27 mutually exclusive behavior codes and eight different affect codes defined a priori as positive, neutral, or negative. Positive behaviors included positive verbalization, such as talk (e.g., *I like this*), praise (e.g., *well done*), positively expressed guidance (e.g., *this block goes here*) and directions (e.g., *put this block here*); nonverbal behaviors, such as initiating play (e.g., presenting a toy), scaffolding (e.g., putting toys where the child may reach them); physically expressed positive affection (e.g., hugging), and positive verbal (e.g., *yes*) or nonverbal (e.g., following the other person's initiative) responses. Neutral behaviors included neutral talk (e.g., expressions with no positive or negative affective value), vocal uttering with no meaningful words (e.g., *oohh*), and solitary play. Negative behaviors included negative talk (e.g., *this is stupid*), disapproval (e.g., *you don't get it*), negatively expressed directions (e.g., *no, not like that*), physical aggression (e.g., throwing toys or hitting), and negative verbal (e.g., *no*) or nonverbal (e.g., withdrawing from the other person's initiative) responses. Affect categories indicated happy, caring/content, neutral, discontent, angry, sad, anxious, and frightened. A team of 6 coders were trained for 4-6 months and were required to obtain 75% agreement and a Cohen's Kappa of .70 before coding study data. Twenty percent of the interactions were randomly selected for reliability checks. Overall coder agreement was 77% with a Cohen's Kappa of .74.

Global ratings were obtained from the NICHD's Study of Early Child Care scales Qualitative Ratings for Parent-Child Interaction at 3-15 Months of Age (Cox & Crnic, 2003) during 2 segments; (1) the free-play and clean-up task (6 min), and (2) the structured play task (6 min). Based on attachment theory, these rating scales included fathers' Intrusiveness (*adult centered, driven by parent's agenda*), Detachment/Disengagement (*lack of engagement with child*), Sensitivity/Responsiveness (*sensitive to child signals, responsive to child cues*), Positive Regard for the child (*physical affection, warm voice, smiles*), Negative Regard for the child (*harsh voice, disapproving, rough handling*), Animation (*energy*,

excitement, interest), and Stimulation of Development (*engage in age-appropriate behaviors that foster cognitive and physical development*). Rating scales include both quantity and quality of observed behaviors and are manualized (Cox & Crnic, 2003) providing extensive examples of scoring behaviors and behavior hallmarks of distinct scores. These were rated on a Likert scale ranging from 1 (*not at all characteristic*) to 5 (*highly characteristic*). Six coders were trained extensively until reliability criteria were met, and reliability was monitored in biweekly team meetings. Intra-class correlations (ICC) for single scales included ranged from .65 to .74.

Measures

Time with infant. Fathers' time with infant was a composite score assessing the amount of time spent with the child during the first year of life, based on two father-reported items at the 1 year assessment: (1) "How many months have you spent at home with your child until now?" and (2) "How many hours per week are you alone with your child?" The composite score was the annualized time with child multiplying reported hours per week times total months during year 1. The mean reported hours alone per week was 13.73 ($SD = 13.23$), the mean number of months was 2.60 ($SD = 2.35$), and the mean annual hours was 38.21 ($SD = 59.45$). The weighted score was significantly skewed and kurtotic, we therefore log transformed the final composite variable which was normally distributed ($M = 3.02$, $SD = 1.25$, Skew = -0.12, and Kurtosis = -0.37).

Fathers parenting behaviors. Two scores were obtained from the micro coding, *positive engagement* and *negative reinforcement* (DeGarmo & Forgatch, 2007; DeGarmo, 2010); and two scores were obtained from the global ratings, *sensitivity* and *intrusiveness* (Cabrera & al., 2007b; Cox & Crnic, 2003).

Positive engagement included all positive behaviors with positive or neutral affect and all neutral behaviors with positive affect. For example, offering a toy (positive nonverbal

behavior) with a neutral facial expression (neutral affect) was regarded positive engagement, as was picking up the child (neutral physical behavior) with a smile (positive affect).

Negative reinforcement was a micro social sequential score theoretically and empirically defined by the frequency of a father-initiated negative behavior (e.g., takes away toy, physically prevents child from moving, says “*don’t do that*”) that is reciprocated by a child negative behavior (e.g. throws toys, fusses, kicks, cries) within a 6 second time frame and subsequently is followed by at least 12 seconds of no aversive exchanges. In these sequences, the child has the last aversive behavior in the chain of events. Thus, the child’s negative behavior is rewarded when the father terminates his initiated aversive behavior (Patterson, 1982). The negative reinforcement score was significantly skewed and kurtotic and was therefore log transformed ($M = 0.59$, $SD = 0.56$, $Skew = 0.41$, and $Kurtosis = -0.88$).

Father sensitivity and intrusiveness scores were based on prior work by Cabrera, Shannon, and Tamis-LeMonda (2007b). *Sensitivity* was a 4-item measure comprised from the global ratings of the following father scales: sensitivity/responsiveness, positive regard, detachment (*reversed*), and stimulation of development (for each coded segment: a principal components eigenvalue with varimax rotation = 3.24 and 3.22; respectively, Chronbach’s $\alpha = .83$ and $.80$; for the comprised scale: a principal components eigenvalue with varimax rotation = 3.41 and Chronbach’s $\alpha = .85$). The second score was the *intrusiveness* rating which was correlated $.55$ across the coded segments.

Age 2 and Age 3 Child Outcomes

Age 2 data were from the maternal focused follow-up and included reports of children’s behavioral functioning by child care teachers and mothers. Age 3 data were from the paternal focused follow-up and included reports of behavioral functioning by child care teachers, and social competence reports by fathers. For data reduction and construct building, we employed factor analyses in structural equation modeling with model trimming criteria

(Eddy, Dishion, & Stoolmiller, 1998). Constructs were required to have internal consistency of scale items with alphas above .60, item-total correlations above .20, scale convergence in the structural equation model greater than .35, and acceptable fit.

Age 2 behavioral adjustment - mother report. A mother-reported child functioning construct was comprised of three indicators, *Physical Aggression*, *Self-Regulation*, and *Soothability*. The aggression indicator included 7-items measured on a scale from 1 (*never/not in the past year*) to 7 (*more than three times daily*). Sample items included: *Hits you*, *Bites other*, *Kicks other*, and *Pulls hair* (Cronbach's $\alpha = .76$). The self-regulation indicator was 4 items from the Ages and Stages Questionnaire (ASQ-SE; ASQ; Bricker, & Squires, 1999; Janson, 2003), and included: *Calms down within time period?* *Cries for long period of time*, *has tantrums?* *Hurts others?* and *Has preservative behaviors?* Items were measured on a scale from 1 (*most of the time*) to 3 (*rarely or never*). Soothability was a 5-item scale from the Early Child Behavior Questionnaire (ECBQ; Putnam, Gartstein, & Rothbart, 2006) rated from 1 (*never*) to 7 (*always*). Sample items included: *When upset, how often did your child stay upset for more than 10 minutes?* *Following an exciting activity or event, how often did your child calm down quickly?* and *When upset, how often did your child become easily soothed?* ($\alpha = .61$).

Age 3 social competence - father report. The latent variable construct of social competence was comprised of six subscales from the *Social Competence in Preschoolers* questionnaire specifically developed for Norwegian preschool children (Lamer & Hauge, 2006). In total, 31 items are rated from 1 (*very rarely*) to 5 (*very often*). Subscale indicators were: *Empathy and role-taking* (5 items, $\alpha = .78$), *Pro-social behavior* (5 items, $\alpha = .81$), *Self-control* (6 items, $\alpha = .70$), *Self-assertion* (6 items, $\alpha = .60$), *Play, pleasure and humor* (5 items, $\alpha = .79$), and overall *Social adjustment* (4 items, $\alpha = .70$).

Age 2 and 3 externalizing - child care teacher report. After construct evaluation,

two indicators defined the teacher construct, *Physical Aggression*, and *Noncompliance*, at ages 2 and 3, respectively, each rated at a 7-point scale from 1 (*never/not in the past year*) to 7 (*more than three times daily*). The 7 items measuring physical aggression at both time points were identical with those included in maternal report above ($\alpha = .82$ and $.78$, at age 2 and 3, respectively) except that *Hits siblings* was substituted with *Hits other children*. Noncompliance was measured with nearly identical items, including 7 items at age 2 and 10 items at age 3, rated from 1 (*never/not in the past year*) to 7 (*more than three times daily*). Sample items included: *Is very loud, shouts and screams*, and *Does not follow rules in the child care center* ($\alpha = .79$ and $.85$, at age 2 and 3, respectively).

Control Variables

Several key covariates were included in the analyses relevant for fathers' paternal leave (Haas & Hwang, 2013), parenting, and child outcomes. We included a child temperament construct at 6 months given its associations with later behavioral problems (e.g., van den Akker, Deković, Printzie, & Asscher, 2010). Following data reduction, the mother-reported child temperament construct was comprised of two indicators from the Infant Behavior Questionnaire (IBQ-R; Gartstein & Rothbart, 2003). *Distress to Limitations* and *Soothability*, each including 7 items, were rated on a modified three-point response format: 1 (*most of the time*), 2 (*sometimes*), or 3 (*rarely or never*), in addition to a *does not apply* option ($\alpha = .77$ and $.76$, respectively, excluding *does not apply*). A third indicator was the *Self-Regulation* subscale from the Ages and Stages Questionnaire (ASQ; Bricker, & Squires, 1999; Janson, 2003). *Self-Regulation* (reversed scale, 5 items), sample item included: *When your child is distressed, is he/she capable of soothing itself within half an hour?* Mothers responded to the items on a 3-point scale scored 0 (*not yet*), 5 (*sometimes*), or 10 (*yes*).

Key demographic covariates were *child gender* coded 0 (*girl*) and 1 (*boy*); *mother education* and *father education* measured as years of formal schooling reported when the

child was 1 year old, *father unemployment* status when the child was 1 year old, coded 0 (*employed*) and 1 (*unemployed*), and *mothers' months with infant* during the first year (*How many months have you spent at home with the child until now?*).

Analytic Strategy

Study hypotheses were tested with structural equation modeling (SEM) in the MPlus7 program (Muthén & Muthén, 1998-2012). Model fit was evaluated using recommendations for large sample sizes including the root mean square error of approximation (RMSEA), a standardized root mean square residual below .08, and a Tucker Lewis index (TLI) greater than .90 (Hu & Bentler, 1998). Main effect hypotheses were tested by regressing latent variable child outcomes on time with infant and fathers' parenting behaviors. To specify tests of fathering behavior as a moderator, variables were entered in the multivariate model as centered first order terms and centered cross products of time with infant and the respective parenting scores (Cohen, Cohen, West, & Aiken, 2003).

Missing data. For the 1159 participating families, 513 families had complete data and 646 had partially missing data on variables employed in the present analyses. Among the demographic covariates, families with complete data were higher on mothers' education ($M = 14.90$, $SD = 2.46$ and $M = 13.78$, $SD = 2.55$, respectively, $t = 7.53$), fathers' education ($M = 14.41$, $SD = 2.48$ and $M = 13.41$, $SD = 2.61$, $t = 6.59$); and lower on number of months mothers were at home ($M = 10.81$, $SD = 1.68$ and $M = 11.17$, $SD = 1.47$, $t = 3.82$) and father unemployment (2% and 8%, respectively, $\chi^2(1) = 17.12$).

There were no differences between complete and partial data families on any fathering behavior scores. However, fathers in complete data families were higher on the log time with infant ($M = 3.25$, $SD = 1.25$ and $M = 2.88$, $SD = 1.25$, $t = 2.64$). For comparison of the dependent latent constructs, we compared unconditional latent factor scores. No differences were observed for age 3 social competence; however, complete data families

were higher on age 2 mother rated behavioral adjustment ($M = .03$, $SD = .26$ and $M = -.02$, $SD = .29$, $t = 3.09$) and were lower on age 2 teacher rated externalizing factor ($M = -.04$, $SD = .59$ and $M = .03$, $SD = .43$, $t = 2.11$). No differences were observed for age 3 teacher rated externalizing ($M = -.02$, $SD = .73$ and $M = .02$, $SD = .63$, $t = 1.12$).

Given the probability of missing data were related to the observed variables, the mechanism of missing data is considered as missing at random (MAR) or ignorable missingness with inclusion of key covariates (Enders, 2010). Following recommendations for the MAR data mechanism (Jeličić, Phelps, & Lerner, 2009), SEM models were estimated with full-information maximum likelihood (FIML) which uses all available information from the observed data in handling missing data. FIML estimates are computed by maximizing the likelihood of a missing value based on observed values in the data.

Results

The means, standard deviations, and bivariate correlations for the key study variables are provided in the Appendix Table 1. The study hypotheses were tested by specifying a latent variable SEM prediction of mother-reported behavioral adjustment, teacher-reported externalizing behavior, and father-reported social competence. Control variables for each model below included 6 month child temperament measured as a latent variable, and demographic control variables described in the method section, including number of months' mothers' spent at home during the first year. First order centered fathering predictors included father's time with infant, and the four measures of observed fathering behaviors (*positive engagement, negative reinforcement, sensitivity, and intrusiveness*). Second order interaction terms included centered cross products of fathers' time with infant by each of the respective fathering behavior scores.

Age 2 Child Behavioral Outcomes

Results of the age 2 teacher-reported externalizing construct are shown in Figure 1. The

freely estimated covariance paths among the exogenous predictor variables on the left hand side of the figure were not displayed for the sake of visual clarity. Hypothesis 1 was not supported by the data; however, partial evidence for hypothesis 2 was obtained. Two of the four potential interaction terms evidenced prediction of externalizing behavior in child care settings in the expected direction. With the exception of boys being rated higher in aggression by teachers ($\beta = .15, p < .001$), none of the first order fathering variables or control variables were associated with age 2 externalizing behavior. However, there was a significant effect obtained for the time \times negative reinforcement ($\beta = .13, p < .01$). In addition, there was a significant interaction effect for time \times father sensitivity interaction term ($\beta = -.12, p < .05$). In summary, more time had a detrimental impact on externalizing if fathers were high in observed negative reinforcement. In contrast, for fathers high in sensitivity, more time spent with the infant had a beneficial impact on lower levels of teacher-rated externalizing. Overall, the teacher-rated model explained 8 percent of the variance and showed good fit to the data (RMSEA = .02, SRMR = .04, TLI = .95). To illustrate the moderating effect, we plotted fathers' time with infant \times fathers' negative reinforcement during interaction for teacher reported child externalizing at age 2 in Figure 2 using methods for probing the conditional effect outlined by Preacher, Curran, and Bauer (2006).

There were no main or interaction effects of the fathering variables for the age 2 mother-reported adjustment model, and thus, hypotheses 1 and 2 were not supported for this outcome. With regard to the control variables, the child's difficult temperament was associated with lower levels of behavior adjustment ($\beta = -.30, p < .001$) and mothers' higher education was associated with higher levels of behavioral adjustment ($\beta = .22, p < .001$). Total explained variance in the model was .17, and the model fit was adequate (RMSEA = .03, SRMR = .04, TLI = .92). Due to space constraints, we do not present the figure.

Age 3 Child Behavioral Outcomes

Result for the age 3 father-reported social competence outcome is shown in Figure 3. A similar pattern emerged to the age 2 teacher reported externalizing problems findings. No main effect of time with infant was obtained; however, two of the four parenting interaction terms predicted age 3 social competence. For this father-reported model, intrusive ($\beta = -.09, p \leq .05$) and coercive ($\beta = -.08, p < .10$) parenting moderated fathers' time with the infant such that more time with intrusive or coercive fathers predicted lower age 3 child social competence. Difficult temperament was associated with lower levels of social competence ($\beta = -.16, p < .001$) and boys were rated lower than girls ($\beta = -.15, p < .001$). The more months the mother was at home in year 1, the higher the child's social competence ($\beta = .12, p < .001$). Total explained variance was 9%, and the model obtained adequate fit (RMSEA = .03, SRMR = .04, TLI = .90). There were no predictive effects of the fathering variables for the age 3 teacher-reported externalizing model. Hypotheses 1 and 2 were not supported for teacher reports at age 3, and thus, we do not present the figure. However, boys were reported to have more externalizing problems ($\beta = .23, p < .001$), as were children with more difficult temperament ($\beta = -.09, p < .05$) and the model fit was adequate (RMSEA = .02, SRMR = .04, TLI = .96), while the total variance explained by the model was .09.

Discussion

In this study, we examined the association between fathers' time spent with their infant the first year, fathers' parenting behaviors at age 1, and child behavioral outcomes rated by multiple informants at ages 2 and 3, within the context of parental leave. We did not find main effects of fathers' time with infants on later child behavior. Across domains and raters, for two of the statistical models, we found that the association between time with infant and child outcomes was contingent on the quality of fathering behaviors, supporting our second hypothesis. Specifically, micro measures of fathers' negative reinforcement significantly moderated time with infant on teacher-rated externalizing at age 2 and

marginally moderated time with infant on father-rated social competence at age 3. Fathers' sensitivity measured by global ratings moderated time with infant on teacher-rated externalizing at age 2, while fathers' globally rated intrusiveness moderated time with infant on father-reported social competence at age 3.

The present findings add to the current literature (e.g., Dishion et al., 2004; Ramchandani et al., 2013; Reid et al., 2002; Tamis-LeMonda et al., 2004) on the relevance of specific parenting behaviors that reinforce and shape developmental outcomes as well as the importance of fathers' sensitive parenting. Focusing on infancy and toddlerhood within a different sociopolitical cultural context, our findings replicate prior research with older children showing that fathering quality moderates time spent with child (DeGarmo, 2010; Jaffee et al., 2003); providing support for the generalizability of father involvement and social learning impacts on children across cultures and developmental periods.

Fathers' Time with Infants

The lack of a direct association between fathers' time with infants and later child outcomes is contradictory of earlier findings from paternal leave studies (Cools et al., 2011; Huerta et al., 2013). This difference may be related to the heterogeneity in the study population. Comparative analyses show that fathers from a wider range of the population take time off work to care for infants when paternal leave is statutory, of extended duration, has high income replacement, and is non-transferable to mothers (Huerta et al., 2013; O'Brien, 2009). When paternal leave arrangements are non-existing or carry low income replacement, only the economically secure parents will be able to spend time with their infants. In Nordic countries a vast majority of eligible fathers take at least some part of the paternal leave (Bringdal & Lappegård, 2012; Haas & Hwang, 2013). Our results are more consistent with recent findings also showing no clear link between fathering leave time and child outcomes in

Denmark, where no significant differences were observed between fathers who took leave and those who did not (Huerta et al., 2013).

In accordance with most empirical research on the impact of parental leave, our measure of fathers' time at home with their infant does not account for how this time was spent, which in turn may have affected our results (O'Brien, 2009). For example, the time fathers spend with children alone may be qualitatively different from time with children in the presence of the mother, and may be of consequence to fathers' influence on later child development (Wilson & Prior, 2010). When both mothers and fathers are present with infants, mothers generally are responsible for the caretaking and fathers tend to be more playmates and babysitters than when fathers have sole care for their child (Craig, 2006; Wilson & Prior, 2010). Mothers still spend considerable more time at home with infants than fathers, and if fathers in addition to spending less time rarely are alone with their infant, close and significant father-child relationships may take longer to evolve (Craig, 2006).

Nevertheless, our measure of fathers' time spent with the infant must be viewed in light of a sociopolitical context emphasizing father involvement in caretaking. This context may encourage fathers to take a more active role as caregivers, than what is common in less facilitating contexts, and may also encourage fathers to spend more unpaid time with their children or to work shorter hours (Huerta et al., 2013; Rege & Solli, 2010). Thus, it is uncertain to what extent findings from countries with divergent parental leave policies (e.g., Wilson & Prior, 2010) regarding parental division of care giving responsibilities are generalizable across contexts.

Fathers' Parenting Behaviors

Contrary to earlier findings from the US (Cabrera et al. 2007b; Tamis Le-Monda et al., 2004), Germany (Trautmann-Villalba et al., 2006) and the UK; (Ramchandani et al., 2013); we found no direct effects of fathers' observed parenting behaviors on children's

behavioral outcomes. This may be partly explained by differences in samples; our study is a large population based study while the above mentioned studies had smaller low-income (Cabrera et al. 2007b; Tamis Le-Monda et al., 2004) or clinical samples (Ramchandani et al., 2013; Trautmann-Villalba et al., 2006). Moreover, the children's age during father-child interactions may be a salient factor, as two of the studies measured father-child interaction at 3 months (Ramchandani et al., 2013; Trautmann-Villalba et al., 2006) and the other two at 2 and 3 years (Cabrera et al. 2007b; Tamis Le-Monda et al., 2004). This could yield dissimilar results because different effects of father-child interactions may emerge at different points in development (Cabrera et al., 2007b).

The sociopolitical context may also have influenced the lack of a direct effect from fathers' parenting. Fathers in countries where paternal leave has been part of policies promoting gender equality for a long time may be better adjusted to their role as important caregivers, and may on average not display enough negative reinforcement or intrusiveness with infants to reach the critical level necessary to affect child development adversely. Our findings should also be viewed in the light of broader aspects of Norwegian social policies, where children usually enter relatively high quality subsidized center care at an early age (Zachrisson, Janson, & Nærde, 2012), and thereby may have more of a buffer against coercive and intrusive parenting than toddlers in countries with less optimal child care arrangements (Watanura, Phillips, Morrissey, McCartney, & Bub, 2011). This contrasts countries like the US, where more children may be exposed to multiple risk factors of negative parenting and low quality very early child care (Watanura et al, 2011).

Moderator Effects

Two out of four specified models provided some support for our second hypothesis. The findings were all in the expected direction, in that the more time fathers' spend at home with their infant, the more impact the quality of his parenting behaviors has on children's

behavioral development. As presupposed, our results suggest that while more time with sensitive fathers benefit later child adjustment, more time with coercive and intrusive fathers may contribute to a less optimal development. Thus, increased time with fathers is not always beneficial to children's development; it may be conditional.

Fathers' *negative reinforcement* moderated fathers' time across two of the three reporters, which leaves some evidence for the father coercion model at 1 year. Children learn negative behaviors both by copying others and by being reinforced for their own behavior, and fathers who initiate negative reciprocity may do both (Patterson, 1982; Scaramella & Leve, 2004). This indicates that the coercive process may start during infancy (Patterson, 2005; Reid et al., 2002), and that fathers' negative reinforcement matters more with increased time at home with the child (DeGarmo, 2010). That child care teachers reported more externalizing at age 2 for children who spent more time with coercive fathers suggests that fathering behaviors affect children's behavior across settings even at this early age. This is in line with earlier findings for mothers and older children in that coercive and negative parenting predicts toddlers externalizing behavior in different settings (Fagot & Leve, 1998; Rubin, Burgess, Dwyer, & Hastings 2003).

Notable, and contrary to the age 2 teacher model, fathers' time and behavior variables at age 1 were not associated with age 2 mother-reported behavior adjustment. This inconsistency in the results does not appear to be related to the model fit. Mothers' education and children's temperament were significantly associated with mother-reported child behavioral adjustment, as may be expected from earlier research (e.g., van den Akker et al., 2010), although there is a risk for shared method variance as both child temperament at 6 months and behavioral outcome at 2 years were reported by mothers.

Fathers' *sensitive parenting* at age 1 had a beneficial impact on teacher-rated behavior outcomes at age 2 for children who spent more time with their father such that children who

spent more time with sensitive fathers showed significantly less externalizing at age 2. This shows some support for recent findings (Cabrera et al. 2007b; Ramchandani et al., 2013; Trautmann-Villalba et al., 2006) in that fathers' sensitivity matters to later child development across contexts. However, in our sample this was only true if fathers spent more time with infants. Fathers' *intrusiveness* significantly moderated fathers' time on father-reported social competence at age 3 such that children who spent more time with intrusive fathers showed less social competence. Micro measures of fathers' overall *positive engagement* showed no association with later child adjustment in our models. It may have affected the results that positive engagement included all positive behavior and affect, and represented various ways in which fathers may be positive. Moreover, positive engagement was the only observed parenting variable representing fathers' parenting behaviors without considering the influence of the child's behavior. Negative reinforcement was derived from both father and child behaviors, and ratings of sensitivity and intrusiveness take into account fathers' reactions to child behaviors (Patterson, 1982; Cox & Crnic, 2003). Taken together, this may suggest that variables that to some extent include reciprocal father-child behaviors are better predictors of later child outcomes than frequency summaries (Scaramella & Leve, 2004).

Unlike the age 2 teacher model, fathers' time and behavior variables at age 1 were not associated with age 3 teacher-reported externalizing. We failed to find other studies from this age group including fathers' parenting behaviors and child care teachers' report of child adjustment. However, for older children, one study found that fathers' sensitivity with 4-5 year-olds mattered for children's level of behavior problems and social skills with others at school entry (NICHD Early Child Care Research Network, 2004), while another found that this was only true if mothers were less supportive (Martin, Ryan, & Brooks-Gunn, 2010). The diversity in findings may suggest that generalization to the preschool setting is dependent on relatively concurrent developmental periods (Fagot & Kavanagh, 1993).

Strengths and Limitations

There are several strengths to the present study. We rely on a large population based study with high retention rates and good representative value (Nærde, Janson, & Ogden, 2013). Few studies of father involvement have controlled for maternal involvement (Pleck, 2012), while in this study we included mothers' time with their infant the first year. A major strength of the design was the comprehensive measures of fathers' parenting with 1-year-olds assessed by discrete father behaviors as well as globally rated parenting quality. Other strengths of the analyses included temporal specification of fathering behaviors and later developmental outcomes, controlling for infant temperament rated at 6 months, and the use of mismatched predictor and outcome data sources that help minimize threats of mono-method bias. Finally, the developmental outcomes included both strength based social competence as well as children's problem behaviors.

The current study also has notable limitations. First, fewer fathers than ideal participated in the observed interactions. Moreover, there may have been a selection bias where participating fathers were more educated, older, more satisfied with their housing quality, and spent more time with their infants than the non-participants. This may reduce the overall representativeness of our results. Furthermore, the variable "fathers' time with infant" was less than optimal, thus, our measure of fathers' time spent at home with infants the first year must be interpreted with caution. It does not specifically account for how much of this time was paid paternal leave, and there may be other reasons for fathers to stay home, which in turn may have different impact on the interaction with their children and later child development. Finally, given the study design and alternating focus on mothers and fathers for the intensive multiple method assessment design, we were not able to control for contributions of maternal parenting behaviors. Both observational developmental and experimental studies indicate that in addition to independent effects of mothers and fathers,

the co-parenting alliances are essential to the parenting domain in two-parent families (Cowan, Cowan, Pruett, Pruett, & Wong, 2009; Feinberg, Kan, & Goslin, 2009).

Implications for Theory, Policy & Practice

By showing interactive associations between fathers' time with infants, fathers' observed parenting behaviors with 1-year-olds, and children's behavioral outcomes at ages 2 and 3, our study supports a large body of fatherhood research emphasizing that a multidimensional approach is necessary to understand father involvement and its impact on child development (e.g., Cabrera et al., 2007a; Lamb, 2010; Schoppe-Sullivan, McBride, & Ho, 2004). However, as father involvement does not merely include fathers' behavior, but is a relational process where the children's behavior also influences fathers' parenting, further research is needed to investigate the nature of these bidirectional transactions. Future studies including longitudinal observational data will help to untangle the transactional process in which children contribute to their own social development (Schoppe-Sullivan et al., 2004; Scaramella & Leve, 2004). Since fathers and children usually constitute only part of the family, and all family members influence each other's behaviors, future research exploring these processes should ideally include samples of both fathers, mothers, and existing siblings.

In practice, public health care nurses and other practitioners who see families during the infants' first weeks are in a unique position to provide fathers, as well as mothers, with knowledge on how parents through sensitive parenting practices may have a positive impact on their child's development. Even in Norway, where pre- and post- natal nurse visits and infant health check-up programs are public and free, such services are mainly directed towards mothers. Recent research from Sweden has shown that encouraging fathers' participation in what has been regarded mother-infant activities, such as infant health check-ups and parent-groups, resulted in more actively engaged fathers who enjoyed sharing perspectives on fatherhood with other fathers (Wells & Sarkadi, 2011).

Simultaneously, more attention should be given to the marginal group of fathers who negatively affect their children's development with more time, and facilitating preventive interventions to fathers and families who need it should be part of a family-friendly social policy. Preventing coercive family processes may be of crucial significance to families at risk (Reid et al., 2002), and programs that aim at increasing fathers' positive parenting skills will likely yield large benefits for children (Cabrera et al., 2007b). The current results highlight the need to intervene early to promote sensitive parenting, and that early father-child interaction may be a critical factor to address and offer opportunities for preventive interventions. Despite policy goals and intentions, our results suggest that in addition to facilitating father-child relationships by generous paternal leave policies, more complex policy guidelines are essential to ensure that fathers' leave time benefits child development.

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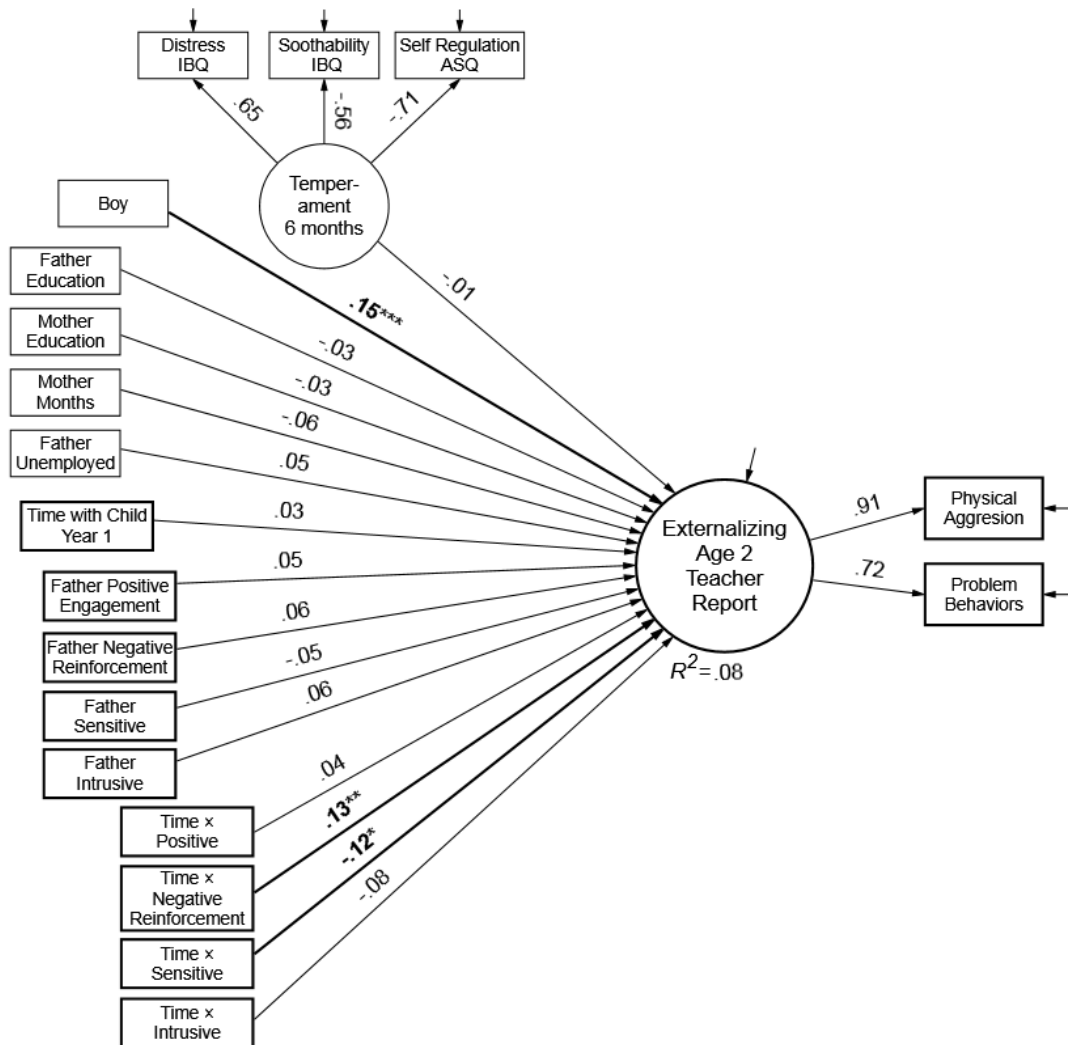


Figure 1. Structural equations path model testing hypothesized father involvement main effects and involvement \times fathering behavior interactions for age 2 teacher-reported externalizing. Paths are standardized coefficients. IBQ = Infant Behavior Questionnaire; ASQ = Ages and Stages Questionnaire; † $p \leq .10$; * $p < .05$, ** $p < .01$, *** $p < .001$; ($\chi^2_{(131)} = 205.64$, $p = .00$, $\chi^2/df = 1.57$, CFI = .93, TLI = .95, RMSEA = .02, SRMR = .04).

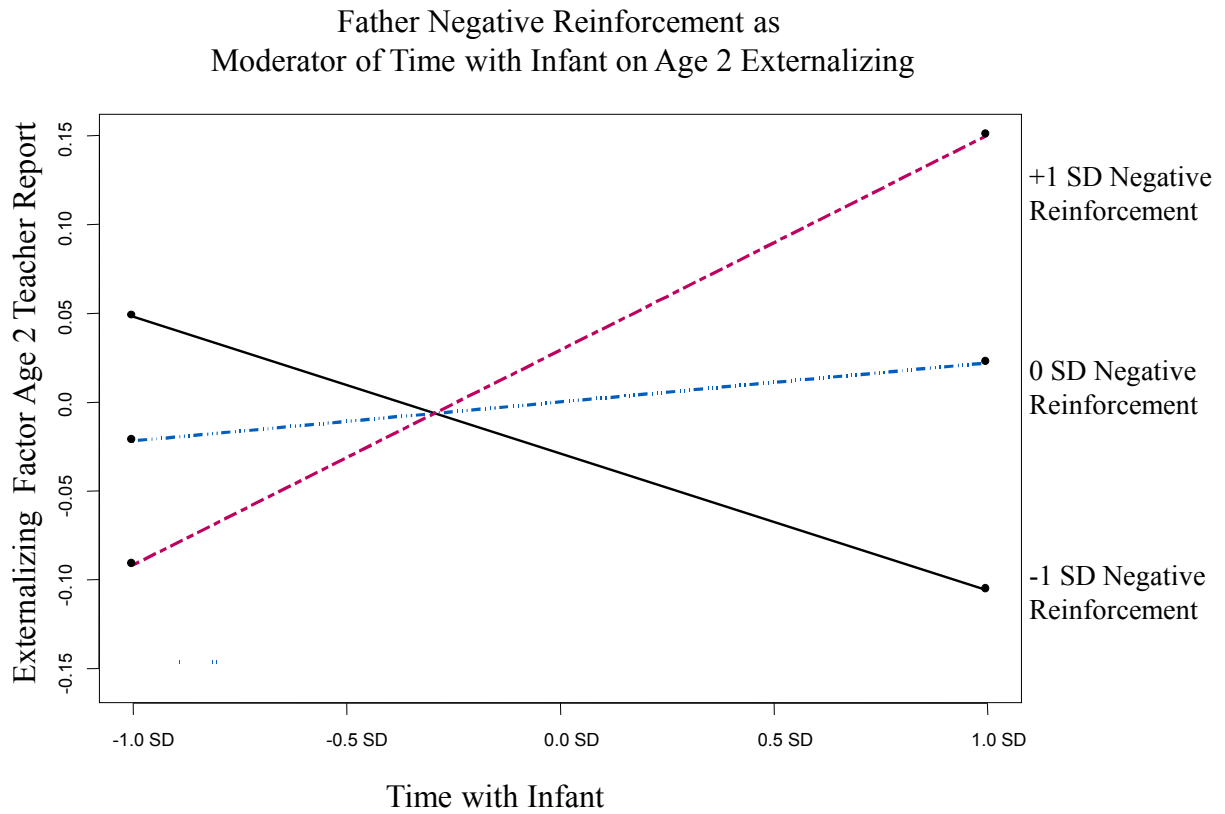


Figure 2. Plot of observed father negative reinforcement as a moderator conditioning the effect of time with infant on Age 2 teacher-rated child externalizing. The plot was generated using the Mplus SEM model based estimates and methods for probing significant two-way interactions (Preacher et al., 2006).

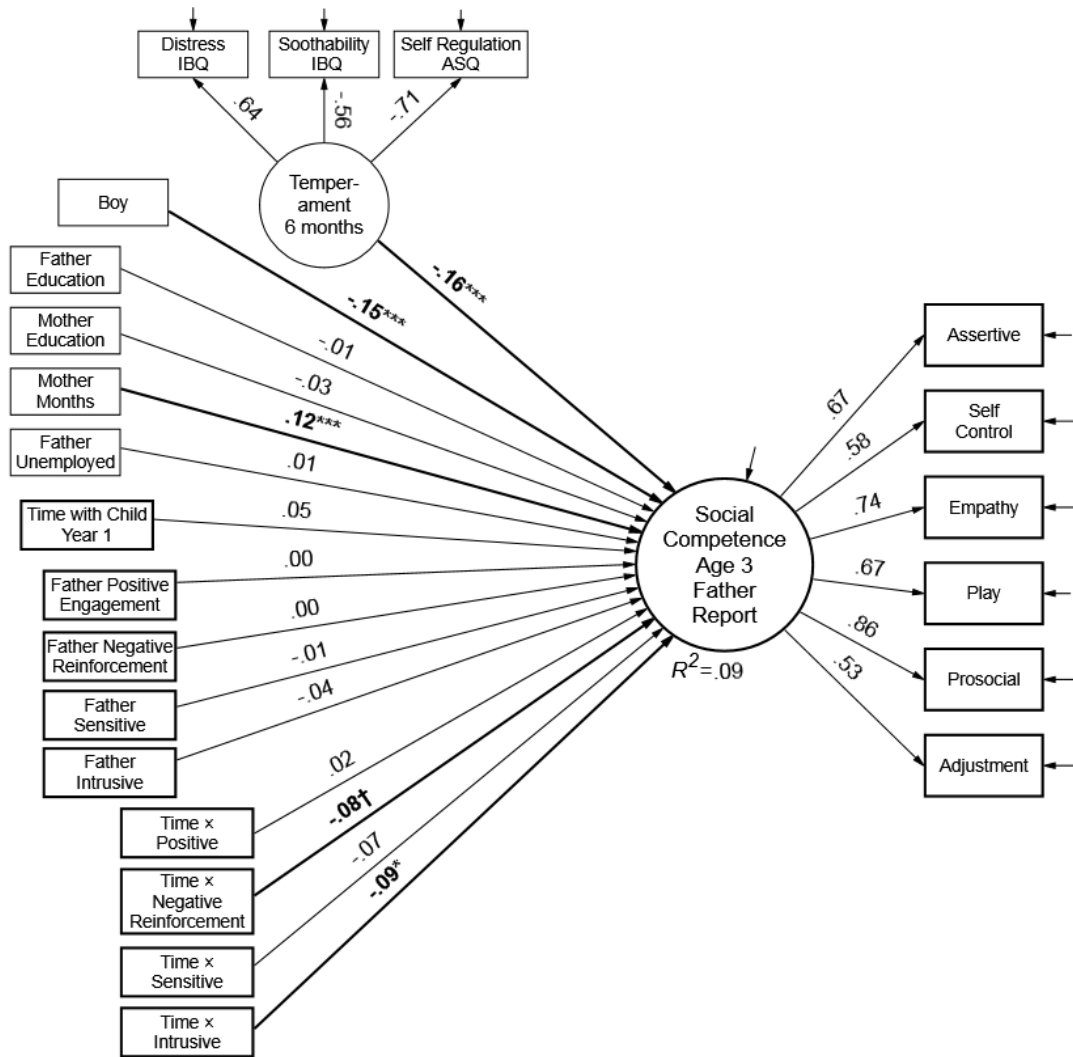


Figure 3. Structural equation path model testing hypothesized father involvement main effects and involvement \times fathering behavior interactions for age 3 father-reported social competence. Paths are standardized coefficients. IBQ = Infant Behavior Questionnaire; ASQ = Ages and Stages Questionnaire; $\dagger p \leq .10$; $*p < .05$, $**p < .01$, $***p < .001$; ($\chi^2_{(209)} = 518.89$, $p = .00$, $\chi^2/df = 2.8$, CFI = .87, TLI = .90, RMSEA = .03, SRMR = .04).

Appendix Table Means, Standard Deviations, Sample Size, and Bivariate Correlations Among Study Variables

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	1	2	3	4	5	6	7	8	9
6 mo Chd Temperament												
1. Distress	1.75	.37	1151	---								
2. Soothability	2.66	.31	1149	-.36***	---							
3. Self Regulation	33.03	6.80	1152	-.45***	.40***	---						
Control Covariates												
4. Sex of Child (Boy)	.52	.50	1157	.11***	-.04	-.04	---					
5. Father Education	13.86	2.61	1134	.05	-.00	-.00	.01	---				
6. Mother Education	14.28	2.58	1150	.04	-.03	.03	-.02	.46***	---			
7. Mother Months	11.00	1.58	1105	.01	.05	.00	.02	-.04	-.07**	---		
8. Father Unemployment	.05	.21	856	.01	.04	-.06	.01	-.11**	-.14***	.02	---	
Age 1 Fathering												
9. Time with infant (log)	3.03	1.25	825	-.01	-.03	.01	.04	.04	.08*	-.21***	.17***	---
10. Intrusiveness	1.77	.77	702	-.07	.00	.03	.13***	-.18***	-.08*	.04	.05	-.02
11. Sensitivity	3.52	.63	702	.03	.05	.01	-.04	.13***	.07	-.05	-.05	-.02
12. Neg. Reinforce (log)	.59	.56	716	-.00	.06	.06	.06	-.04	-.07	-.04	.01	.03
13. Positive Engagement	285.08	67.99	716	-.06	.09**	.11**	-.04	.01	.03	.00	.01	-.05
Age 2 Mother Report												
14. Physical Aggression	2.45	.91	1050	.07*	-.06	-.04	.14***	.02	.00	.03	-.02	-.07*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	1	2	3	4	5	6	7	8	9
15. Self Regulation	21.42	4.46	1035	-.10***	.07*	.18**	-.06	.10***	.20***	.03	-.07**	.02
16. Soothability	2.78	.28	1029	-.14***	.12***	.23***	-.07*	.05	.13***	-.07*	-.04	.04
Age 2 Teacher Report												
17. Physical Aggression	1.78	.79	748	.02	.03	.01	.15***	-.06	-.05	-.06	.07	.04
18. Problem Behaviors	2.28	.99	748	.03	.01	.03	.11**	-.06	-.05	-.05	-.03	.02
Age 3 Father Report												
19. Assertiveness	3.49	.49	763	-.05	.06	.06	-.08*	.06	.03	.09*	.02	-.02
20. Self Control	3.31	.47	764	-.03	.09*	.07*	-.02	.03	.06	.10**	.00	.06
21. Empathy	3.67	.54	764	-.01	.11**	.02	-.16***	.05	.01	.12**	.06	.03
22. Play	4.05	.50	764	-.06	.09**	.07	-.08*	-.00	.01	.08*	-.00	-.06
23. Prosocial	3.47	.59	764	-.13***	.14***	.13***	-.15***	-.09*	-.08*	.07*	.01	.02
24. Adjustment	3.36	.51	764	-.10***	.05	.09**	-.06	.01	-.04	.01	.02	.01
Age 3 Teacher Report												
25. Physical Aggression	1.90	.88	827	-.03	.05	.04	.21***	-.09**	-.09**	-.05	.01	.07
26. Problem Behaviors	2.04	.79	827	-.05	.02	.06	.14**	-.09**	-.07*	-.05	.01	.04

Variable	10	11	12	13	14	15	16	17	18	19	20
10. Intrusiveness	---										
11. Sensitivity	-.31***	---									
12. log Neg. Reinforcement	.22***	-.05	---								
13. Positive Engagement	.02	.29***	-.05	---							
14. Physical Aggression	.00	.02	-.03	.01	---						
15. Self Regulation	-.04	.05	-.01	.03	-.30***	---					
16. Soothability	-.08*	.08*	-.04	.02	-.16***	.40***	---				
17. Physical Aggression	.08	-.05	.08	.05	.30***	-.14***	.02	---			
18. Problem Behaviors	.12**	-.10*	.11**	.01	.18***	-.12**	-.03	.65***	---		
19. Assertiveness	-.03	.00	-.05	-.05	.02	.04	.02	.04	.06	---	
20. Self Control	-.10**	.04	-.04	.08*	-.14***	.18***	.14***	-.02	-.03	.32***	---
21. Empathy	.09*	.04	-.04	.00	-.11**	.05	.06	-.03	-.03	.49***	.48***
22. Play	.04	-.02	-.05	-.07	.03	.06	.09**	.00	.04	.59***	.30***
23. Prosocial	-.02	-.03	.04	.03	-.05	.08*	.11**	.02	.05	.56***	.49***
24. Adjustment	-.00	.03	.05	.09*	-.13***	.12***	.09**	-.03	-.06	.27***	.49***
25. Physical Aggression	.09*	-.07	.05	-.03	.16***	-.11**	-.05	.33***	.27***	.04	-.11**
26. Problem Behaviors	-.07	-.12**	.04	-.05	-.10**	-.10**	-.07*	.23***	.28***	.06	-.11**

Variable	21	22	23	24	25	26
21. Empathy	---					
22. Play	.49***	---				
23. Prosocial	.63***	.57***	---			
24. Adjustment	.36***	.28***	.48***	---		
25. Physical Aggression	-.08*	.04	-.03	-.02	---	
26. Problem Behaviors	-.04	.04	-.01	.02	.70***	---

Note. * $p < .05$; ** $p < .01$; $p^{***} < .001$

PAPER III

Risk and Protective Factors Related to Fathers' Sensitivity and Negative Reinforcement with
One-year-olds

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Synopsis

Objective: Guided by a social interaction learning model, this study investigated potential risk and protective factors related to fathers' early parenting behaviors. **Design:** Participants were a Norwegian sample of 726 fathers with their one-year olds (51.7% boys). Conducting multivariate regression analyses the authors investigated child and father factors associated with fathers' sensitivity and negative reinforcement. Fathers' parenting behaviors were assessed by both micro and macro coding from direct observation of structured father-child interactions. Father and child factors were reported by fathers when the child was six months and one year old. **Results:** Fathers' sensitivity was associated positively with children's activity level and sustained attention, and with fathers' verbal instructions, and negatively with children's communicative risk and fathers' lower education. Fathers' negative reinforcement was associated positively with children's developmental difficulties and communicative risk, and with fathers' extraversion. Sensitivity and negative reinforcement were not correlated and mainly predicted by different factors, indicating they are separate dimensions of parenting. **Conclusion:** Findings highlight the importance of examining how multiple predictors relate to different parenting dimensions and point to factors that may enhance father-infant interaction and identify fathers and children who may benefit from early intervention.

Key words: fathers' parenting, infants, direct observation, sensitivity, negative reinforcement

Risk and Protective Factors Related to Fathers' Sensitivity
and Negative Reinforcement with One-year-olds

The relation between early parenting behaviors and children's later social, emotional and behavioral adjustment has been well established (for review, see Lamb & Bornstein, 2011). Sensitive, warm and engaged parenting promote healthy child development (Gardner, Ward, Burton, & Wilson, 2003; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004), whereas coercive, hostile and disengaged parenting predict child internalizing and externalizing social and behavioral problems (Eddy, Leve, & Fagot, 2001; Ramchandani, Domoney, Sethna, Psychogiou, Vlachos, & Murray, 2013; Shaw, Owens, Giovannelli, & Winslow, 2001). Coincident with cultural and political changes, fathers today spend more time caring for their infants than previous generations (Haas & Hwang, 2013; Sullivan, Coltrane, McAnnally, & Altintas, 2009). Although there is a growing body of research concerned with father-infant relationships (Cabrera & Tamis LeMonda, 2013; Lamb, 2010), as fathers' participation in early child care continues to increase the need to understand more about factors related to fathers' quality parenting behaviors also grows. A recent Norwegian study examined the relation between the amount of time fathers spent with their infants during their child's first year and behavioral outcomes at ages 2 and 3. The findings showed that child outcomes were associated with the quality of their fathers' observed parenting behaviors at one year, but only when fathers had spent more time at home (Nordahl, DeGarmo, Zachrisson, & Manger, 2013). In that study, more time spent with sensitive fathers predicted less child externalizing at age 2, and more time spent with fathers who initiated negative reinforcement predicted more externalizing at age 2 and lower social competence at age 3.

Given the importance of the quality of fathers' parenting behaviors with infants, it is vital to identify which father, child and contextual factors promote or inhibit this quality. Understanding risk and protective factors related to fathers' early parenting could

subsequently be helpful when targeting children and fathers for early preventive intervention (Cabrera, Shannon, & Tamis LeMonda, 2007). With some exceptions (e.g., Shannon, Tamis Le-Monda, & Cabrera, 2006), few studies have investigated factors related to observed father-child interaction with older infants, and evidence is sparse for predicting different aspects of fathers' parenting behaviors with one-year-olds. Guided by a social interaction learning (SIL) model of parenting (Patterson, 1982; Reid, Patterson, & Snyder, 2002), and based on earlier findings with older children (Appelbaum et al., 2000; Eddy et al., 2001; Holmes & Huston, 2010), the present study investigated potential child and father factors associated with fathers' sensitive parenting behaviors and negative reinforcement with their one-year-old children.

Parental Sensitivity and Negative Reinforcement

Contingent and appropriate responsiveness from the parent are assumed to produce secure attachment relationships, and lay the ground for advantageous child behavioral and emotional development (Shaw, Bell, & Gilliom, 2000). Two qualitatively distinct parental qualities have been identified as germane to early child behavioral development: sensitivity and negative reinforcement (Scaramella & Leve, 2004; Shaw et al., 2000). Sensitivity, a salient parenting dimension derived from attachment theory as a predictor of secure attachment relationships, implies that the parent is tuned in and responsive to the infant's emotional cues and behaviors (Ainsworth, Behar, Waters, & Wall, 1978). Attachment theory provides a conceptual framework to describe how parental sensitivity, responsiveness and attentiveness interact with the child's emotional responses to the parents' behaviors, and how this subsequently affects child behavioral adjustment (Scaramella & Leve, 2004). Negative reinforcement, a key concept from the SIL-based coercion model, takes place when the parent reinforces a child's aversive behavior, either by withdrawing from the situation, or by terminating an unpleasant initiation (Patterson, 1982). In this manner, the child learns that negative behavior pays off, and is more likely to repeat the same behavior in future situations

(Eddy et al., 2001; Patterson, 2002). Through a process of mutual reinforcement, parents inadvertently reinforce difficult child behavior, and difficult child behavior amplifies parental negativity (Scaramella & Leve, 2004). The coercion model posits that such contingent patterns of family interaction, influenced by environmental factors, shape the child's behavioral development, and that aggressive behaviors develop through reciprocal aversive patterns of parent-child interaction (Patterson, 1982).

Although based on differing theoretical frameworks, attachment and SIL theories both postulate that parents' behaviors and children's subsequent responses contribute to child social and behavioral adjustment. Parents' sensitivity and negative reinforcement have generally been investigated separately, and while sensitivity typically has been studied in infancy and early toddlerhood (Lamb & Bornstein, 2011), negative reinforcement has most often been focused on with preschool and school aged children (DeGarmo, 2010; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003). Both mothers' and fathers' supportive and sensitive parenting has been found to benefit children's later development (Cabrera et al., 2007; Tamis-LeMonda et al., 2004). Moreover, the coercion model has been found equally relevant for fathers as for mothers, with children from early childhood (Eddy et al., 2001), middle childhood (DeGarmo & Forgatch, 2007), and adolescence (Dishion, Owen, & Bullock, 2004).

During the transition from late infancy to early toddlerhood children begin to actively explore their environment, which requires parents to address the challenge of balancing support of autonomy with an increasing need for limit setting (Scaramella & Leve, 2004). These diverging parenting demands underline the importance of investigating the two parental qualities simultaneously. Research including measures of sensitivity and negative reinforcement heavily relies on observational methods that employ disparate levels of assessment (Reid et al., 2002). Parental sensitivity is most often scored with ratings of more

global parenting practices (Cabrera et al., 2007; Ramchandani et al., 2013), while coercive parenting including negative reinforcement is more frequently investigated with micro measures of distinct behavior sequences (Patterson, 1982; Reid, et al., 2002). To our knowledge, no study to date has employed both global ratings of fathers' sensitive parenting and micro measures of fathers' negative reinforcement based on direct observation with one-year-olds and evaluated predictors of the two.

Factors Associated with Fathers' Parenting Behaviors

Parenting practices are subject to a wide variety of factors associated with the context and qualities parents bring to their interactions. Father's older *age* and higher levels of *education* have been shown to be related to more sensitive parenting during play with two- and three-year-olds (Appelbaum et al., 2000; Cabrera et al., 2007; Tamis LeMonda et al., 2004). A meta-analytic review found parents' *personality* characteristics to be associated with parenting behaviors for fathers as well as mothers (Prinzle, Stams, Dekovic, Reijntjes, & Belsky, 2009). Research has generally found extraversion, agreeableness and openness to be related to more warm and responsive parenting, while neuroticism, mistrust and hostility were related to less warm and more negative and forceful parenting (Koenig, Barry, & Kochanska, 2010; Kochanska, Friesenborg, & Lange, 2004). Another meta-analysis found *depression* to significantly relate to the quality of parenting, with depressed mothers and fathers demonstrating decreased positive and increased negative parenting behaviors (Wilson & Durbin, 2010).

In line with SIL theory, contextual sources of stress and support have been found to influence fathers' parenting and to be mutually related. *Parenting stress* is related to the kinds of pressures incumbent in fulfilling parental roles for both mothers and fathers (Fagan, Bern, & Whiteman, 2007; Ponnet, Mortelmans, Wouters, Van Leeuwen, Bastaits, & Pasteels, 2013). Parenting stress is often more strongly tied to parenting behaviors than is stress emanating

from other domains, and first-time parents may be particularly vulnerable to this type of stress (Bronte-Tinkew, Horowitz, & Carrano, 2010). Contextual factors can ameliorate parenting stress for both fathers and mothers. Social support has been shown to protect against effects of parenting stress by decreasing coercive and increasing prosocial parenting (DeGarmo, Patras, & Eap, 2008). One study of teenage fathers found that social support protected against the negative influence of parenting stress on fathers' involvement with the infant (Fagan, Bernd, & Whiteman, 2007). *Partner relationship* (or marital) quality has also been found to influence father-child interactions (Lamb, 2010). Appelbaum et al. (2000) found that fathers' higher levels of marital intimacy were related to greater sensitivity with toddlers. Others have suggested that partner relationship quality may be especially influential during the child's first year of life, when parent-child relationships are established (Cox, Owen, Lewis, & Henderson, 1989; Easterbrooks & Emde, 1988).

In Scandinavia fathers are encouraged to spend time caring for their infants through public policies that extensively subsidize parental leave arrangements (Haas & Hwang, 2013). About 78% of all Norwegian fathers with children under the age of one took parental leave between 2006 and 2009, and 25% of fathers took more than the 6 week quota provided in a *use-it-or-lose-it* paternal leave policy (Bringdal & Lappegård, 2012). However, *fathers' time with infants* does not necessarily by itself benefit later child adjustment (Pleck, 2010), and thus, it is pertinent to gain more knowledge about factors related to the quality of fathers' parenting behaviors with infants (Cabrera & Tamis LeMonda, 2013; Lamb, 2010). Our study is the first to investigate risk and protective factors related to fathers' sensitive and coercive parenting with one-year-olds in the context of extended paternal leave.

Child Characteristics Related to Fathers' Parenting Behaviors

According to SIL and transactional perspectives, parent-child interaction is a two-way dynamic process in which parents and children affect each other's behavior, and children

contribute to their own development by influencing parenting (Cabrera & Tamis LeMonda, 2013; Patterson, 1982; Reid et al, 2002). Fathers' parenting behaviors may be dependent on stable child characteristics, such as *child gender* and *temperament*. Fathers of boys have been found to be more sensitive and more positively engaged with one-year-olds than fathers of girls (Nordahl, Janson, Manger, & Zachrisson, in press; Schoppe-Sullivan, Diener, Mangelsdorf, Brown, McHale, & Frosch, 2006). Child temperament has been shown to be related to both mothers' and fathers' parenting (Kiff, Lengua, & Zalewski, 2011). More sociable and responsive children tend to elicit more sensitive and positive parenting, while highly reactive, frustrated and irritable children evoke harsher parenting (Holmes & Huston, 2010; McBride, Schoppe, & Rane, 2002; Scaramella & Leve, 2004).

Similarly, child social-cognitive behaviors or skills could be related to father's parenting. Children's *communication skills* have been found to be associated with the quality of father-child interactions (Holmes & Huston, 2010), perhaps as socially responsive and communicative children may be easier to parent, especially during toddlerhood (Smith, 2010). Furthermore, it may be easier to respond sensitively to children who independently initiate interaction and are *sustained* in their attention compared to children who are particularly *active* and constantly on the move (Shannon et al., 2006). Factors in the makeup of the family, such as the presence of older siblings, may affect fathers' parenting. Firstborns received 20-30 minutes more quality attention each day than a second-born child from the same family; on the other hand, younger siblings may benefit from a father with more parenting experience (Price, 2008). In addition to the direct associations between child behaviors and parenting, child characteristics may moderate the association between father characteristics and parenting. For example, children with difficult temperaments may receive less sensitive parenting or more negative reinforcement when parents experience high levels of stress or suffer from depression (Patterson, 2002; Scaramella & Leve, 2004).

The Current Study

The aim of the current study was to investigate predictors of fathers' sensitivity and negative reinforcement as observed during fathers' interaction with their one-year-olds. First, we questioned whether the same or different factors were associated with fathers' sensitivity and negative reinforcement. Next, we asked whether the associations between fathers' parenting behaviors and fathers' stress, support or depressive symptoms were moderated by the children's temperament, observed behavior or gender. Finally, we examined whether the time fathers spent with their infant during the first year moderated the impact of paternal stress, support or depressive symptoms on their parenting strategies.

Method

Participants

This study is based on data from the *Behavior Outlook Norwegian Developmental Study* (BONDS), a longitudinal study tracking children's social development from 6 months. The parents of 1931 eligible children (child of approximately 6 months of age, and at least one parent able to participate and to speak Norwegian) were informed about the study, of which 1465 (76%) agreed to be contacted, and subsequently 1159 (60%) agreed to participate. Recruitment took place through public and free child health clinics in five Norwegian municipalities in 2006 - 2008. We compared participating parents with anonymous records of all eligible families on key demographic variables (i.e., child's gender and birth order, parents' birth country, parents' age at child's birth, marital status and education) and found the only difference was mothers in the sample had higher education. The overall retention rate was very high: 98% of families were still participating at the age one follow-up (i.e., 1137 out of 1159 children). This study was reported to the Norwegian Social Science Data Services and approved by the Regional Committee for Medical and Health Research Ethics.

Personal interviews with the parents took place when the children were six months and one year of age. At six months both parents were invited to the interview, and at one year fathers were specifically invited to participate in interviews and structured video-recorded father-child interactions. Parents of 1137 children came to the one-year assessment; this included 839 fathers of whom a total of 750 (89%) participated in the structured interactions. Compared to nonparticipant fathers, fathers who agreed to participate in father-child interactions were typically older, better educated, lived in better housing, and spent more time with their infant during the first year. Twenty-four of the parent-child interactions could not be coded due to poor technical quality or incomprehensible language. Thus, the final sample consisted of 726 fathers and their one-year old children (51.7% boys).

Assessment Procedures of Father-Child Interactions

For the structured interaction task, age-appropriate, gender non-stereotypic activities were selected based on their capacity to elicit parent and child behaviors associated with later child adjustment (e.g., Gardner et al., 2003; Snyder et al., 2003). Tasks included: *free play*, fathers were asked to play with their child as they liked with a provided set of toys (4 min); *clean up*, fathers were asked to put the toys away and were told that their child could help but was not required to (2 min); *structured play*, fathers were presented with two sets of toys, a shape sorter box and a set of stacking rings, and were asked to help the child as much as they thought necessary with one toy at a time (2 × 3 min); and a *waiting task*, in which the child had to wait in a high chair with no toys while the father answered a questionnaire (3 min). Fathers were repeatedly informed that they could choose to discontinue the tasks at any time.

Two different coding strategies, micro-social assessment of the interactions and more global ratings of parenting qualities, were utilized to obtain measures of fathering behaviors from the observed interactions. Global ratings were recorded using the NICHD's Study of Early Child Care (SECC) scales *Qualitative Ratings for Parent-Child Interaction at 3-15*

Months of Age (Cox & Crnic, 2003) during two separately rated segments (a total of 12 minutes): (1) the free-play and clean-up tasks (6 min), and (2) the structured play task (6 min). This rating system includes 7 parent scales (i.e., intrusiveness, detachment, sensitivity/responsiveness, positive regard, negative regard, animation, stimulation of development), 4 child scales (i.e., positive affect, negative affect, activity, sustained attention) and one dyadic scale (dyadic mutuality). Scores are based on both quantity and quality of observed behaviors and rated on a Likert scale ranging from 1 (*not at all characteristic*) to 5 (*highly characteristic*). Six coders were trained until reliability criteria were met; subsequently reliability was monitored in biweekly team meetings. Intra-class correlations (ICC) for single scales included ranged from .65 to .74.

The micro-social coding captured the moment-to-moment exchange of discrete behaviors of father-child interaction during all four structured tasks using the *Toddler and Parent Interaction Coding System* (TOPICS; Nordahl, Duckert & Bjelland, 2007). TOPICS is a micro-social coding system adapted from the *Family and Peer Process Code* (Stubbs, Crosby, Forgatch & Capaldi, 1998) to be suitable for interactions with one-year-old children. TOPICS includes 27 mutually exclusive behavior codes classified as verbal (e.g., parents' talk or children's babbling), nonverbal (e.g., play with toys, gestures such as "give-me-five"), or physical (e.g., parent holding child, child crawling away) behaviors. Across these categories, behaviors are defined as positive (e.g., praise, offer a toy to the other, give a hug), neutral (e.g., vocal uttering with no meaningful words, solitary play, parent picking up child), or negative (e.g., verbal disapproval, take a toy from the other, physical aggression). Expressed positive, neutral or negative affect is coded for each behavior based on tone of voice (e.g., warm, neutral, harsh), facial expressions (e.g., smile, flat, frown) and body language (e.g., relaxed, calm, tense). The exclusive behavior codes can subsequently be combined into sequential behavior chains including both child and parent behaviors. A team of six coders

was trained for 4-6 months and required to obtain 75% agreement and a Cohen's Kappa of .70 before coding study data. Overall coder agreement for 20% of the interactions randomly selected for reliability checks was 77% with a Cohen's Kappa of .74.

Measures

Outcome variables. *Fathers' sensitivity* was a composite score derived from the NICHD global rating scales (Cox & Crnic, 2003). Based on prior studies (Appelbaum et al., 2000; Cabrera et al., 2007), Exploratory Factor Analyses and subsequent Confirmatory Factor Analyses were conducted for the 7 global parent scales to investigate the basis for constructing one measure of sensitive parenting for the purpose of our study (see Nordahl et al., 2013). The global ratings showed good fit for a 4-item sensitivity measure comprised of *sensitivity/responsiveness* (sensitive to child signals, responsive to child cues), reversed *detachment/disengagement* (lack of engagement with child), *positive regard for the child* (physical affection, warm voice, smiles), and *stimulation of development* (engage in age-appropriate behaviors that foster cognitive and physical development): CFI = 1.00, TLI = .99, RMSEA = .012. This was taken as support for the use of these 4 scales in a composite variable averaging the individual scales (Chronbach's $\alpha = .85$).

Fathers' negative reinforcement was a micro-social sequential score defined by the frequency of a father-initiated negative behavior (e.g., takes away toy, physically prevents child from moving, says "don't do that") that is reciprocated by a child negative behavior (e.g. throws toys, fusses, kicks, cries) within a 6 second time frame and subsequently is followed by at least 12 seconds of no aversive exchanges. In these sequences, the child has the last aversive behavior in the chain of events. Thus, the child's negative behavior is rewarded when the father terminates his initiated aversive behavior (Patterson, 1982). The negative reinforcement variable was obtained from the TOPICS coding and based on prior research (DeGarmo, 2010; DeGarmo & Forgatch, 2007). The negative reinforcement score

was significantly skewed and therefore log-transformed ($M = 0.59$, $SD = 0.56$, $Skew = 0.41$, and $Kurtosis = -0.88$).

Child predictors. *Gender* was coded 0 (*girl*) and 1 (*boy*).

Temperament. Fathers reported on their child's temperament at the 12-month assessment using the EAS Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984), which includes four dimensions of temperament: (1) Emotionality (5 items) - the tendency to become aroused easily and intensely; (2) Activity (4 items) - preferred levels of activity and speed of action; (3) Sociability (4 items) - the tendency to prefer the presence of others to being alone; and (4) Shyness (4 items) - the tendency to be inhibited and awkward in new social situations. Items were rated on a 5-point scale from 1 (*not characteristic or typical of your child*) to 5 (*very characteristic or typical of your child*), and scores were summed to form the four temperament indicators (Mathiesen & Tambs, 1999).

Activity level. Scores of the children's activity level were derived from the NICHD global ratings of father-child interaction at 12 months. This scale measures the extent to which the child exhibits motor activity during observation and includes judgment of the speed (moving fast, squirming), the frequency (spending a lot of time in high-energy activities), the intensity (shaking, bouncing or kicking vigorously), and the duration of motor activity (persisting in energetic activity longer than other children; Cox & Crnic, 2003).

Sustained attention. Also from the global rating scales, scores of the children's sustained attention during interaction were obtained. Based on both intensity and duration, this scale measures to which extent the child exhibits thorough, sustained exploration of an object or activity, or appears clearly involved, interested and focused with people or objects (Cox & Crnic, 2003).

Communicative risk. At the 12-month assessment, fathers reported on 5 of the original 6 items from the communication subscale of the Ages and Stages Questionnaire (ASQ;

Bricker, & Squires, 1999; Janson, 2003). The items were scored on a 3-point scale (*not yet; sometimes; yes*). The score has been transformed to the traditional 0-60 scale, and a cut point indicating risk for communicative delay was set at 15 points following the manual recommendations (Bricker, & Squires, 1999; Janson, 2003)

Older siblings. When children were 6 months, fathers reported on whether the child was his firstborn (1) or not (0).

Father predictors. *Age.* At the 12-month interview, fathers' age in years was calculated by subtracting the interview year from his birth year, which was centralized to the mean age.

Education. Fathers reported their completed education level at the 6 or 12 month interview on a 6-category scale: 9-year primary/secondary school; <3-year high school; 3-year vocational high school (12 y); 3-year high school general studies (12 y); 4-year technical college or university degree (16 y); >4 years of technical college or university. Very few had 9 years of schooling, thus we merged the first two categories and generated five dummy variables.

Personality. At 6 months, fathers reported on their personality using the 30-item short version of Eysenck Personality Questionnaire (EPQ-I; Eysenck & Eysenck, 1975; Eysenck & Tambs, 1990). The EPQ-I measures level of extraversion, neuroticism and psychoticism by summing up 10 dichotomous items (yes/no) for each scale.

Depressive symptoms. Fathers' reported on their symptoms of depression and anxiety at the 12-month interview using the 13-item-version of the Hopkins Symptom Check List (SCL-13), based on the 25-item SCL scale (Derogatis, Rickels, Uhlenhuth, & Covi, 1974; Tambs, & Moum, 1993). Responses range from 1 (*not at all*) to 4 (*extremely*). A mean score was computed (Cronbach's alpha was 0.89), and a cut point was set at ≥ 1.75 , indicating risk for depression.

Stress and support. Three self-reported scales captured fathers' perceived stress and support. At 6 months, the *Social Support Scale* included 5 items on scales ranging from 1-6 (Dalgard, Bjørk & Tambs, 1995). At 12 months, the *Parental Stress Scale* included 18 items on a 5-point scale (Berry & Jones, 1995), and the *Partner Relationship Scale* included 10 items on a 6-point scale of which 7 were derived from the Relationship Satisfaction Scale by Blum & Mehrabian (1999; see Røysamb, Vittersø, & Tambs, 2010, for more information).

Time with infant. At the 12-month interview, fathers reported on the number of months he had spent at home with his child until then. A cut point was set at below (0) and above (1) 1.5 months (approximately the father-quota weeks).

Verbal instructions. From the micro-social coding of father-child interactions at 12 months, a measure of fathers' verbal instructions was calculated as the total number of utterances with an instructive, teaching or labeling content across all tasks. To ease interpretation, scores were centralized and divided by 10 so that one unit change indicates an increase of 10 instructive utterances from the mean.

Control variables. The multiple regression analyses were adjusted for *child age* in months during observations (centralized to mean), *twin* (1), *low child birth weight* (<2,499 g), as well as *child developmental difficulties*, reported at 6 and 12 months, including hearing, vision or motion impairments (N = 21), other congenital disabilities (N=2), or preterm birth >3 weeks (N = 62).

Analyses

We performed all analyses with SPSS, Version 20. Missing data were imputed using the EM (expectation maximization) algorithm. As the algorithm does not impute categorical values, system-missing values were coded as 0 before the imputation for 15 children on the premature measure used in the developmental difficulties measure and for 6 fathers on the SCL scale. Table 1 compares descriptive results for predictor and outcome variables before

and after imputation. A correlation analysis showed no significant association between the two outcome variables ($r = -.05, p = .175$). Supplementing table 1, on a range from 1.3 to 4.9, the mean for the global ratings of fathers' sensitive parenting was 3.5. In our sample, 294 father-child dyads (41%) displayed no incidents of father initiated negative reinforcement, 204 dyads (28.5%) displayed one, and 126 dyads (30.5%) displayed between 2 and up to 9 incidents. To ease interpretation of the results, both outcome variables were z-transformed prior to the regression analyses. The Z-scores indicate the percent-wise impact of change in SD of the predictors. Since the psychometric continuous predictor variables do not have meaningful scales, z-scores were also saved out before the regression analyses for child temperament, observed activity and sustained attention, for father stress and support scales and for personality measures. All analyses were performed separately for the two outcomes. The multiple regression analyses first included the covariates, then the child predictors, and at last the father predictors. We examined the interaction terms separately, controlling for child age, twin status, birth weight and developmental risk.

Results

Predictive Results for Father Sensitivity

Table 2 shows the bivariate and multivariate regression results for the father sensitivity outcome. Of the child covariates and predictors in the bivariate results, low birth weight, developmental difficulties, and communicative risk were associated with *less* sensitivity from fathers. However, only communicative risk remained significant when including all child variables (Model 1) and subsequently all father predictors (Model 2) in the multivariate analyses. Contrary, children high on sustained attention had *more* sensitive fathers both in the bivariate analysis and when including all child and father variables in both multivariate models. Children with a more sociable temperament had more sensitive fathers only when accounting for all child factors in Model 1. Children's observed activity level was related to

more father sensitivity only in the multivariate analyses, indicating a suppression effect. For fathers, 3 years or less of vocational high school, or less than 3 years of high school, were associated with *less* sensitivity in the bivariate analyses; in the multivariate analyses the lowest education, less than 3 years of high school, remained significant. In contrast, fathers' partner relationship quality, social support, and verbal instructions during observation were related to *more* sensitivity in the bivariate analyses. Only verbal instructions sustained in the final multivariate analysis. The full regression model explained 21% of the variance in fathers' sensitivity.

Predictive Results for Negative Reinforcement

Table 3 shows the bivariate and multivariate regression results for the negative reinforcement outcome. Of the child predictors, communicative risk and a higher activity level during interaction were related to *more* negative reinforcement from fathers, although only communicative risk sustained significance when including all child and father variables in Model 2. Contrary, greater sustained attention during interaction was related to *less* negative reinforcement in the bivariate analyses and when including all child factors in Model 1, but not when including the father factors in Model 2. Again, a suppression effect was detected: developmental difficulties were related to *more* negative reinforcement in both multivariate models, but not in the bivariate analyses. Fathers' higher ratings on extraversion were associated with *more* negative reinforcement in both the bivariate and multivariate analyses. The full model explained 3% of the variance.

Interaction Results

For fathers' sensitivity, there were first two negative interactions between fathers' depressive symptoms and children's temperament and two of the EAS scales; emotionality (intercept $B = .06$, $p = .151$; depressive symptoms $B = .12$, $p = .535$; emotionality $B = .03$, $p = .509$; interaction term $B = -.31$, $p = .037$) and activity (intercept $B = .06$, $p = .150$; depressive

symptoms $B = -.18, p = .317$; activity $B = -.03, p = .408$; interaction term $B = -.34, p = .041$).

This means that fathers who scored above the cut point on the SCL scale displayed less sensitivity if they had children with higher scores on the EAS emotionality or activity scales than if they had children with lower scores on these scales. Moreover, fathers with depressive symptoms who spent more than 1.5 months at home with their infant the first year were less sensitive during interaction than fathers with depressive symptoms who spent less time with their infant (intercept $B = -.03, p = .686$; depressive symptoms $B = .58, p = .094$; time with infant $B = .13, p = .105$; interaction term $B = -.85, p = .031$). Finally, for father's sensitivity, we also found a negative interaction between fathers' partner relationship and observed sustained attention (intercept $B = .06, p = .105$; partner relationship $B = .06, p = .131$; sustained attention $B = .23, p = .000$; interaction term $B = -.08, p = .025$), and a positive interaction for fathers' perceived parental stress and children's observed sustained attention (intercept $B = .05, p = .242$; parental stress $B = -.06, p = .089$; sustained attention $B = .25, p = .000$; interaction term $B = .11, p = .002$). Thus, fathers who reported lower partner relationship quality or higher levels of parental stress displayed less sensitive parenting if they had a child with lower sustained attention.

For negative reinforcement, fathers' with depressive symptoms showed less negative reinforcement if their child had higher compared to lower EAS sociability scores, but no gap was found for fathers without depressive symptoms (intercept $B = -0.00, p = .965$; depressive symptoms $B = -.34, p = .055$; sociability $B = .03, p = .406$; interaction term $B = -.40, p = .033$).

Discussion

The aim of this study was to investigate child and father factors related to fathers' sensitivity and use of negative reinforcement observed during structured interactions between fathers and their one-year-old infants. Initially, we examined whether predictors of fathers'

sensitivity and negative reinforcement were dissimilar or overlapping, and found no correlation between the two parenting dimensions, even though they were both measured in the same setting. Perhaps this makes it not so surprising that fathers' sensitivity and negative reinforcement were predicted by different factors with only few exceptions. Accounting for all included factors in our multivariate models, fathers' sensitivity was associated positively with children's activity level and sustained attention during interaction, as well as fathers' verbal instructions, and negatively with children's communicative risk and fathers' lower education. In comparison, fathers' negative reinforcement was associated positively with children's developmental difficulties and communicative risk, and fathers' extraversion. Subsequently, we questioned whether child characteristics or fathers' time with their infant the first year would moderate associations between father predictors and fathers' parenting behaviors. Results showed that children's emotional and active temperaments were associated with less sensitivity during interaction, while children's sociable temperament was related to less negative reinforcement, but only for fathers with depressive symptoms. Moreover, for fathers who reported lower partnership quality or more parental stress, their sensitivity declined if their child was less sustained during interaction. Finally, fathers' time at home with their infant during the first year was associated with lower levels of sensitivity for fathers with depressive symptoms.

Consistent with earlier research with mothers and older children, we found that child *developmental difficulties* were associated with lower levels of fathers' sensitivity and higher levels of negative reinforcement (Ciciolla, Crnic, & West, 2013; Patteson & Barnard, 1990). Moreover, children's *communicative risk* was the only child factor that predicted fathers' less optimal parenting across both parenting dimensions and at the same time sustained significance across bivariate and multivariate models. Infants who are generally at risk of being delayed in their social and communicative development may be particularly vulnerable

to insensitive parenting or negative reinforcement because they typically do not initiate or respond to contact in the same way as other infants. At the same time, these children's parents may be exposed to more contextual stress exactly because they have a child with special needs, thereby doubling the children's risk (Baker et al., 2003; Davis & Carter, 2008).

Children's behaviors observed during the father-infant interactions were associated with fathers' parenting behaviors, thus supporting attachment and SIL perspectives that parents and children influence each other's behavior in a reciprocal process (Scaramella & Leve, 2004; Shaw et al., 2000). As child *sustained attention* stood out as the most salient behavior factor, this may illustrate that children who persist in their activities and are sustained during interaction elicit more sensitivity and less negative reinforcement from their parents, and subsequently that fathers who are sensitive, responsive, attentive and stimulating facilitate more sustainability in children's attention (Shannon et al., 2006). This mechanism may also apply to the fact that we found child-sustained attention to buffer the effect of fathers' parental stress and lower partner relationship quality on fathers' sensitivity. On the other hand, our findings revealed that children with higher *activity* levels experienced both more sensitivity and more negative reinforcement from their fathers. This may appear contradictory; however, even if active children's eager exploration of their surroundings provide fathers with opportunities for sensitive encouragement and guidance, high intensity child behaviors can also elicit a need for limit setting, which may generate more episodes of negative reinforcement (Scaramella & Leve, 2004).

Contrary to earlier research (Holmes & Huston, 2010; Kiff et al., 2011; McBride et al., 2002), we found no direct association between children's temperament and fathers' parenting behaviors, which may be related to our normative sample or the children's young age. Likewise, our data did not support the literature with older children in that fathers with depressive symptoms show more negative reinforcement (Scaramella & Leve, 2004; Wilson

& Durbin, 2010); to some extent, this may be explained by our non-clinical sample where few fathers reported depressive symptoms. Nevertheless, our interaction analyses revealed that for fathers with depressive symptoms, their parenting behaviors were associated with the child's temperament for three of the four child temperament scales. While most fathers' of one-year-olds would probably react to an active or emotionally upset infant with appropriate responsiveness, fathers with depressive symptoms may not be able to read the child's signals or attend to the child's needs in the same sensitive manner. Moreover, for fathers with depressive symptoms, interaction may be more dependent on the child's ability to initiate and engage in positive interaction, and thus, a sociable child may prevent negative reinforcement.

The lack of association between fathers' time at home with the infant and fathers' parenting behaviors lends some support to research showing that fathers' time with the infant by itself is not necessarily a beneficial factor (Nordahl et al., 2013; Pleck, 2010).

Nevertheless, our interaction analyses revealed that for fathers with depressive symptoms, more time spent with their infants during the first year was associated with less sensitive parenting. This is in line with a recent meta-analysis showing that depressed fathers may be less able to maintain positive parenting over time (Wilson & Durbin, 2010). Surprisingly, depressive fathers whom spent less time with their infants the first year ($N = 9$) were even more sensitive than fathers without depressive symptoms. However, fathers with depressive symptoms in our sample were few, and results must be interpreted with caution.

In keeping with findings from other studies (Appelbaum et al., 2000; Tamis LeMonda et al., 2004), fathers' lower educational attainment was associated with less sensitive parenting. Lower levels of education tends to be related to other contextual factors associated with less optimal parenting such as low income, unemployment, and poorer housing (Holmes & Huston, 2010; Tamis LeMonda et al., 2004). Thus, there might be secondary socio-demographic risk factors and processes that underlie the association. That fathers who gave

more verbal instructions during interaction (e.g., labeling toys, or encouraging the child's attempt to master an activity) were rated as more sensitive was not surprising, as both measures were derived from the same observations, albeit from different coding strategies. However, verbal instructions were also associated with less negative reinforcement in the bivariate regressions, indicating that fathers' verbal instructions may be a salient behavior to target both when promoting sensitive parenting and preventing negative reinforcement.

Contradicting earlier studies (Prinz et al., 2009), we found fathers high on extraversion to display more negative reinforcement rather than to show more sensitivity. This result may reflect that although extraversion is generally perceived as a positive, cheerful and sociable personality trait, it does have an assertiveness component, which in early parent-child interaction can appear dominating and insensitive (Glidden, Bamberger, Turek, & Hill, 2009). We found no direct association between child gender and fathers' parenting behaviors with one-year-olds, and neither did child gender moderate any of the associations investigated. The discrepancy with earlier studies (Nordahl et al., in press; Schoppe-Sullivan et al., 2006) may partly be attributed to the use of diverse observational measures and settings. Nordahl et al. (in press) used positive and negative frequency behavior variables, which are different from global ratings of sensitivity and sequential scores of negative reinforcement. Schoppe-Sullivan et al. (2006) rated parents' sensitivity within the Strange Situation, a dissimilar setting from the current study.

The failure to find a significant relation between fathers' sensitivity and negative reinforcement suggests that they are separate dimensions of parenting, not simply polar opposites of each other. Fathers' sensitivity is a macro measure that covers a broad range of positive parenting behaviors, and is rated as an overall score based on viewing the total duration of the interaction. This score represents how the father responds to the child's signals and provides appropriate stimulation, as well as his attentiveness and positive regard (Cox &

Crnic, 2003). Substantially different from global ratings, negative reinforcement is a sequential micro measure of negative behavior chains mutually displayed by both father and child coded in real time and during limited duration within the total observed interaction (Patterson, 1982). Thus, since sensitivity is based on both quality and quantity of the parent's behaviors throughout the observation, fathers may receive a fairly high rating of sensitivity and at the same time initiate one or two episodes of negative reinforcement during the same period. On the other hand, absence of negative reinforcement does not necessarily mean that the father is sensitive. Our findings provide expanded detail to our understanding of fathers' parenting behaviors uniquely related to promoting and inhibiting factors during children's early development. Particulars regarding significant predictors of negative reinforcement provide some evidence that coercive processes can begin in infancy (Patterson, 2005). The low percent explained variance for negative reinforcement may be partly explained by the low occurrence of aversive behaviors in our population-based sample, that there are other unmeasured predictors that are more critical, or that there is a need to examine more complex or subgroup hypotheses. Furthermore, fathers' negative reinforcement with infants may be associated with different predictors when fathers are both more sensitive and display more negative reinforcement, than when fathers are less sensitive and display more negative reinforcement. Even if other unknown factors explain the variance in fathers' negative reinforcement in our sample, this does not change the fact that we found that children with developmental difficulties, communicative risk, extroverted fathers, or who had both depressive fathers and a less sociable or more active temperament, experienced higher mean levels of negative reinforcement during the structured interactions.

Limitations

Several limitations must be noted. First, selection bias may have affected the results and reduced the overall representativeness of our results since participating fathers were more

educated, older, and spent more time with their infants than the non-participants. Another limitation related to our sample was that father initiated negative reinforcement was a low base rate event and many fathers never engaged in it. Fathers from the general population may be generally positive during interaction with their one-year-olds, and especially when being observed. This potentially makes it more difficult to detect associations that would have been more conspicuous in a sample targeted particularly to study coercive family processes. Furthermore, due to the study design and alternating focus on mothers and fathers, we were not able to include mother-child interaction in the current study. All family members influence each other's behavior, and mother-child interaction has been shown to be related to father-child interaction (Lamb, 2010). Other factors not included in the current study may well contribute to fathers' early parenting behaviors, such as mothers' education, parents' employment status or family income. However, the collinearity of socio-demographic indicators yields a need for hypotheses about specific mechanisms if included in the same analyses, due to the variables' tendency to control each other out. Finally, since most of our variables were not true interval scales, the imperfect scaling across levels might have created artifact interaction effects. Thus, these effects must be interpreted with care, and they need to be replicated, preferably with strategies that improve the scaling and take measurement error of variables into account.

Implications

The relation between fathers' time with their young children and the quality of parenting behaviors is an area more important to research as fathers are becoming increasingly involved in early parenting. By investigating factors related to fathers' sensitivity and negative reinforcement with one-year-olds in a large normative sample within the context of extended paternal leave, our study expands the current research on fathers' parenting behaviors with infants in several ways. Notably, our study adds to the literature by employing

multiple methods when predicting observational micro and macro outcome measures derived from direct observation from father-reported measures of child, father, and background characteristics. Moreover, by employing measures of parenting from diverse perspectives, results from our study support two distinct and developmentally significant theoretical models, and broaden our understanding of the relation and distinction between SIL- and attachment- based parenting dimensions and early father-child interaction. Finally, the present study goes beyond studies showing that fathers' extended time with infants is beneficial only when accompanied by better quality parenting, by identifying predictors of the quality of fathers' parenting defined as sensitivity and negative reinforcement with infants.

Our findings point to factors that may enhance father-infant interaction, and in turn, this can identify children and fathers who may benefit from early preventive intervention. The results indicate that child health nurses, and other practitioners who meet with families during a child's first year, may need to be attentive to father factors, such as education, mental health, social support and partner relationship, and of child factors, such as developmental difficulties or communicative risk. Currently, there are few validated intervention programs for fathers with infants (Magill-Evans, Harrison, Rempel, & Slater, 2006), and little is known about which types of interventions with fathers are effective in promoting sensitive, responsive father-infant interactions. Our results emphasize the significance of children's own behavior during interaction, and support earlier brief interventions with small non-clinical samples suggesting that the use of video feedback, and also fathers' observation of, or direct active participation with, the infant, may be effective in enhancing fathers' ability to comprehend the child's signals and engage in sensitive interaction with the child (Benzies, Magill-Evans, Harrison, MacPhail, & Kimak, 2008; Lawrence, Davies, & Ramchandani, 2012). Toddlerhood can be especially challenging to parents, when children often have highly developed motor abilities but less advanced language skills. Our findings suggest that positive

parenting practices, such as positive involvement, monitoring and emotion regulation, even at this early age, may benefit fathers' sensitive parenting and prevent coercive processes within the father-child relationship.

On the basis of our results future research should continue to explore the mutual relations between fathers' sensitivity and negative reinforcement and their subsequent relations to child development and adjustment. Other important areas to investigate are the stability of fathers' sensitivity and negative reinforcement over time, and possible factors related to change in fathers' parenting. Future studies should apply a broader family perspective to investigate how mother, father, child, and contextual factors contribute, separately and simultaneously, to child development and adjustment. Viewed in the light of earlier research finding that fathers' sensitivity and negative reinforcement are predictive of later child adjustment, it is particularly salient to understand the factors that contribute to these critical parenting dimensions. The current results expand our understanding of early father-child interaction and significant child and father factors related to fathers' parenting behaviors with one-year-olds.

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Table 1

Sample Characteristics for Original and EM Imputed Data

Variables	Original data				EM imputed data (N=726)		
	N	%	M	SD	%	M	SD
Child characteristics							
Age	726		12.17	0.48		12.17	0.48
Low birth weight	726	5.5			5.5		
Boy	726	51.7			51.7		
Twin	726	5.2			5.2		
Developmental difficulties	726	11.7			11.7		
Fathers' first born	726	49.6			49.6		
Activity level ^a	693		2.80	0.62		2.80	0.61
Sustained attention ^a	693		3.43	0.68		3.43	0.67
EAS Emotionality ^b	721		2.34	0.59		2.34	0.59
EAS Activity	721		3.91	0.56		3.91	0.56
EAS Sociability	721		3.93	0.49		3.93	0.49
EAS Shyness	721		2.19	0.64		2.19	0.64
Communicative risk	723	10.7			10.6		
Father characteristics							
Age	726		34.02	5.11		34.02	5.11
Time with infant	725		2.76	2.31		2.76	2.30
Verbal Instructions	716		35.05	19.90		34.99	19.79
Depressive Symptoms	720	5.1			5.1		
Partner relationship	708		5.23	0.74		5.29	0.73
Parental stress	720		31.38	7.36		31.39	7.34
Social support	558		2.44	0.38		2.44	0.34
EPQ Extraversion ^c	558		7.38	2.18		7.39	1.94
EPQ Neuroticism	558		2.20	2.04		2.18	1.82
EPQ Psychoticism	558		1.77	1.38		1.77	1.22
Education ^d							
<3-yr HS	726	5.5			5.5		
3-yrs HS-V	726	31.8			31.8		
3-yr HS-G	726	9.0			9.0		
≤4-yr C/U	726	35.0			35.0		
>4-yr C/U	726	18.7			18.7		
Outcome measures							
Sensitive parenting	701		3.52	0.63		3.51	0.62
Negative reinforcement	716		1.13	1.34		1.13	1.33

^a Behavior observed during structured interaction ^b EAS, Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984) ^c EPQ, Eysenck Personality Questionnaire (EPQ-I; Eysenck & Eysenck, 1975) ^d >4-yr C/U, >4-year technical college/ university; ≤4-yr C/U, ≤4-year technical college/university; 3-yr HS-G, 3-year high school general studies; 3-yr HS-V, 3-year vocational high school; <3-yr HS, <3-year high school

Table 2

Child and Father Factors Associated with Fathers' Sensitivity during Father-Child Interaction at One Year

Variable	Bivariate		Model 1		Model 2	
	<i>B</i>	(95%CI)	<i>B</i>	(95%CI)	<i>B</i>	(95%CI)
Child Covariates						
Intercept	0.00	(-0.07 to 0.07)	0.09	(-0.04 to 0.22)	0.10	(-0.12 to 0.31)
Age ^a	0.03	(-0.12 to 0.18)	-0.03	(-0.17 to 0.12)	-0.06	(-0.20 to 0.08)
Twin birth (intercept)	0.01	(-0.06 to 0.09)	–	–	–	–
Twin	-0.26	(-0.59 to 0.06)	-0.09	(-0.42 to 0.25)	-0.10	(-0.42 to 0.26)
Birth weight (intercept)	0.03	(-0.05 to 0.10)	–	–	–	–
Low (<2,499 g)	-0.52**	(-0.83 to -0.20)	-0.27	(-0.64 to 0.11)	-0.27	(-0.62 to 0.08)
Developmental difficulties (intercept)	0.05	(-0.03 to 0.12)	–	–	–	–
Developmental difficulties	-0.39**	(-0.61 to -0.16)	-0.24	(-0.50 to 0.02)	-0.17	(-0.42 to 0.07)
Child Predictors						
Gender (reference: girl)	0.04	(-0.06 to 0.15)	–	–	–	–
Boy	-0.08	(-0.23 to 0.06)	-0.03	(-0.18 to 0.11)	-0.01	(-0.14 to 0.13)
Temperament (intercept = 0) ^b						
Emotionality	-0.00	(-0.07 to 0.07)	-0.02	(-0.09 to 0.06)	0.00	(-0.07 to 0.08)
Activity	-0.04	(-0.12 to 0.03)	-0.05	(-0.13 to 0.02)	-0.05	(-0.12 to 0.03)
Sociability	0.06	(-0.01 to 0.13)	0.09*	(0.02 to 0.17)	0.06	(-0.01 to 0.13)
Shyness	0.04	(-0.04 to 0.11)	0.04	(-0.04 to 0.12)	0.02	(-0.05 to 0.09)
Observed behavior (intercept = 0) ^b						
Activity level	-0.04	(-0.11 to 0.03)	0.05	(-0.02 to 0.13)	0.08*	(0.00 to 0.15)
Sustained attention	0.25***	(0.17 to 0.32)	0.25***	(0.18 to 0.33)	0.24***	(0.17 to 0.31)
Communicative risk (intercept)	0.04	(-0.04 to 0.11)	–	–	–	–
<15 ASQ cut point	-0.35**	(-0.58 to -0.11)	-0.27*	(-0.50 to -0.03)	-0.26*	(-0.48 to -0.04)

Older siblings (reference)	0.01	(-0.09 to 0.12)	—	—	—	—
Father's first child	-0.03	(-0.17 to 0.12)	0.00	(-0.14 to 0.15)	0.01	(-0.14 to 0.15)
Father Predictors						
Intercept	-0.00	(-0.08 to 0.07)			—	—
Age ^a	0.01	(-0.00 to 0.03)			0.00	(-0.01 to 0.02)
Education (reference: >4-yr C/U) ^d	0.07	(-0.09 to 0.24)			—	—
≤4-yr C/U	0.10	(-0.10 to 0.31)			0.02	(-0.17 to 0.21)
3-yr HS-G	-0.09	(-0.38 to 0.21)			-0.06	(-0.33 to 0.21)
3-yrs HS-V	-0.23*	(-0.44 to -0.02)			-0.11	(-0.30 to 0.09)
<3-yr HS	-0.47**	(-0.82 to -0.12)			-0.34*	(-0.67 to -0.02)
Personality (intercept = 0) ^b						
Extraversion	-0.02	(-0.09 to 0.05)			-0.02	(-0.09 to 0.05)
Neuroticism	-0.04	(-0.12 to 0.03)			0.01	(-0.07 to 0.08)
Psychoticism	-0.02	(-0.10 to 0.05)			0.02	(-0.05 to 0.09)
Depressive symptoms (intercept)						
> SCL cut point	-0.05	(-0.38 to 0.28)			0.10	(-0.22 to 0.41)
Stress and support (intercept = 0) ^b						
Parental stress	-0.06	(-0.14 to 0.01)			-0.02	(-0.10 to 0.06)
Partner relationship	0.09*	(0.02 to 0.16)			0.00	(-0.08 to 0.08)
Social support	0.08*	(0.01 to 0.16)			0.07	(-0.01 to 0.15)
Time with infant (intercept)						
>1.5 month	-0.06	(-0.19 to 0.07)			—	—
	0.09	(-0.07 to 0.24)			0.03	(-0.12 to 0.17)
Verbal behavior (intercept = 0) ^c						
Verbal instructions	0.19***	(0.15 to 0.22)			0.17***	(0.14 to 0.21)

Note. ASQ = Ages and Stages Questionnaire; SCL = Hopkins Symptom Check List

^a centralized to mean age. ^b z-transformed. ^c 10 utterances per unit from the mean number of utterances. ^d4-yr C/U, >4-year technical college/ university; <4-yr C/U, ≤4-year technical college/university; 3-yr HS-G, 3-year high school general studies; 3-yr HS-V, 3-year vocational high school; <3-yr HS, <3-year high school.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Child and Father Factors Associated with Fathers' Negative Reinforcement during Father-Child Interaction at One Year

Variable	Bivariate		Model 1		Model 2	
	<i>B</i>	(95%CI)	<i>B</i>	(95%CI)	<i>B</i>	(95%CI)
Child Covariates						
Intercept	0.00	(-0.07 to 0.07)	-0.10	(-0.23 to 0.03)	-0.05	(-0.28 to 0.19)
Age ^a	-0.02	(-0.17 to 0.13)	0.00	(-0.15 to 0.16)	-0.01	(-0.17 to 0.14)
Twin birth (intercept)	0.01	(-0.06 to 0.09)	–	–	–	–
Twin	-0.26	(-0.59 to 0.06)	-0.12	(-0.47 to 0.23)	-0.11	(-0.47 to 0.24)
Birth weight (intercept)	0.01	(-0.07 to 0.08)	–	–	–	–
Low (<2,499 g)	-0.12	(-0.43 to 0.20)	-0.35	(-0.74 to 0.03)	-0.38	(-0.77 to 0.00)
Developmental difficulties (intercept)	-0.02	(-0.10 to 0.06)	–	–	–	–
Developmental difficulties	0.18	(-0.05 to 0.41)	0.31*	(0.04 to 0.57)	0.32*	(0.05 to 0.59)
Child Predictors						
Gender (reference: girl)	-0.07	(-0.17 to 0.04)	–	–	–	–
Boy	0.13	(-0.01 to 0.28)	0.09	(-0.06 to 0.24)	0.09	(-0.06 to 0.24)
Temperament (intercept = 0) ^b						
Emotionality	0.03	(-0.04 to 0.10)	0.03	(-0.04 to 0.11)	0.05	(-0.03 to 0.13)
Activity	0.07	(-0.01 to 0.14)	0.04	(-0.04 to 0.12)	0.03	(-0.05 to 0.11)
Sociability	0.02	(-0.05 to 0.10)	-0.00	(-0.08 to 0.08)	-0.01	(-0.09 to 0.07)
Shyness	-0.01	(-0.08 to 0.06)	0.00	(-0.08 to 0.08)	0.02	(-0.06 to 0.10)
Observed behavior (intercept = 0) ^b						
Activity level	0.10*	(0.03 to 0.17)	0.06	(-0.02 to 0.14)	0.05	(-0.03 to 0.13)
Sustained attention	-0.11**	(-0.19 to -0.04)	-0.08*	(-0.16 to -0.00)	-0.08	(-0.16 to 0.00)
Communicative risk (intercept)	-0.03	(-0.10 to 0.05)	–	–	–	–
<15 ASQ cut point	0.24*	(0.00 to 0.47)	0.23	(-0.01 to 0.47)	0.29*	(0.04 to 0.54)

Older siblings (reference)	-0.04	(-0.14 to 0.06)	—	—	—	—
Father's first child	0.08	(-0.07 to 0.23)	0.04	(-0.11 to 0.19)	0.05	(-0.11 to 0.20)
Father Predictors						
Intercept	0.00	(-0.07 to 0.07)			—	—
Age ^a	-0.01	(-0.02 to 0.01)			0.00	(-0.02 to 0.02)
Education (reference: >4-yr C/U) ^d	-0.05	(-0.21 to 0.12)			—	—
≤4-yr C/U	-0.00	(-0.21 to 0.21)			-0.02	(-0.23 to 0.19)
3-yr HS-G	0.10	(-0.20 to 0.39)			0.01	(-0.29 to 0.31)
3-yrs HS-V	0.11	(-0.10 to 0.33)			0.06	(-0.16 to 0.27)
<3-yr HS	0.03	(-0.32 to 0.39)			-0.02	(-0.37 to 0.34)
Personality (intercept = 0) ^b						
Extraversion	0.09*	(0.02 to 0.17)			0.09*	(0.01 to 0.17)
Neuroticism	0.03	(-0.04 to 0.11)			0.05	(-0.03 to 0.13)
Psychoticism	-0.06	(-0.14 to 0.01)			-0.07	(-0.15 to 0.01)
Depressive symptoms (intercept)						
> SCL cut point	-0.23	(-0.56 to 0.11)			-0.25	(-0.60 to 0.10)
Stress and support (intercept = 0) ^b						
Parental stress	-0.04	(-0.12 to 0.03)			-0.03	(-0.12 to 0.05)
Partner relationship	-0.01	(-0.08 to 0.07)			-0.04	(-0.13 to 0.05)
Social support	0.05	(-0.02 to 0.12)			0.06	(-0.04 to 0.15)
Time with infant (intercept)						
>1.5 month	-0.13	(-0.29 to 0.02)			-0.09	(-0.25 to 0.06)
Verbal behavior (intercept = 0) ^c						
Verbal instructions	-0.04*	(-0.08 to -0.00)			-0.03	(-0.06 to 0.01)

Note. ASQ = Ages and Stages Questionnaire; SCL = Hopkins Symptom Check List

^a centralized to mean age. ^b z-transformed. ^c 10 utterances per unit from the mean number of utterances. ^d4-yr C/U, >4-year technical college/ university; <4-yr C/U, ≤4-year technical college/university; 3-yr HS-G, 3-year high school general studies; 3-yr HS-V, 3-year vocational high school; <3-yr HS, <3-year high school.

* $p < .05$, ** $p < .01$, *** $p < .001$

APPENDIX A

Table 1. Overview of Variables Included in the Current Thesis.

Variable	Method	Predictor	Outcome	Covariate
Parents' observed behaviors				
Positive engagement	Direct observation TOPICS micro coding	Paper II	Paper I	
Negative engagement			Paper I	
Verbal behavior			Paper I	
Nonverbal behavior			Paper I	
Physical behavior			Paper I	
Verbal instructions		Paper III		
Neg. reinforcement		Paper II	Paper III	
Sensitivity	Direct observation NICHD global ratings	Paper II	Paper III	
Intrusiveness		Paper II		
Children's observed behaviors				
Positive engagement	Direct observation TOPICS micro coding		Paper I	
Negative engagement			Paper I	
Verbal behavior			Paper I	
Nonverbal behavior			Paper I	
Physical behavior			Paper I	
Activity level	Direct observation NICHD global ratings	Paper III		
Sustained attention		Paper III		
Father factors				
Time with infant	Father report	Papers II & III		
Education		Paper III		Paper II
Extraversion		Paper III		
Neuroticism		Paper III		
Psychoticism		Paper III		
Age		Paper III		
Unemployment				
Child factors				
Behavior adjustment	Mother report		Paper II	
Social competence	Father report		Paper II	
Externalizing	Teacher report		Paper II	
Temperament 6 m	Mother report			Paper II
Emotionality	Father report	Paper III		
Activity		Paper III		
Sociability		Paper III		
Shyness		Paper III		
Communicative risk		Paper III		
Gender	Parent report	Papers I & III		Paper II
Age				Paper III
Twin				Paper III
Developm. difficulties				Paper III
Family factors				
Mother time home	Mother report			Paper II
Mother education				Paper II
Older siblings	Parent report	Paper III		
Contextual factors				
Depressive sympt.	Father report	Paper III		
Social support		Paper III		
Parental stress		Paper III		
Partner relationship		Paper III		

Table 2. Pearson's Correlations Examining Child and Parent Behaviors across Coding Systems

Micro measures	Global father measures						Global child measures			
	Intrusive	Detached	Sensitive/ responsive	Positive regard	Stim of develop	Sensitive parenting ¹	Positive mood	Negative mood	Activity	Sustained attention
Child behaviors										
Positive eng ¹	.01	-.15*	.13**	.09*	.16**	.16**	.05	.03	-.04	.02
Negative eng ¹	.22**	.00	-.14**	-.08*	-.08*	-.09*	-.06	.46**	.25**	-.18**
Verbal	.07	-.02	.03	.06	-.04	.02	.30**	.14**	.25**	-.16**
Nonverbal	.02	.02	-.01	-.02	.04	-.00	-.07	-.12**	-.09**	.08*
Physical	.09*	.15**	-.18**	-.16**	-.10**	-.18**	-.10*	-.02	.27**	-.26**
Father behaviors										
Positive eng ¹	.08*	-.23**	.14**	.18**	.29**	.25**	-.00	-.00	-.00	.03
Negative eng ¹	.28**	.01	-.15**	-.07	-.03	-.08*	.04	.14**	.13**	-.05
Verbal	-.02	-.27**	.27**	.35**	.40**	.39**	.06	-.01	-.03	.01
Nonverbal	.04	-.06	.02	-.02	.03	-.02	.01	.05	-.03	.06
Physical	.20**	.03	-.14**	-.05	-.12**	-.10**	.02	.06	.00	-.05
Neg. reinf. ²	.22**	.00	-.10**	-.07	.02	-.04	-.00	.09*	.12**	-.12**
Verbal stim ¹	-.09*	-.25**	.30**	.22**	.42**	.36**	-.01	-.02	-.06	.05

Note. ¹ Composite variables, ² Sequential variable, eng = engagement, neg. reinf. = negative reinforcement, stim = stimulation, develop = development

* = $p < .05$, ** = $p < .01$, *** = $p < .001$

Table 3. Pearson's Correlations Examining Observed Child Behaviors and Parent Reported Variables

	Boy	EAS Emotionality	EAS Activity	EAS Sociability	EAS Shyness	ASQ Communication	Developmental difficulties
Micro measures							
Positive engagement	-.09*	.03	-.06	.06	.05	.06	-.02
Negative engagement	.03	.10**	.05	.07	-.02	-.04	.04
Verbal behavior	.02	-.03	.07	-.00	-.03	.14**	-.01
Nonverbal behavior	-.02	.08*	-.04	.04	.04	-.01	-.04
Physical behavior	.13**	-.04	.15**	-.02	-.09*	-.03	.05
Negative reinforcement ¹	.06	.01	-.00	.08	.01	-.03	.09*
Global measures							
Positive mood	.01	-.02	-.03	-.06	.06	.05	-.02
Negative mood	-.02	.03	.05	-.01	-.04	-.00	.05
Activity level	.13**	-.03	.20**	.05	-.06	.03	-.03
Sustained attention	-.04	.05	-.11**	-.03	.05	.03	-.04
Dyadic mutuality ²	-.09*	.03	-.05	-.01	.09*	.08*	-.13**

Note. EAS = Temperament Survey for Children , ASQ = Ages and Stages Questionnaire, ¹ Sequential measure including child and parent behaviors, ² dyadic measure including both child and parent behaviors, * = $p < .05$, ** = $p < .01$, *** = $p < .001$

Table 4. Pearson's Correlations Examining Observed Father Behaviors and Self-reported Variables

Observed behaviors	Age	Education	Extroversion	Neuroticism	Psychoticism	Poor housing	First child
Micro measures							
Positive engagement	.07	-.00	.05	-.06	-.10*	-.06	-.01
Negative engagement	-.08*	-.16**	.12**	.02	-.04	.06	.10**
Verbal behavior	.07	.04	-.02	-.03	-.14**	-.12**	.03
Nonverbal behavior	-.01	-.05	-.00	-.05	-.03	-.01	.01
Physical behavior	-.03	-.07	.05	.02	.05	-.01	-.02
Negative reinforcement ¹	-.04	-.04	.08	.03	-.04	.11**	.04
Global ratings							
Intrusiveness	-.03	-.19**	.14**	.07	-.03	.06	-.01
Detachment	-.06	-.08*	-.00	.03	.03	.03	.02
Sensitivity	.05	.17**	-.06	-.04	.03	-.08*	-.03
Positive regard	.03	.15**	.02	-.06	-.03	-.09*	-.01
Negative regard	.00	-.06	.11*	.02	.00	.06	.06
Animation	-.01	.04	.09*	.04	.04	-.01	.06
Stimulation of development	.04	.10*	-.02	-.01	-.02	-.03	.02
Dyadic mutuality ²	.02	.12**	-.03	-.03	.02	-.07	-.09*

Note. ¹ Sequential measure including parent and child behaviors, ² Dyadic measure including parent and child behaviors, * = $p < .05$, ** = $p < .01$, *** = $p < .001$

APPENDIX B

Assessment protocol for BONDS' structured interaction tasks at age one

Prior to the family's arrival:

- Memorize the parent's and child's names
- Place chairs, table and playing mat in position in front of the camera.
- Adjust the tripod to the appropriate height. The camera should be at an angle where child and parent are being filmed as much as possible from the front (not from above).
- Attach the camera to the tripod and place the cord as far out of reach for the child as possible.
- Write date, the child's ID number (B) and age in addition to the adult's ID number (D) on the tape. The recording is to be identified in four different spots, on the back and on the side of the tape, and on the back and the side of the cover:

11.12.05, B#2001, age 1, D# |

- Film the video tag for 15 seconds
- Zoom in for the playing task ensuring that you will see the parent, the child and the toys on the mat

When the family arrives:

- *"Welcome, and thank you so much for coming."*
Do your best to make the family feel comfortable. If the child is sleeping: Be flexible about when the interaction task is conducted.
- Ask the parent to hang up coats and bags (to ensure as little interruption of the tasks as possible).
- Tell the parent what is going to happen and that the structured tasks and the interview will take about 2 hours all together. *"This study is investigating how children develop socially. Social development mainly takes place during interacting with other people. Parents are the first and the most important people in the child's life. Therefore we would like to film you and your child while you do these play-tasks together."*
- *"We will start with the interaction tasks, and after that we will do the interview. The tasks take about 15 minutes all together."*
Remember: If the child is asleep; be flexible about when the interaction tasks are conducted.
- If the parents have questions:
Give informative answers, but keep it as short as possible. If there are many questions, you may, for example, say, *"that is a very good question, and I understand your asking it"* and then ask if it is ok that get back to it later. It is important that the parents feel that their needs are being met, but it is just as important that the interaction tasks are conducted before the child gets tired.
- Short presentation of all the tasks:
"All in all there are four tasks. In two of the tasks you will be playing together with different toys. In between the play tasks there is also a clean up task. In the final task (the child) has to wait in a high chair while you start filling out a questionnaire. I will explain each task to you along the way, and in between the tasks I will be in outside this room keeping track of the time."
- *"There is no right or wrong way to do these tasks. Just do what you like in your own way. You may stop the tasks at any time if you wish to do so. In that case, please let me know. Does this sound ok with you? Now I will turn on the camera and fetch the toys for the first task."*
- Turn the camera on

TASK #1 – FREE PLAY FOR 4 MINUTES

1. Get the box of toys, and close the door behind you
2. Ask the parent to sit down on the mat with the child facing the camera
3. *"The first task is to play together with these toys for four minutes. I will empty the box now, and then you can play with the toys as you like."*
4. Empty the box ensuring that the toys are between the child and the camera
5. Check that the camera is turned on and that the parent, the child and the toys are in the picture
6. *"I will be back in four minutes."*
7. Take the box with you out of the room and close the door behind you
8. Start the timer when you close the door, and keep track of the time – it needs to be ACCURATE!

TASK #2 – CLEAN UP FOR 2 MINUTES

1. Knock on the door
2. Bring the toy box back into the room and close the door behind you
3. *"Now I would like you (mother/father) to put the toys back in the box. (The child) may help, but is not required to."*
4. Put the box down on the floor ensuring it is being filmed as well
5. Check that the camera is on and that the parent, the child, the toys and the box are in the picture
6. *"I will be back in two minutes."*
7. Leave the room and close the door behind you
9. Start the timer when you close the door, and keep track of the time – it needs to be ACCURATE!

TASK #3 – STRUCTURED PLAY FOR 3 + 3 MINUTES

1. Knock, enter the room and close the door behind you
2. If they have not finished cleaning up; help putting the rest of the toys into the box
3. *"I will take the box out now, and bring back the toys for the next tasks."*
4. Take the toy-box out (close the door while you are out) and bring back the "stacking rings" and the "putting box" in. Close the door behind you.
5. *"The next has two parts. Here I have two different toys."*
6. Show both the "putting box" and the "stacking rings"
7. Place the "stacking rings" so that the child can see them and that they are visible to the camera
8. Then show the "putting box" and empty the blocks out on the floor
9. *"The first thing I want you to do is to get the blocks back into the "putting box". You may help (the child) as much as you find necessary."*
10. *"After three minutes I will ask you to swap to the "stacking rings". Then you take the rings off, and you may help (the child) as much as you find necessary to stack the rings back on the pole."*
11. *"Now you may start with the "putting box". It is not necessary to finish the tasks. In three minutes I will come in and ask you to swap toys."*
12. Check that the camera is on and that the parent, the child and the toys are in the picture
13. Leave the room, close the door and keep track of the time!
14. After three minutes, knock on the door, poke your head in and say, *"Now you may swap toys."* Remember that the parent is in charge of the swap.
10. Start the timer when you close the door, and keep track of the time – it needs to be ACCURATE!

TASK #4 – WAITING IN HIGH CHAIR FOR 3 MINUTES

1. Knock, enter the room and close the door behind you
2. Give supportive answers to any comments regarding the last task
3. Gather the toys
4. *"I will take the toys out now, and bring back equipment for the last task."*
5. Take the toys out and bring the high chair into the room, closing the door behind you
6. Place the high chair facing the camera, so that the child can see the adult by looking over his/her shoulder.
7. *"In this last task I'd like (the child) to wait in this chair for three minutes, while you (mother/father) start filling out this questionnaire."*
8. *"Now you (mother/father) may place (the child) in the chair and fasten the safety belt."*
9. Tell mother/father to sit down at the table to fill out the questionnaire. Keep the angle in mind. The child has to be able to see his/her mother/father by turning his/her head.
10. *"If your child becomes fussy or uneasy, please do what you like to in order to calm her/him down. However, in this task we wish that you do not give (the child) anything to play with or pick him/her up from the chair. You are of course entitled to brake off the task any time you may feel like it."*
11. Give the questionnaire and a pen to the mother/father
12. *"I would like you to fill in this short questionnaire asking about your child's sleep the last 24 hours while your child is waiting."*
13. Check that the camera is on. Adjust the picture, zooming in on the child, with mother/father visible in the background
14. *"I will be back in three minutes. Then these tasks are completed."*
15. Leave the room, close the door, start the timer and keep track of the time – it needs to be accurate!

Debriefing the interaction tasks:

- Knock on the door and bring the gift to the child
- *“That was the last task and you may now take (the child) out of the chair.”*
- Turn the camera off
- Praise the child/parent for completing the tasks, and thank them for their effort. Give positive feedback, but do not comment on how they performed the tasks
- Give the child the gift as a “thank you”
- Bring the toy box back in and let the child play with the toys for the rest of the interview
- Ask the parents if he/she found that it was ok to do the tasks while being videotaped. Give the opportunity to comment, be supportive without overdoing it. If the parent has more comprehensive questions, please refer them to the researchers.
- Rewind the tape completely. Remember to take the tape out of the camera and make sure it is appropriately labelled.

Toddler and Parent Interaction Coding System
(TOPICS)

CODING MANUAL

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December 2010

This coding system is adapted from the Family and Peer Process Coding system (FPPC) with permission from
and in collaboration with Dr. Emeritus Marion S. Forgatch
Translation from Norwegian to English by Sihu Klest (2012)

TOPICS is a micro-social coding system where parent-child interaction is coded into a five-digit code number (e.g. 22182). The digits in the code number set the initiator (the speaker/actor), the content of the message (what is being said/done), recipient (the one receiving the message/behavior), as well as what affect the expression/behavior contains. In the example above this can be understood as father (2) saying something positive about the child (21), in this case a girl (8), in a caring tone (2). In addition, an activity code is included which can be registered before one starts to code, however, this initial code can be altered during coding if desired/necessary. Our goal is to code as objectively as possible based on what we see/hear/observe and without interpretation of reason or cause.

MANUAL CONTENTS:

Activity codes	p. 3
Codes for initiator	p. 3
Codes for recipient	p. 3
Content codes	p. 4
Verbal codes	p. 4
Nonverbal and physical codes	p. 14
Response codes	p. 19
Other content codes	p. 20
Affect codes	p. 21
Marker codes	p. 23

ACTIVITY CODES

1= *on task* is coded when the participants follow the task instructions. 1: playing together with the toys, 2: tidying up the toys back into the box 3: Playing with sorting blocks and stacking rings, 4: child sitting in the chair waiting (this will be the case for most of the time in most tasks).

2= *off task* is coded when the participants play with other toys than the task suggests (usually if the film is recorded at the participants' home) or if the child is given a pacifier, toys, or other things while sitting in the chair.

CODES FOR INITIATOR

1= boy

2= father (also adoptive or foster father)

3= mother (also adoptive or foster mother)

8= girl

4= others

CODES FOR RECIPIENT

0= object/animal/camera

1= boy

2= father

3= mother

4= others

8= girl

9= everyone/several/no one/speaking into the air to oneself/speaking to both participants as "we"

Note! During the waiting task all sounds from the child are coded with the parent as recipient.

CONTENT CODES

The content codes are double-digit and divided into subgroups: Verbal codes, nonverbal codes, physical codes and response codes. Codes ending with 1 are usually positive, those ending with 2 are neutral, and codes ending with 3 are usually negative.

Verbal codes

To code a verbal content code the statement/exclamation must be understood as a spoken word (with some leeway at 12 months).

GENERAL GUIDELINES FOR VERBAL CODES

Verbal codes and sequence of events

The content codes in TOPICS may depend on the sequence of events. This is particularly true when determining whether a statement belongs to the 40-codes and/or the 20- or 30-codes respectively. Statements related to a specific action/behavior in advance of or during the act itself will often belong to the 40-codes because it involves suggestions/guidance/learning. Statements describing a behavior after the fact will often involve the 20- and 30-codes (particularly 21, 23, or 32). When the difference is hard to discern because of the participants position, one code should be used based upon the coder's first impression.

Examples:

The mother shows the boy how to put the blocks into the box while saying: "*Yes, inside!*" (41) (as an explanation of what she is doing)

The mother gives the boy a block as she points to the box saying: "*Yes, inside!*" (42) (as a request for the child to put the block into the box)

The boy manages to put a block into the box and the mother says: "*Yes, inside!*" (21) (as encouragement/praise for the boy)

The boy indicates to his father that he wants to switch toys and the father says, "*Would you rather see the book?*" (32)

The father suggests that they switch from blocks to book and says, "*Would you rather see the book?*" (41)

When determining whether a statement should be coded as 22 (neutral interpersonal), 21 (positive interpersonal), or 32 (articulate feelings), the sequence of events is important. The statement can be interpreted respectively as a description of expressed perception/emotion, as

an offer, or as a neutral comment on the other's behavior depending on the sequence of events in the situation.

Example:

The mother is showing the book to her son, but the boy is more occupied with the teddy bear. Mother says, "*Would you rather play with that one?*" (32)

The boy is sitting and looking at the toys and the mother hands him the book and says, "*Want to read this one?*" (21)

The boy is sitting and looking at the toys and the mother says, "*Which toy would you like to play with?*" (22)

Priority rules

Remember that the entire sentence/expression should be coded, not the individual words themselves. Positively or negatively charged words may give an indication, but are not always decisive for which content code applies to the statement. A verbal statement should usually be coded with a content code in TOPICS. The exception is when there are distinct dependent clauses (i.e., sentences with a main clause and one or more subordinate clauses).

Statements you are in doubt about need to first be checked with the manual. If the statement meets the criteria for two different codes (or more), follow these priority rules:

21 and 23 are used over (i.e., they cancel out) 42 and 43. Codes 42 and 43 are used over 41, 31, 32, 33 and those codes in turn are used over 22, 11, 12, and 13.

This means that if a statement can be interpreted as comprising multiple concurrent codes, the interpersonal codes are prioritized over 11, 12, and 13. 21 and 23 have the highest priority followed by the 40-codes. The message codes (42 and 43) are prioritized over 41 if the sentence does not contain subordinate clauses. The 30-codes are prioritized over the remaining interpersonal codes and over 11, 12, and 13.

Examples:

"Look at the big brown horse" (42)

"Look at the horse, big brown horse" (42) (41)

"Put the nice square block in here" (42)

"Apparently, you thought the book was just as nice as I did" (32)

"Now, don't do the same stupid thing all over again" (23)

TALK

11 Positive talk

Positive statements or exclamations about objects, situations, events, expectations, or preferences. This code includes positive statements about oneself. General positive statements or exclamations in relation to people who are not present in the situation are also included.

Examples of 11:

“What a nice toy”

“That went very smoothly!”

“Grandma is kind”

“Yes!!” (very excited, but 21 if meant as a direct encouragement to something the child does)

“Hope the weather will be nice”

“I win”

“I want/would like/like—” (positive preferences in relation to objects, situations, or events)

12 Talk

Description of facts (not explanations of how something is done [41]). General statements and exclamations with neutral content. Statements describing what somebody else has said. Words for what animals say (unless it is a response to a learning question, or to explain what the animal says, in which case it is 41). When pretending that dolls or stuffed animals are talking regardless of content (in addition, the expressed affect is coded). Statements that are unfinished sentences with no specific meaning.

Examples of 12:

“I give up”

“Indeed...”

“Wow!”

“Woof, woof, woof”

“Moo, moo”

“Like that”

Father assumes the role of toy zebra, transforms his voice and says: *“I am a zebra, jazzy zebra!”*

13 Negative talk

Negative statements or exclamations regarding objects, situations, events, or preferences. Negative statements about oneself are also included. This code includes general negative statements or exclamations in relation to someone outside the situation and leading questions that put blame on someone who is absent. General complaining and cursing that is not

directed towards someone present in the situation (with the exception of the speaker referring to themselves).

Examples of 13:

Father says, *"That wasn't very smart,"* as a comment on something he did himself.

Mother says, *"Mom cannot do it"* (as a complaint)

"The weather outside is bad"

"Oh no!"

"That one is completely wrong" (about a block)

"Mom is tired and worn out today"

"Silly"

"Damn it!"

"I don't want/wouldn't like/don't like—"(negative preferences in relation to objects, situations, events)

"Yuck" (if not directly related to the child)

INTERPERSONAL TALK

21 Positive interpersonal

General positive statements or exclamations in relation to someone present in the situation. This code includes both statements about the other's actions as well as general statements about the other as a person. Verbal expressions of praise, encouragement and recognition of the other. Also includes support, offers to help, toys, food or drink, expressions of empathy or compassion, and thanks or apologies aimed directly at a person present. Statements that convey personal recognition or warm feelings toward another person present, and the use of positive pet names are coded 21. "Here you go" and, "Thank you" can be coded 21 although they may also be understood as learning or information. Positive references to what others have said about someone present is coded 21. Positive preferences directly relating to the other.

Examples of 21:

"You're so good at solving the jigsaw puzzle!"

"Well done"

"You can make it!"

"Awesome, Maja!"

"There you go, love"

"That's right" (directed at something the child is doing)

"Yay!" (when the child makes a hit)

"Would you like some help?"

"Daddy help?"

"You're lucky"

"Poor you"

“Would you like some juice?”
“You can play with this one if you like”
“Do you want to play with the car?” (as an offer)
“Do you want to read the book?”
“Grandma says you’re super!”
“We did that well”
“I’ll gladly play with you”
“I want to play with you”
“I like when you smile”
“Do you want this one?” (Father holds up a toy)

22 Neutral interpersonal

Statements with neutral content regarding the other person present. Questions about what the other thinks or what has happened (if it is not 41). Questions to children at 12 months are often 41 because they articulate something which the child knows or is learning (e.g., *“You see the horse?”*). 22 can describe something that the other is doing without directly articulating an experience or feeling that the other expresses.

Examples of 22:

Father and daughter are dumping the toys out on the floor during the free play-task. Father says, *“What do you want to play with?”*

Father and son are playing together on the floor and the child crawls away. Father says, *“Are you crawling away?”*

Other examples:

“What do you think, Petra?”
“I know where you’re going.”
“Did you hear what the lady said?”
“Let’s do it like that.”
“You think you’re going to get fed now.” (Child sitting in high-chair)

23 Negative interpersonal

Negative statements regarding someone present in the situation. Verbal criticism, disapproval or accusations against a person present. Personal discord and personalized negative statements or sentiments directed against a person who is present. Negative preferences directly related to the other.

Examples of 23:

“No, you made a mistake!”
“You cheated”

“You did it wrong!”
“You put it in the wrong place.”
“Oops, we missed.”
“You’re holding it the wrong way.”
“I don’t want to play with you.”
“I don’t think it’s any fun to play with you.”
“That was stupid!” (to the other)
“Why do you always put it the wrong way?”
“You always do the stupidest things.”

31 Play and humor

“Nonsense and silliness” used to create enthusiasm and attempts to be funny to the other person. Singing and recounting fairy-tales. Established sayings and nursery rhymes. Jokes and teasing statements, exaggerations clearly intended as play, games such as peek-a-boo, adult jokingly using baby talk. Imitation or “repeat-play” (e.g., when the child has acquired a new word and both child and parent repeats it as a game [*“Lookit – lookit – lookit...”*]). Good-natured teasing nicknames are coded as 31.

Examples of 31:

“Hee –loooo!”
“Someone’s got a case of the sillies!”
“Ready – set – go!”
“Onee, twooo, threeee...” (as part of play, not as learning)
“Teaser.”
“You little silly pants!”
“Mr. fuzzle bucket.”
“You clever scoundrel.”
“Little darling.”

Remember to code 12 with expressed affect when stuffed animals are “talking”.

32 Articulate the other’s feelings

This code is used when the parent articulates the child’s feelings and/or describes the child’s experience (In theory, the child will also be able to do this at 24 and 36 months). This code will thus often be related to situations where one can observe that the child (or the adult), verbally or non-verbally, communicates a feeling or an experience to mother or father. The statement can be phrased as a question, but must be directly related to the child and usually contain the word “you” or the child’s name. Also, “we”-statements may be coded as 32.

Examples of 32:

Father and son are tidying up the toys into the toy chest in the play-task and the boy refuses to let go of the book. Father says, *“Did you think this book was nice then?”*

Boy is sobbing and crying during the waiting-task. Mother says, *“It’s no fun sitting there?”*

Father and daughter are dumping the toys out on the floor during the free play-task. The girl is clapping her hands at the sight of the book and father says, *“Oh, now we’re happy!”*

Other examples:

“Now you’re upset.”

“Now you’re enjoying yourself.”

“Are you sad?”

“Was it spooky?”

“Did you enjoy knocking it down...”

33 Verbal attacks and threats

Demeaning, threatening, and hurtful statements directed against another person present. Threats containing a negative physical, emotional, or psychological reaction (“clean up or mom will be upset”). Negative nicknames and humiliations toward the other.

Examples of 33:

“I’ll get mad if you don’t stop.”

“You brat.”

“Fuck you.”

“You need a beating.”

“Stupid.”

“Jerk.”

“Stop whining (43), or mommy won’t love you anymore (33).”

For examples of codes that are close to 33, see p. 4.

INSTRUCTIONS

41 Guidance

Naming of objects and activities in the situation in order to teach the child. Applies only to descriptions of what things are or do, not to what things are not or don't do. The statement must contain at least one descriptive word to be coded 41 ("*that goes down there*" (41) vs. "*like that*" (12). Descriptive vs. empty words). This code includes information which helps the other to solve a task (e.g., the learning-task). Explanations for how something works or is to be done (e.g., "*and the round one goes down there*"), as well as statements meant to direct, show, or facilitate solving a task. Suggestions on ways to do things ("*perhaps we can build a castle.*") Here we code 9 as recipient because the parent uses "we", and thus directs the proposition both to him/herself and to the child. Statements that are covered by this code can be phrased as a question (e.g., "*Is this the book?*"). 41 does not call for a change in behavior, it is only suggestions, advice, or guidance, and therefore, no response is coded. Statements beginning with "*shall we...*" / "*will you...*" are mainly coded as 41.

Examples of 41:

"*Now we'll put the car in the toy chest.*" (while father puts car in the chest)

"*That's the book, you know.*"

"*Book*" (the parent is displaying the book to the child)

"*This one goes down here and that one goes down there.*"

"*What does the horse say?*"

"*There it disappeared...*"

"*You can play with the clown afterwards.*"

"*Yes, that's a car outside.*"

"*Can you hear the church bells?*"

"*Shall we put this into the toy chest?*"

"*Will you put it there now?*"

"*What does the cow say?*" "*Moooo.*" (both question and answer is 41).

42 Start directions

Positive or neutrally worded requests, directives or inquiries about something that demands an immediate behavioral change from the other. The code applies only to requests for something the other must do or say, and not to what should not happen. Statements for this code do not need to be full sentences, but they must clearly be understood as a request to do or say something. The request can be phrased as a question (e.g., "*Can you put this inside there?*"), and also includes questions about permission (e.g., "*Can I borrow this?*"). Using the child's name to call attention ("*Mary!*" or "*Mom*" / "*Dad*") is included. 42 calls for a change of behavior (intended immediately) and is coded with a response (01/03 and/or 51/53). Statements containing "we" instead of "you" are coded as suggestions (41). Statements beginning with, "Can you..." is mainly coded 42.

Examples of 42:

"*Put this on top of the other.*"

“(Put it) inside.”

“Try this one also.”

“Do you think I can borrow that one?”

“Give to daddy?”

“Can you show mommy how good you are?”

“Do you think daddy can borrow that one?”

“Look at that one.”

“Look.”

“Put it here.”

43 Stop directions

Requests demanding an immediate behavioral change about what the other cannot say or do, or what he/she needs to stop. Can (like 42) be both a single word or a question.

Examples of 43:

“Stop that!”

“Stop whining.”

“You mustn’t go over to the camera.”

“You mustn’t put that there.”

“Don’t go away!”

“You can’t.”

“No!!”

“Don’t do it!”

“Stop!!”

“Quit it.”

“Don’t put it there.”

“You’re not allowed to take the lid off.”

VOCAL SOUNDS

62 Vocalization

Vocalization includes all vocal sounds that are not recognizable words (quite a lot for the child at 12 months), like “aaaaah”, “eeeeee”, “uuuu”, etc. Laughter is 62 with affect 1 (see definitions of affect). Whining/weeping is 62 with 4, 5, 6, 7, or 8 as affect code. 62 are only sounds, not words. To grunt like a bear is 62, but saying “BOO BOO” is 12. Involuntary sounds like coughing are not coded. Sighs are coded 62 with the appropriate affect.

Examples of 62:

Animal sounds (imitating an animal)

Grunting

Weeping

Gurgling

Laughter

Whining

Train sounds (but not saying, “*HOOT HOOT*”, that’s 12).

Sighs

Nonverbal and physical codes

NONVERBAL

71 Positive nonverbal

Positive nonverbal includes giving someone an object or a toy, showing something to the other (holding up a toy for the other to see), showing how something is done without physical interaction between the persons. The object must be actively displayed (holding up, pointing, or otherwise trying to get the other person to see the object). We also code 71 for the child when he or she clearly reaches towards the parent to be picked up. Positive facial expressions, hand gestures or body language, such as clapping hands and smiling. A response (01/03) may follow this code, but not necessarily. Some 71's requires a response (e.g., showing something), others do not (e.g., thumbs up, smiling). The 71-code can roughly be divided into behaviors that can be understood as *initiatives*, such as showing something or extending one's arms to be picked up, and behaviors that can be understood as *gestures*, such as smiling and clapping hands. Initiatives require a coded response, whereas gestures do not.

Examples of the use of 71:

Father and child are sitting and looking at the book without talking. Father is leafing through while the child is looking. We code 71 for the father and 01 for the child, 71 for the father, 01 for the child, etc. (code 71 for every time they flip a page). This also applies if the child is leafing through the book and the father is watching, but in this case we code 71 for the child who is the initiator, and 01 or 03 for the father. If the father and child are building a tower with the blocks (father is building, the child follows) it is coded in the same way, 71 for each time a block is placed on another. HOWEVER, if only one of them is occupied with the task and they are not in communication with the other, 72 is coded (see below). Parent pushes the block into the toy chest for the child (while the child is attempting to do so), is coded 71. If the parent is in physical contact with the child's hand, the code is 92.

Other examples of 71:

Smiling

Clapping for something the other has done.

Thumbs up

"Give me five."

Nonverbal invitation to play (holding up a toy)

Demonstrating how the rings are stacked

Showing how to tidy up the toys

72 Neutral nonverbal (play with object)

All play or handling of an object/toy which is not clearly included in another code (e.g., as a response to something). The code also includes reaching for a toy (as well as picking it up and looking at it if it is not a part of an interaction with the other in the room). Cuddling with a pet toy (the pet toy acts as "middleman"), cuddling is coded with affect 2. Holding a toy in

contact with the other's body is 72 (e.g., father makes a teddy bear 'walk' on the child's leg). When the participants handle toys or other objects without it being a part of an interaction with the other, it is coded recipient 0 (object). An example of this is: Father is tidying up toys into the toy chest without it being a demonstration for the child (i.e., without talking to or looking at the child [72 to 0]). The child is sitting and playing with a toy by him-/herself (72 to 0).

Examples of 72:

Tidying up toys (alone).

Playing with a toy by oneself.

Father makes a teddy bear jump up his daughter's leg.

73 Negative nonverbal

To take an object, toy, or food from the other (or try to). Negative facial expressions, hand gestures, or body language that appear threatening, condescending, or derogatory. To wriggle out of another's grip (or try to). To pout or shake one's head can be a negative response to someone else's 71, and is thus coded 03.

Examples of 73:

Father takes a toy from the child's hand.

Pouting

Thumbs down

Shaking one's head

The child extracts his/her arm (which the father is holding).

Father holds the child on his lap (92) and the child tries to wriggle away (73).

PHYSICAL BEHAVIOR

81 Physical facilitation

The parent's physical facilitation of an activity or a task (e.g., collecting the blocks that go into the toy chest, moving oneself so that the child has an easier way of getting to, moving the stacking ring post closer to the child, putting the lid on the chest, etc. This code has child as the recipient, although it is the object that is physically being moved.

Examples of 81:

If the father is putting the lid on the toy chest (and holding it) and the child is trying to remove it, we code 81 (facilitation) from father and 73 (remove object) from child. If father then takes the lid from the child, we code 73 from father, as well as 81 if he then puts the lid back on.

Place an object before the child (e.g., pushing the chest closer). If one is actively demonstrating, it is 71.

Pushing other toys away or tidying up the space for a chosen activity is coded 81.

82 Physical movement

Child: When the child is walking or crawling around the room. The code is not stopped, but is coded again if the activity is still in progress after another code has been registered.

Parent: When the parent walks over to the 12 month-old child in the high-chair (task 4). When the parent walks over to the box with the strange sound for the 24 month-old task or the 'dragon cage' at for the 36 month-old task. It is not stopped, but is coded again if the activity is still in progress after another activity has been registered.

83 Physical behavior against or with an object

This code includes hitting, throwing, or kicking with or against an object (toys, furniture, etc.). These behaviors are included even if they are not rough or violent. The behavior does not have to be explicitly aggressive, this is subsequently conveyed with the affect code. The behavior must in any case be the main focus for the child or the adult. This means that actions/movements must be made with a modicum of energy. If the child, for example, drops or lets go of the toys in order to get to another toy, it is not coded 83 but 72.

Examples of 83:

Child is drumming on the table of the high-chair

Child is kicking against the chair legs

Throwing blocks

Hitting toys against each other

Throwing blocks against the toy chest (it can be an attempt to get the block inside).

PHYSICAL INTERACTION

91 Positive physical interaction

Includes visible positive and/or loving interaction between two persons. The code also includes positive physical contact from one to the other. Behavior which includes reciprocity must be coded with both actors as initiator (i.e., is coded both from parent to child and child to parent).

Examples of 92:

Sitting on lap, hugging, caressing the hair or cheek (Note! The child must be sitting ON the lap, not just be touching the other).

High five

Clapping together

Friendly pats on the other's body (often affect 2).

92 Neutral physical interaction

The code includes neutral and/or directing physical contact (e.g., carrying the child, putting the child somewhere else, tidying up toys with the child's hand in one's own, steering the child's hand toward the toy chest or the rings, etc.). Can also be coded with child as initiator when appropriate. Straightening the child's clothes is coded 92. Tickling is coded 92, if it is affectionate or lively this is shown with the affect code.

Examples of 92:

Tickling

Straightening clothes

Wiping off a runny nose or drool

Arranging hair

Lifting the child

Changing the child's position

Leading the child's arm in order to get the block into the chest

Example bordering 93:

Pulling the child along the floor by his/her clothes (+ appropriate affect if violent and rough).

93 Negative physical interaction

The code is used for negative physical behaviors directed against another (punches, kicks, shakes, pushes, hits with an object). The action must be performed with some energy, but not necessarily deliberately (e.g., the child may carelessly hit the parent with a toy). The behavior need not be expressively aggressive to be coded 93; this is appropriately shown using the affect codes.

Examples of 93:

The child hits the parent.

The parent gives the child a spanking.

The child shakes the father's arm.

The child kicks the parent in the shin.

The child pushes the parent away from a toy.

The child hits the parent with a ring.

Pushing on the other's body rough enough for the other's body to move.

Examples of codes bordering 93:

The father is driving the car over the child (72).

Brushing/lightly touching the other with a toy (72).

Giving a high five on the other's open palm (as an invitation) (91).

99 Stop code

All 90-codes (physical interaction) are completed with two final digits (99) when the behavior ceases. Behavior is stopped, for instance, when the adult stops stroking the child's cheek, if the child dismounts the parent's lap, or the child is put back into the high-chair during the waiting task. If a behavior that is stopped ceases at the same time as a new behavior occurs, the rule is to code the new behavior before turning off the old one. This also applies when the new behavior is covered by a code that is to be stopped.

Example:

Father lifts child up from the floor and puts her on his lap, is coded 292123, 29113, 29299 and when the child leaves her father's lap, 29199.

Father strokes his daughter affectionately over her hair, is coded 29182 and completed with 29199 when the father removes his hand.

Response codes

The response codes are used for the content codes 42, 43, and 71. The response is coded if it begins within a 3-second time frame.

VERBAL RESPONSE

51 Verbal consent

Statements that to give someone permission to do something or that convey agreement to a request.

Examples of 51:

“Yes, you may”

“Of course”

“Ok”

“Sure”

“After this”

“Soon”

53 Verbal refusal

Statements that convey that one will not follow a request. Statements that refuse to give permission for a request.

Examples of 53:

“No, you may not”

“Don’t want to”

“Never”

“I won’t do that”

NONVERBAL RESPONSE

01 Positive response

Visible positive nonverbal response to codes 42, 43, and 71.

To 42 and 43:

Cooperate, comply, do as one's told (or making a notable attempt at doing so). At 12 months attempting to do something (even if the action does not perfectly match the content of the parent's direction) in relation to the other is 01.

To 71:

Paying attention, receiving something (object, food, toy) from another, looking at what the other is showing, trying to do as the other directs. 01 is coded if the child is attentively watching the adult and what he/she is showing (does not have to physically act).

Note! There is no need for more than one 01 or 03 if the response is for 42/43 and 71 simultaneously (same request, both verbal and physical). At 12 months the response to a 42 is often slightly delayed. If the response to 42 and 71 differs and there is not time for both, priority goes to the response to 71.

03 Negative response

Visible negative nonverbal response to the codes 42, 43, and 71.

To 42 and 43:

Actively not doing what the other requests, or evading compliance (no reaction, no attempt).

To 71:

Actively avoiding paying attention, turning away from the other.

If the reaction to 42 or 71 is another code (e.g., father is waving [71], child is waving [71]) the code in question is coded (and not 01/03).

OTHER CONTENT CODES

00 Not audible

Statements that cannot be coded because of poor sound, sound distortions, or speaking too softly or mumbling. Also includes words spoken in a foreign language that are incomprehensible to the coder.

AFFECT CODES

In general: Use the affect codes actively!! This means there can be long sequences with the same codes (e.g., 1 or 2). In coding affect one has to be attentive to the actors' facial expression, vocal pitch, and body language. Vocal pitch has priority in coding affect, except with code 3 (neutral). If in doubt whether a facial expression is neutral or another code, code the latter.

Remember that the expressed affect can change even though the content of the code remains the same. Each single affect code covers a broad range of emotional aspects, so there is a large span within each category.

1 Joyful

The person expresses joy, either through smiling and laughter, or through facial expression, vocal pitch, or body language. Using a playful teasing tone is included in this code. Children making joyful and enthusiastic sounds, loud "shrieks" of joy, and gurgling. Parents using a lighthearted tone of voice.

Descriptive words for affect 1:

Joyful, lively, gay, humorous, delighted, enthused, eager, tense (positive), amused, happy, joking, merry, elated, playful, jubilant, high-spirited

2 Affectionate/Contented

The person expresses warmth, care, interest, support, or consideration for the other. Includes empathy and showing one's affection for the other. Teasing in a loving tone. Soft, bright and warm tone of voice. Gestures that express sympathy, understanding, encouragement, including warm/affectionate smiles or glances.

Descriptive words for affect 2:

Caring, consoling, considerate, acknowledging, affectionate, admiring, grateful, heartfelt, empathetic, encouraging, loving, interested, engaged, friendly, proud, responsive, supportive, tender, warm, helpful, content

3 Neutral

The person talks/acts in an emotionally neutral way, matter-of-factly and soberly.

Descriptive words for affect 3:

Calm, balanced, factual, business-like, monotonous, matter-of-factly, untouched.

If the expressed affect is very indistinct and conflicting, as in cases where there is uncertainty between positive and negative affect (1, 2 vs. 5, 6, 7, 8), affect 3 is coded.

4 Discontented

The person expresses discontentment and/or frustration. Whining, fussing, and whimpering from the child. Whining, “poor me” voice from the adult. Impatient, stressed, commanding (pushing the child towards something), rough and stiff movements.

Descriptive words for affect 4:

Whimpering, fussy, sulky, impatient, sour, grumpy, frustrated

5 Angry

The person expresses anger, hostility, aversion, rejection, coldness. Expressions of sarcasm or ridicule toward others are included. Children’s howling and screaming as voicing anger or aversion (e.g., when the child refuses to give up a toy).

Descriptive words for affect 5:

Angry, inflamed, enraged, provoking, quarrelsome, belligerent, callous, disdainful, irreverent, arrogant, furious, seething, threatening, irritated, cruel, mocking, rejecting, rude, sarcastic, harsh, unfriendly, heavy-handed, rough

6 Sad

Expressions of sadness, despair, disheartened, and depression. The person appears unaffected by what goes on around him or her, apathetic, and withdrawn. Crying as expressing sadness, tearful, sighing.

Descriptive words for affect 6:

Dejected, depressed, despondent, despairing, down, desolate, downtrodden, dark, disheartened, resigned, sad, tearful.

7 Anxious/tense

The person expresses nervousness, unease, disturbance, embarrassment, or worry. Moderate expressions of physical pain. Worried/stressed about things.

Descriptive words for affect 7:

Anxious, restless, ashamed, timid, nervous, surprised (negatively), tense, worried

8 Afraid

Expressions of fear, dread, and lasting shock. Strong expressions of physical pain.

Descriptive words for affect 8:

Scared, shocked, anguished, howls of pain.

MARKER CODES

The marker codes indicate that something in particular is happening that causes the last registered code to no longer apply (i.e., the code is stopped).

55555 – One of the participants is leaving the room or the camera image (55555 is entered and then coding commences as normal).

77777 – The interviewer is in the room (nothing is coded during this time).

99999 – Break. Nothing happens for at least 3 seconds.

TOPICS - CONTENT (behavior) CODES overview

June 10th 2008

	VERBAL BEHAVIOR				
	Talk	Interpersonal	Interpersonal (Cont´)	Directions	Vocal behavior
pos	11 positive talk	21 positive interpersonal	31 humor og playtalk	41 namegiving objects/act	
neut	12 neutral talk	22 neutral interpersonal	32 namegiving feelings/exp.	42 start-directions.	62 vocal
neg	13 negative talk	23 negative interpersonal	33 verbal attacs and threats	43 stop-directions	
other	00 can`t hear/understand				

	NONVERBAL AND PHYSICAL BEHAVIOR			RESPONSE BEHAVIOR	
	Nonverbal behavior	Physical behavior	Physical interaction	Verbal responses (to 42/43/71)	Nonverbal responses (to 42/43/71)
pos	71 positive nonverbal	81 physical scaffolding	91 positive phys. interact	51 positive verbal response	01 positive response
neut	72 play with objects	82 crawling/walking around	92 neutral phys. interact		
neg	73 negative nonverbal	83 physical with object	93 negative phys. interact	53 negative verbal response	03 negativ response
other					

**QUALITATIVE RATINGS FOR PARENT-CHILD INTERACTION
AT 3-15 MONTHS OF AGE**

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August 2003

Adapted from
The NICHD Study of Early Child Care Mother-Infant Interaction Scales. Margaret Tresch Owen (1992).
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PARENT CODES

SENSITIVITY/RESPONSIVENESS (Adapted from Ainsworth)

This scale focuses on how the parent observes and responds to the child's social gestures, expressions, and signals as well as responds to cries, frets, or other expressions of negative affect. The key defining characteristic of a sensitive interaction is that it is child-centered. The sensitive parent is tuned to the child manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her interaction.

If the child initiates social gestures and expressions (looking at the parent, reaching toward the parent, waving, clapping hands, handing objects, vocalizing), or makes demands, desires, or requests known (stretching arms to be picked up, reaching for toys the parent is holding), the sensitive parent responds appropriately.

If the child loses interest, the sensitive parent takes time to re-engage the child in a manner that demonstrates sensitivity to the child's mood. When the child is bored or frustrated, the parent offers toys or other distractions. When the child is interested and involved with toys, the sensitive parent allows him/her to independently explore them. During play, the sensitive parent provides one toy or game at a time and bases continuation on the child's response. How and what they play is geared to whether or not the child seems to be enjoying the activity. The parent does not persist with an activity or toy that the child is obviously not enjoying.

A sensitive parent provides stimulation that is appropriate to the situation. He/she provides the child with contingent vocal stimulation and acknowledges the child's interest, efforts, affect, and accomplishments.

Sensitive parents can spend some time watching the child, but the difference between them and the detached parent is that the sensitive parent seems to be actively taking an interest in the child's activities, as evidenced by comments and embellishments when the child loses interest. It is at these times--when the child loses interest or is distracted--that the difference between the sensitive parent and the detached, under stimulating parent is most easily seen; the detached parent does not respond, responds in a listless manner, or responds with developmentally inappropriate comments and behavior. The insensitive parent could also be overstimulating/intrusive and might continue in his/her attempts to engage the child even when the child is providing clues that he/she is seeking to end the interaction.

A sensitive interaction is well timed and paced to the child's responses, a function of its child-centered nature. Such an interaction appears to be "in sync". The parent paces games or toy presentation to keep the child engaged and interested, but also allows him/her to disengage in order to calm down and reorganize his/her behavior. Sensitivity involves judging what is a pleasurable level of arousal for the child and helping the child to regulate arousal and affect. When the child loses interest, the sensitive parent switches

to a new tactic or toy and observes the child's reaction, or stops interacting entirely. In this way the sensitive parent can be distinguished from both an intrusive and a detached parent.

Markers of sensitivity include:

- (a) acknowledging the child's affect;
- (b) contingent vocalizations by the parent;
- (c) facilitating the manipulation of an object or child movement;
- (d) appropriate attention focusing;
- (e) evidence of good timing paced to the child's interest and arousal level;
- (f) slowing the pace when the child appears over stimulated or tired (e.g., demonstrates gaze aversion, fussiness);
- (g) picking up on the child's interest in toys or games;
- (h) shared positive affect;
- (i) encouragement of the child's efforts;
- (j) providing an appropriate level of stimulation when needed; and
- (k) sitting on floor or low seat, at the child's level, to interact.

Thus, the sensitive parent demonstrates the ability to adapt interactions to the child's mood and level of development. The parent neither over-nor underestimates. The parent knows when it is time to increase or reduce the amount of stimulation the child is experiencing. For example, the parent discontinues an activity that is beyond the child's capacity for response or introduces a new activity when the child appears bored. Sensitive parents attend to and follow the child's lead. Ratings on this scale should be based on both quality and quantity of parent behavior.

This scale also focuses on how the parent responds to the child's cries, frets, or other expression of negative affect. It is judged in the following three ways:

1) Proportion of distress signals responded to. The parent consistently responds to all distress signals.

2) Latency of response. The parent responds promptly. Mild fussiness does not require the parent to respond as quickly as does the child's acute distress.

3) Appropriateness of response. Appropriateness of the adult's behavior can generally be inferred by its effectiveness in soothing the child. However, the

SENSITIVITY/RESPONSIVENESS continued

completeness of the response should also be taken into account. For example, a parent who responds distally (e.g., voice from the other side of the room) should not be judged as sensitive as a parent who approaches and/or picks up the child. Parents who do not acknowledge distress, even if the infant self-soothes quickly, should be judged as less sensitive than those who do acknowledge the distress, however short lived. Parental responses to infant distress generally involve speaking to the child, approaching the child, changing position, offering toys, patting, picking up, holding closely (especially in a ventral/ventral position), and rocking. Any of these or other behaviors can be considered appropriate if they appear to have the effect of soothing the child. If the parent's first

response to the distressed infant does not soothe the child, the episode should be judged as insensitive/unresponsive (even if their response was immediate) unless the parent proceeds to offer a "fuller" response (i.e., more proximal soothing behaviors).

1 = Not at all characteristic. There are almost no signs of parent sensitivity. Thus, the parent is either predominantly intrusive or detached. The parent rarely responds appropriately to the child's cues, and does not manifest an awareness of the child's needs. Interactions are characteristically ill timed or inappropriate. When the child cries or frets, the parent responds not at all, very slowly, negatively or inappropriately. If there is a response, it is only after the child becomes very demanding, and the response is so delayed that it cannot be construed to be contingent upon the child's behavior. A parent who typically appears oblivious or punitive to the child's distress would receive this score.

2 = Minimally characteristic. This rating should be given to parents who display infrequent or weak sensitivity/responsiveness. While the parent is sometimes sensitive, the balance is clearly in the direction of insensitivity. The parent may give some delayed perfunctory responses to cues. The parent responds rarely or slowly to the child's signals (e.g. vocalizations, affect, distress), and appears more unresponsive than responsive. The responses tend to be minimal or perfunctory. For example, if the child shows distress, the parent may talk to or briefly pat a crying child and he/she may not pick up the child. The parent may not typically bring the child to a ventral/ventral position.

3 = Somewhat characteristic. This rating should be given to parents who display some clear instances of sensitive responding. The parent can be characterized as sensitive to the child; however, the parents' behaviors may be mechanical in quality and ill paced. There are fleeting instances of genuine comforting of child (e.g. picking up the child, bringing him/her to a ventral/ventral position), but these instances may be delayed or perfunctory. The interaction can be characterized by a mix of well-timed and faster paced episodes, or by a parent who is trying to be sensitive, but the interaction has signs of insensitivity. This rating can also be given when the parent is making an effort to comfort his/her child, but he/she may appear to not know what he/she should do. The parent is inconsistently sensitive and hard to categorize.

SENSITIVITY/RESPONSIVENESS continued

4= Moderately characteristic. This rating should be given to parents who are predominantly sensitive/responsive. The parent demonstrated sensitivity in most interactions but may neglect to give a fuller response or a well-timed or appropriate response. If the child cries or frets, the parent typically responds promptly to the child's distress, demands, and signals, but there is some time in which clear child signals do not receive a response or in which the response is somewhat delayed. Some of the parent's responses are mixed, i.e. some are half-hearted or perfunctory, but the majority are full responses.

5 = Highly characteristic. This rating should be given to parents who are exceptionally sensitive and responsive. Instances of insensitivity are rare and never striking. Interactions are characteristically well timed and appropriate. If the child shows distress, this rating should be given to parents who are exceptionally sensitive and responsive to distress. The parent responds quickly and appropriately to the child's distress. If the child is upset, the parent takes the time to soothe and calm the child. Overall most responses are prompt, appropriate, and effective.

INTRUSIVENESS

An intrusive, insensitive interaction is adult centered rather than child centered. Prototypically, intrusive parents impose their agenda on the child despite signals that a different activity, level, or pace of interaction is needed. High arousal, vigorous physical interaction, or a rapid pace, are not, by themselves, indicative of intrusive overstimulation--if the child responds positively with sustained interest and is not engaging in defensive behaviors. It is when the child averts his/her gaze, turns away, or expresses negative affect and the parent continues or escalates his/her activity that intrusive behavior is most evident. Particularly at 12-15 months of age, a child may respond to intrusive behaviors by displaying active avoidance of the parent. Intrusiveness is also apparent when the parent does not allow the child a "turn" or an opportunity to respond at his/her pace. Some intrusive parents persist in demonstrating toys to the child long after his/her interest has been gained and he/she obviously wants to manipulate the toy him/herself. These parents appear unable to facilitate the child's exploration or regulation of the activity. Another controlling intrusive behavior is displayed by parents who overwhelm the child with a rapid succession of toys or approaches, not allowing him/her time to react to one before another occurs.

Extreme intrusiveness can be seen as overcontrol to a point where the child's autonomy is at stake. It should be kept in mind that a parent can become involved in play with the child without being highly intrusive.

Specific behaviors characterizing intrusive interactions include:

- (a) failing to modulate behavior that the child turns from, defends against, or expresses negative affect to;
- (b) offering a continuous barrage of stimulation (physical and/or verbal), food, or toys;
- (c) not allowing the child to influence the pace or focus of play, interaction, or feeding;
- (d) taking away objects or food while the child still appears interested;
- (e) not allowing the child to handle toys he/she reaches for;
- (f) insisting that the child do something (play, eat, interact) in which he/she is not interested;
- (g) not allowing the child to make choices; and
- (h) manipulating the child's body in an intrusive manner (e.g. making the child dance or bounce for the parent)
- (i) physically impairing the child's movement

Parent's actions, which are clearly in the child's best interests, such as removing a child from danger, administering medicine, or putting an obviously tired child to bed, are not included in the considerations of intrusiveness. Similarly, bringing the child back to the mat for play when instructions to the mother are to do so, will not be judged intrusive unless the child is handled in an unduly perfunctory or rough manner.

INTRUSIVENESS continued

Intrusiveness must be evaluated from the perspective of the child. If fast-paced stimulation is enjoyed by the baby, as shown by smiles and laughter, or seems a part of a game or ritual that is clearly enjoyed, parental behavior that might otherwise be judged intrusive will not be counted as such. An important element in judging the behavior as intrusive or not is the degree to which the parent modulates his/her behavior in response to the child's interest and enjoyment in the stimulation.

1 = Not at all characteristic. This rating should be given to parents who display almost no signs of intrusive behavior. The interactions are well-timed and tuned to the baby's signals. The interaction is clearly "child centered".

2 = Minimally characteristic. This rating should be given to parents who display minimal intrusiveness. There is some evidence of intrusiveness, but it is not typical. The parent may initiate interactions with and offer suggestions to the child, which occasionally are not welcomed. The parent may sometimes continue his/her activity in instances when the child engages in defensive behavior, but even when this happens; the parent does not escalate the activity.

3 = Somewhat characteristic. This rating should be given to parents who display frequent, but weak signs of intrusiveness or display a few clear instances of unwelcomed behavior. The parents engage in activities that are characterized by the parent's agenda, and may repeat or escalate these activities, even if the child does not respond negatively to them. The parents are not predominately intrusive, however, intrusive behaviors appear to be more typical than a minimally characteristic (rating of 2) interaction. There may be inconsistent intrusive behavior and the parents may be hard to categorize.

4 = Moderately characteristic. This rating should be given to parents who are regularly intrusive. Parental intrusiveness occurs with moderate frequency. The pace is frequently controlled by the parent and ill timed to the baby's signals. Parents persist with intrusive behaviors even when the child engages in defensive and/or avoidant behavior.

5 = Highly characteristic. This rating should be given to parents who are highly intrusive. The parent is consistently and typically intrusive. Most of the observation period is marked by the parent completely controlling the interaction, allowing the child little self-direction in his/her activities. The parent allows the child little autonomy, and essentially negates the child's experience.

DETACHMENT/DISENGAGEMENT

The detached parent appears emotionally uninvolved or disengaged and unaware of the child's needs for appropriate interaction to facilitate involvement with objects or people. This parent does not react contingently to the child's vocalizations or actions, and does not provide the "scaffolding" needed for the child to explore objects. Detached parents "miss" the child's looks to them or reach for a toy, and their timing is out of synchrony with the child's affect and responses (although not the overwhelming barrage of stimulation that intrusive parents present. Simply allowing the child to play by him/herself is not necessarily a sure sign of detachment; this can be appropriate at times, such as when the child is playing happily or contentedly and the parent checks in with the child visually. The detached parent will remain disengaged even when the child makes a bid for interaction with the parent. The detached parent is passive and lacks the emotional involvement and alertness that characterizes a sensitive parent. He/she appears uninterested in the child. There may be a "babysitter-like" quality to the interaction in that the parent appears to be somewhat attentive to the child, but behaves in an impersonal manner that fails to convey an emotional connection between the parent and the child. Other parents may demonstrate a performance-orientation in that the interaction is tailored towards performing for the camera rather than reacting to and facilitating child-centered behavior.

A parent receiving a high rating for detachment is considered to be insensitive. A low rating for detachment can signal either sensitivity or intrusiveness.

Detachment can be marked by:

- (a) putting the child so he/she faces away from the parent, without attempts to visually "check in";
- (b) presenting toys without first engaging the child or showing him/her how to manipulate them;
- (c) rarely making eye contact or rarely talking to the child;
- (d) not responding to the child's vocalizations, smiles, or reaches for toys;
- (e) an unawareness of the child's capabilities and appropriate activities;
- (f) positioning the child so that he/she cannot reach or manipulate a toy;
- (g) ignoring the interesting things the child does;
- (h) letting the child play unsupervised without checking in; and
- (i) continually calling the child "baby" instead of using his/her name;
- (j) directing comments or stares towards the camera;
- (k) behaving in a mechanical or performance-oriented manner and
- (l) behaving in an emotionally uninvolved manner or appearing to be a baby-sitter rather than a parent when interacting with the child.

While an intrusive parent might persist in presenting a toy to the child even if the child turns away, the detached parent does not respond to the child's bids to play with the toy (e.g., the child reaches for the toy, hands the toy to the parent or looks to the parent for a reaction to actions with the toy, and the parent neglects to respond to the child and to facilitate play). Detached parents tend to pay greater attention to the toys than to their child's response to the toys, or they tend to pay greater attention to other objects or people

DETACHMENT/DISENGAGEMENT continued

outside of the play interaction, or they appear distracted, for whatever reason, from attending to the child's interest. When interactions do occur, they may have an artificial or performance-oriented quality.

This scale contains both qualitative and quantitative components. A parent who interacts consistently with the child but does so in a perfunctory or indifferent manner with little or no emotional involvement would be rated high on detachment.

1 = Not at all characteristic. This rating should be given to parents who display almost no signs of detachment or under involvement. When interacting with the child, the parent is clearly emotionally involved. These parents can be sensitive or intrusive.

2 = Minimally characteristic. This rating should be given to parents who display minimal signs of detachment. While they are clearly emotionally involved with the child during most of the interaction, there may be brief periods of detachment.

3 = Somewhat characteristic. This rating should be given to parents who remain involved and interested in the child while at the same time demonstrating the tendency to act in an uninterested, detached or perfunctory manner. Parents alternate between periods of engagement and disengagement. The periods of disengagement may be marked by unemotional or impersonal behavior. There may be a low-level of impersonal/unemotional behavior running throughout the interaction.

4 = Moderately characteristic. This rating should be given to parents who are predominantly detached. While there may be periods of engagement, the interaction is characterized chiefly by disengagement. The parent may be passive and fail to initiate interactions with the child. When interactions do occur, they may be marked by an impersonal, perfunctory style. Parent may show a lack of emotional engagement throughout the interaction

5 = Highly characteristic. This rating should be given to parents who are extremely detached. The child lies or sits without parent attention almost all of the time, even when the parent is within a suitable distance for interacting. In the minimal instances of involvement, the parent's behaviors are simple, mechanical, stereotyped, bland, repetitive, and perfunctory. The parent is clearly not emotionally involved with the child, and appears to be "just going through the motions".

POSITIVE REGARD FOR THE CHILD/POSITIVE AFFECT

This scale rates the parent's positive feelings toward the child, expressed during interaction with him/her.

Positive feelings are shown by:

- (a) speaking in a warm tone of voice;
- (b) hugging or other expressions of physical affection;
- (c) an expressive face;
- (d) smiling;
- (e) laughing with the child;
- (f) enthusiasm about the child;
- (g) praising the child; and
- (h) general enjoyment of the child.

Positive regard is evident when the parent listens, watches attentively, looks into the child's face when talking to him/her, has affectionate physical contact, and is playful. Ratings on this scale are based on both quality and quantity of positive regard. Keep in mind the uniformity of positive affect, and also be aware of the "brightness" in vocal quality. Positive regard that lacks "genuineness" should not receive a rating of 5.

1 = Not at all characteristic. This rating should be given to parents who display little positive regard. This rating can also be used for positive expressions (laughing, smiling) that appear to be inappropriate to the situation or an inaccurate reflection of the parent's feelings. The parent may be expressionless or flat, or negative.

2 = Minimally characteristic. This rating should be given to parents who display infrequent or weak signals of positive regard. The intensity and frequency of behavioral indicators of positive regard are both low.

3 = Somewhat characteristic. This rating should be given to parents who inconsistently express positive affect towards their child. Parents can receive a rating of 3 when they are hard to categorize (a mix between positive and negative or flat affect). *A few clear signs, but not frequent.*

4 = Moderately characteristic. This rating should be given to parents who predominantly display positive regard. Parents must show some enthusiasm for the infant, but "true delight" is not evident as in a rating of 5. Parental enthusiasm for the infant must be evident in more than just the parent's voice. More frequent and intense positive affect is shown than in a rating of 3, but the parent is not as consistently positive as those scored as a 5.

5 = Very characteristic. This rating should be given to parents who are exceptionally positive, in terms of facial and vocal expressiveness and behavior. Affect is positive and spontaneous. The parent shows a range of expressions and behaviors that are all clearly positive. He/she clearly "delights" in the child.

NEGATIVE REGARD FOR THE CHILD/NEGATIVE AFFECT

This scale rates the parent's negative regard for the child. Both frequency and intensity of negative affect toward the child are considered.

Some markers of negative regard include:

- (a) disapproval;
- (b) tense body;
- (c) negative voice when correcting;
- (d) abruptness;
- (e) tense facial muscles and strained expression;
- (f) harshness;
- (g) threatening the child or punishing without explanation;
- (h) roughness in wiping the child's face, changing his/her diapers, or burping;
- (i) calling the child unflattering names; and
- (j) teasing in a non-playful manner.

Coders should be sensitive to non-verbal as well as verbal indicators. Ratings on this scale are composed of both qualitative and quantitative evaluations. The amount and intensity of negative affect exhibited is evaluated in relation to the duration of the observation period.

1 = Not at all characteristic. This rating should be given to parents who do not display negative regard for the child either in words or in expressions. No evidence of anger, distrust, frustration, impatience, disgust, general dislike, or other indicators of negative regard is observed in the parent's face or voice. The parent may be expressionless or flat or positive.

2 = Minimally characteristic. This rating should be given to parents who display minimal negative regard. There are one or two instances of negative affect with moderate or low intensity of negative expression.

3 = Somewhat characteristic. This rating should be given to parents who display a few weak instances of negative affect or regard (about 3 or 4) or one particularly intense expression of negative regard. The parent's may show a mix of negative affect and positive or flat affect. The difference from a rating of 2 is frequency and intensity in expression.

4 = Moderately characteristic. This rating should be given to parents who predominantly display negative regard. Persistent evidence of low-intensity negative regard or some evidence of more intense negative regard is observed. Parents are more negative than positive throughout the interaction. Parents who engage in mean spirited teasing should receive at least a rating of 4.

5 = Highly characteristic. Feelings of negative regard are expressed strongly, or persistent moderate levels of negative regard are expressed. The overriding affect influencing the parent-child interaction is negative.

ANIMATION

This scale measures how animated the parent is. Animation may reflect energy, excitement, or interest (e.g., watching the child with eyes bright). Animation is often seen in big facial expressions such as opening mouth wide, eyes open wide, and an enthusiastic tone of voice. Lack of animation, (i.e., flat affect) may reflect boredom, depression, fatigue, or distraction. Parents who show consistently high levels of physical and verbal animation should be given a “5.” Parents who lack animation, but are not blank or impassive and flat in face and voice, or parents who are inconsistently animated should be scored in the middle range. Parents whose face and voice are flat, impassive, expressionless, and lack energy should be given a score of “1.” This scale assesses the parent’s overall demeanor, not just animation with the target child.

1 = Not at all characteristic. This rating should be given to parents who are highly impassive, flat and low energy in the face and voice. There is a consistent absence of any animation or energy.

2 = Minimally characteristic. This rating should be given to parents who are predominately flat. Some periods of animation alternate with more clear periods of flatness.

3 = Somewhat characteristic. This rating should be given to parents who are inconsistent in their use of animation, but who overall display a balanced mix of animation and flatness of affect. These parents may present a disconnect between face and voice such that one is consistently animated while the other is consistently flat or passive.

4 = Moderately characteristic. This rating should be given to parents who are predominately animated. The parent is usually animated, but there is some time when facial expression is blank and impassive or the voice lacks energy.

5 = Highly characteristic. This rating should be given to parents who exhibit high and consistent levels of animation in the face and voice.

STIMULATION OF DEVELOPMENT

This scale measures the degree to which the parent tries to foster the child's development. A stimulating parent may take advantage of even simple activities (like feeding and diapering) to stimulate development, and will consistently engage in a variety of activities that can facilitate learning. The parent will make deliberate attempts to encourage the child's development, achievement and learning.

Behaviors characterizing stimulation include:

- (a) attempting to focus the child on an object or task;
- (b) focusing the child's attention on perceptual qualities (sounds, colors, movement, etc.) of objects;
- (c) verbally responding to or expanding the child's verbalizations or vocalizations,
- (d) encouraging the child to actively participate in activities, and
- (e) assisting in motor movement or coordination.

However, parents who simply focus or encourage a child should not be given the highest scores. Higher scores should be reserved for parents who engage in some of the following:

- (a) describe or label toys or objects or demonstrate how they work;
- (b) stimulate the child's verbalizations or vocalizations and expand on them;
- (c) read or recite to the child;
- (d) encourage or reinforce the child's attempts at mastery, or challenge the child to try something new;
- (e) present activities in an organized sequence of steps;
- (f) teach the child or give him/her an opportunity to experiment with materials that illustrate or teach concepts;
- (g) ask questions that require problem solving;
- (h) label and interpret the child's experiences (e.g., "You think that's funny");
- (i) assist the child in motor coordination or mastery of a developmental milestone, and so on.

Activities involving strictly physical stimulation such as rough and tumble play, bouncing, and tickling are not considered as stimulating development per se, but it is possible for a caregiver to provide stimulation in these contexts if the caregiver expands on these experiences with verbal labels. For example, active play with a child that expands on the child's abilities or assists in the coordination of the child's movements would be considered stimulation of development because it encourages and elaborates on the child's current ability and mastery. This scale does not measure those activities that are only social (smiling) or caretaking (soothing), but stimulation can occur in these contexts as well.

The focus of this scale is on the amount and quality of activities that may ultimately enhance perceptual, cognitive, linguistic, and physical development. The parent's attempts may be less than perfect from a developmental psychologist's point of view, but they reflect the parent's belief that he/she is teaching the child. Simply placing

STIMULATION OF DEVELOPMENT continued

objects in front of the child or handing him/her toys is not to be considered stimulating. Stimulation must involve effortful interaction with the child in the contexts described above.

All qualitative judgements must be considered in relation to the quantity of stimulation provided by the parent: How many of the available opportunities for stimulation were taken advantage of? A parent who simply repeats a word or phrase that a child says (e.g., “shoe”) would be lower level stimulation than putting the word in a sentence or elaborating on it (e.g., “The shoe is red”). A rating of 1 should be given to those parents who provide almost no stimulation of development. If a parent spends a very brief portion of the time in high-quality interactions with the child and provides that child with no stimulation for the remainder of the time, he/she would receive a rating of 2. A parent might also receive a 2 if stimulation is continuous but minimally advantageous. A rating of 3 is generally given when the parent doesn’t strive to offer cognitive or physical stimulation for some small portion of the time or when he/she neglects some aspects of stimulation (e.g., manipulative skills), but otherwise engages in stimulating activities. A rating of 4 should be given to parents who clearly have a stimulation agenda, but may fail to take full advantage of opportunities or whose efforts are not “rich” in stimulation. A rating of 5 should be given to those parents who work at providing exceptionally advantageous stimulation. Higher scores for stimulation of development indicate that the parent’s stimulation attempts are at the appropriate developmental level for the child and are in tune with the child’s interests and activities so that the child may potentially benefit from the parent’s behavior.

Note that at 3 months, stimulation of development may take the form of physical and sensory-motor stimulation, whereas at 6 and 12 months, stimulation of development may tend to focus on cognitive stimulation.

1 = Not at all characteristic. This rating should be given to parents who provide little or no stimulation. The parent makes almost no attempts to teach the child anything or provide any stimulation. He/she may provide routine care but does not use it as an opportunity for learning. The parent may ignore the child’s activities or interact perfunctorily, providing no stimulation. The parent never does more than offer toys in a perfunctory, mechanical manner, without demonstration or labeling or bounce the child around. The parent is typically silent. Any efforts made are developmentally inappropriate.

2 = Minimally characteristic. This rating should be given to parents who provide infrequent or weak stimulation. The parent’s conscious and purposeful attempts to engage the child in development-fostering experiences are limited. He/she may label or demonstrate materials or demonstrate physical activities, but does so perfunctorily and with minimal elaboration.

STIMULATION OF DEVELOPMENT continued

3 = Somewhat characteristic. The parent makes some effort to stimulate development, but it may not be her/his main agenda or the parent's agenda is inconsistent. Efforts to engage the child are limited in number and are often unsuccessful. The parent does not consistently take advantage of opportunities to provide stimulation. The parent provides few opportunities for rich, varied stimulation and most attempts are repetitive.

4 = Moderately characteristic. This rating should be given to parents who have a clear agenda of expanding their child's physical and/or cognitive mastery. Parents who receive this rating provide adequate stimulation but could reasonably be expected to provide more and higher-quality stimulation. The parent may find some new ways to engage the child with toys or activity, for example, but these ways are limited in number. Parents who provide a rich linguistic or physical environment, but do not demonstrate the potential of toys or movements, would receive this rating as well as parents who demonstrate toys or movements in a stimulating but non-vocal manner.

5 = Highly characteristic. This rating should be given to the parent who is consistently stimulating and takes advantage of many activities as opportunities for stimulation. The parent provides frequent stimulation through "lessons," explanations, activities, physical games, or toys. Teaching and fostering development is a primary intent of the parent's frequent interactions with the child, and as such the stimulation episodes should be more frequent and prolonged. The parent thoughtfully varies and elaborates on these activities, providing numerous opportunities, which are exceptionally advantageous to the child. He/she provides rich stimulation in terms of language and movement as well as embellishment of the potential of the physical world.

CHILD SCALES

POSITIVE MOOD

This scale assesses the extent to which the child is satisfied, content, and pleased with the situation overall. Measures of child positive affect include smiles, laughter, and positive tone of voice, as well as enthusiasm expressed with arms, legs, and body tone. Lack of positive affect may be manifested by a neutral or negative mood. Note that positive and negative mood are two independent codes and scores should be assigned based on the behaviors evident in the interaction. For example, a 3 on positive mood does not necessarily mean that the child receives a score of 3 on negative mood.

Ratings on this scale should be based on the quality and quantity of behavior. Attempt to balance both the intensity of the child's positive affect and the relative amount of time positive behavior is shown. A rating of 1 should be given to those children who exhibit almost no positive affect. A child would receive a 3 for an entire observation period of weak positive affect (e.g., contentment) with 1 or 2 strong instances of positive mood. A rating of 5 should be given to those children who regularly display high-intensity positive affect, who "sparkle".

1 = Not at all characteristic. This rating should be given to children who display almost no signs of positive mood. The child may be fussy, or largely neutral or flat throughout the interaction. Children who show fleeting interest in the interaction (e.g. brief periods of observing toys, etc.) and no clear signs of positive affect may receive a 1.

2 = Minimally characteristic. This rating should be given to children who predominately display infrequent or weak positive affect (e.g. ambiguous vocalizations, small smiles, smirks). The child may show several fleeting instances of positive affect that may be paired with few, low intensity expressions of negative affect, or the child may be characteristically pleasant, content, or satisfied throughout the observation period. At 12 months, the child may exhibit only 1 display of stronger positive affect (e.g., full smile). Contentment may be characterized by the child's sustained interest in the interaction (e.g. observing the toys, parent, etc. throughout most of the interaction) without showing any clear signs of positive affect.

3 = Somewhat characteristic. This rating should be given to children who are characteristically content, but show at least 1 or more instances of clear positive affect (e.g. full smiles, laughter). The child may also show some instances of negative mood or neutral expression. *Body language expresses enthusiasm.*

4 = Moderately characteristic. This rating should be given to children who predominately display positive affect. The child exhibits several instances of strong positive affect (expresses enthusiasm, playfulness, smiling, and laughter) and are frequently pleasant.

POSITIVE MOOD continued

5 = Highly characteristic. This rating should be given to children who are exceptionally positive in terms of physical and vocal expressiveness. This child displays multiple instances of strong positive affect and is characteristically “happy” during the observation period. The child should truly “radiate” or “sparkle”. For this rating, a child can have no prolonged episodes of flatness or strong distress.

NEGATIVE MOOD

This scale assesses the extent to which the child cries, fusses, frowns, tenses the body while crying, throws “temper tantrums,” or otherwise expresses his/her discontentment. Note that positive and negative mood are two independent codes and scores should be assigned based on the behaviors evident in the interaction. For example, a 3 on positive mood does not necessarily mean that the child receives a score of 3 on negative mood.

Ratings on this scale should be based on both qualitative (intensity) and quantitative (frequency) assessments.

****If there is a false start (interaction is restarted after taping has begun) and the child displays signs of negative mood, DO NOT code the behavior if it is apparent that the child was negative because he/she was hungry, tired or needed to be changed. If this is not the case and the child continues to be negative when taping commences, then you should take into account the behaviors elicited during the false start****

1 = Not at all characteristic. This rating should be given to children who display no negative affect. There are no signs of strong (intense crying, body stiffening) or weak (fussing) negative affect from the child during the observation period.

2 = Minimally characteristic. This rating should be given to children who display infrequent or weak signs of negative affect. The child may display fleeting instances of mild negative affect, though the instances are more intense than in a rating of 1. *One fuss.*

3 = Somewhat characteristic. This rating should be given to children who display one or two strong instances of negative affect or instances of negative affect are inconsistent. The child may display a mix of negative and positive and/or flat affect throughout the interaction. Child may inconsistently respond to parental attempts to soothe and longer or stronger attempts to soothe may be required. *Two fuss.*

4 = Moderately characteristic. This rating should be given to children who display stronger negative affect. The child displays two or more instances of strong negative affect or are moderately discontented (“fussy”) throughout most of the observation period. Fairly consistent parental soothing is needed to calm, though the child does show some periods of calmness. *Three fuss.*

5 = Highly characteristic. This rating should be given to children who are crying and angry for most of the observation. Expressions of negative affect are much stronger and more explicit, which could include, but is not limited to more screaming, hostile verbalizations, or intense body language. The child is resistant to parental attempts to soothe and is rarely or never content or positively affective.

ACTIVITY (for use at 6 and 12 months only)

The extent to which the child is motorically active during the observation. This includes: the speed of motor activity (moving fast, squirming), the frequency of motor activity (spending a lot of time in high-energy activities), the amplitude or intensity of motor activity (shaking, bouncing or kicking vigorously), the duration of motor activity (persisting in energetic activity longer than other children). Vocalizations indicative of activity (i.e., high intensity, not including crying) are usually accompanied by some physical movement. However, there may be occasions during which a vocalization is an activity in its own right. Although, in order for it to be coded as activity, it must be child-initiated, focused, sustained, and purposeful (i.e., for the purpose of entertainment). Child-initiation is key to determining a score for activity.

High activity is typically marked by a variety of behaviors and characteristically involves whole body movement (e.g., the child may display some arm movements followed by wiggling of the body and/or high intensity leg movements—full body does not necessarily imply that the child’s entire body has to move all at once, rather a succession of movement can occur and still be considered “full body” movement). Moderate to high intensity motor activity while crying or fussing (kicking, flailing arms, wiggling, etc.) can be coded as activity. If this is the only display of activity, however, then the score should be no higher than a 2. If the activity during distress is of moderate to low intensity, then the score should be a 1. If the parent is the cause of the high intensity movements (e.g., arms moving while bouncing) and that is the only instance of high intensity movement, be cautious when assigning a high activity score to the child. Remember this is a *child* code and we are interested in what the child is doing voluntarily. Parents who manipulate the child’s body (e.g. shake them, move hands on toys) should not be coded as child activity. Involuntary actions (e.g. hiccups), and unsteadiness (e.g. baby is too small to support him/herself when sitting up) should also not be coded as activity.

With 6-month olds, low intensity activity may be marked by reaching, grabbing, and/or sucking on objects. Hitting and/or banging of the toys may be quite common, however, in order for hitting and banging to be considered high-level activity, the action must be high intensity and sustained.

For 12-month olds, the intensity of the activity, including speed, as well as the quantity of the activity should be weighed carefully. Crawling or walking should not automatically be considered high intensity activities.

Examples of intensity:

Low (not an exhaustive list): passive sucking, simple holding of objects, reaching, grasping, minor hand and/or feet movements. At 12 months, low intensity activity may include simple hand movements with the toys. Behaviors may be marked by a sense of lethargy.

High (not an exhaustive list): rolling over, standing on own (no help from parent), lifting body up, crawling, sustained hitting/banging of objects, flailing of arms, aggressive kicking of legs, arching back, twisting body, etc. At 12 months, high intensity activities may include walking or crawling fast, walking or crawling while throwing, or high energy throwing. Full body activity (e.g., bouncing) should still be considered high intensity.

Be aware that these ratings are context-sensitive within each episode; different activities pull for a different level of motor activity. Structured activities may look different. Also be aware that the position of the child may also pull for different levels of activity (e.g. baby on his back or sitting in mom's lap).

1 = Not at all characteristic— A child with a score of 1 is predominately *sitting quietly in one place with some movement in upper body. At times moving hands to play with toys.* All activity, if any, is of low intensity, even if it persists for much of the interaction.

2 = Minimally characteristic—This child is below average in activity for a child of this age. More intense, self-initiated activity would be expected. *Regularly moving upper body to play.*

3 = Somewhat characteristic—The child may show a predominant amount of self-initiated activity. Alternatively, the child may be difficult to characterize due to a mix in activity. The child may display frequent moderate intensity activity or brief instances of high intensity activity.

4 = Moderately characteristic—The child is above average in activity. The child predominantly shows intense, sustained activity. However, the child either does not keep up the vigor of the activity or displays some periods of inactivity or low intensity activity. Activity for the most part tends to be self-initiated and is characterized by high intensity movement.

5 = Highly characteristic—This child is frequently/typically initiating movement. The child is constantly moving some body part; something is moving at all times. There is evidence of consistent high intensity activity. The activity may be varied or can be a single, sustained intense activity. The majority of activity is typically self-initiated. There may be some brief periods of moderate levels of activity, but these periods are far outweighed by hi levels of sustained activity. For example, a child can achieve a rating of “5” if he/she displays moderate levels of manipulation of an object but then escalates his/her activity level (i.e. he/she starts crawling, standing up, moving entire body, etc.).

**NOTE: Revised after consultation with Keith Crnic (12/16/03).

SUSTAINED ATTENTION (for use at 6 and 12 months only)

This scale assesses the child's sustained attention to/involvement with the physical world (i.e., objects and people). The involved child initiates contact with objects or responds with strong attention to objects or persons engaging them. In either case, the attention must be sustained. There are a variety of ways that attention can be displayed. For example, when objects are within reach, a child may seek toys out, look at them, touch them, explore them; and may comment on them. Alternatively, a child may watch intently or reach as a parent demonstrates an object or plays a game. The child seems interested in objects/people and what can be done with them. The length of possible sustained attention will increase with age. The uninvolved child may appear apathetic, bored, distracted, or distressed (e.g., frequently looking away or squirming/flailing).

Coding sustained attention in infants requires attending to gazes, facial expressions and behaviors construed as attempts to initiate contact with object or the parent. Sustained attention in infants may be demonstrated by visual tracking of objects held or moved by parents. Intensity of the sustained periods of attention should also be taken into consideration when assigning scores. Infants who focus with great intensity on an object (e.g. appears that their focus cannot be broken or is hard to break) should receive higher scores. Infants may display interest in objects by placing them in their mouths. However, the infant needs to display exploration of the object (not simple mouthing) in order for the behavior to be coded as high sustained attention. Higher forms of exploration or "complete" exploration of objects involve multiple object directed behaviors (i.e. looking, licking, twisting in hands, etc.). Higher forms of focus are marked by eye gaze matching activity (i.e. looking at the object while banging it). Be aware that these ratings are both context-sensitive and age-dependent. Monitor the parents' activities, but do not use them to determine a score. Even if the parent is intrusive in presenting toys to the child or presents the toys at a rapid rate, infants with higher levels of sustained attention will try to attend to objects and remain involved and interested. Also, keep in mind that enjoyment and interest are separate, but related constructs to higher levels of sustained attention. Enjoyment and interest in combination with sustained attention can be used for discriminating judgments regarding score assignments.

***NOTE:** Do not code sustained attention to things off camera. Only code the infant's attention to the objects, people, activities in the interaction.

1 = Not characteristic—The child displays limited sustained attention. Attention is not sustained and the child typically moves rapidly from activity to activity. The child's focus is limited and displays very few attempts to initiate contact with objects.

SUSTAINED ATTENTION continued

2 = Minimally characteristic—The child exhibits some periods of attention to objects or activities, however, the instances are very brief and the intensity of the attention is weak. Periods of distraction exceed those of interest. While child may initiate contact with an object more so than a rating of “1”, attention for the most part lacks initiation. A child may watch when an object is demonstrated, but mostly fails to reach or initiate contact.

3 = Somewhat characteristic---The child maintains involvement for relatively longer periods of time. However, the child demonstrates a loss of attention or exhibits less complete exploration when involved with an object or activity. Child may alternate between periods of attention and lack of focus.

4 = Moderately characteristic—For the most part child initiates or responds to objects/activity and the child sustains contact/involvement with the objects or activity. While the child may display brief instances of lack of attention, the child is clearly more involved than not. The child’s attention is typically less focused or intense than a rating of 5.

5 = Highly characteristic—The child is clearly involved, interested, and focused for a substantial majority of the time. When the child is playing with objects, he/she is interested in playing with objects and the activity is sustained due to the child’s intense attention. The child exhibits a thorough, sustained examination/exploration of the object or activity. There may be moments when the child glances away from the object, but they do not disrupt the flow of the interaction.

**NOTE: Revised after consultation with Keith Crnic (12/16/03).

DYADIC CODES

DYADIC MUTUALITY

This scale assesses the synchrony of the interaction and the degree of shared experience between parent and child. Essentially we are interested in the behaviors that reflect intimacy and coordination in the dyad. Dyadic mutuality may be reflected by reciprocal play, reciprocal communication and shared enjoyment. At the low end, lack of mutuality will be reflected by an interaction that is stifled, conflictual, or non-reciprocal. There may also be a veneer of intimacy evinced by a perfunctory or mechanical quality to the interaction. There may be a stifling of emotion or behaviors, which negate or reject partner behavior. Dyads who are low on this scale rarely exchange glances or shared experience during the interaction. They may negate or reject the experience or behaviors of the partner, or they may be largely disengaged from one another (e.g., playing independently, ignoring the partner's behavior or bids for attention). Dyads high on this scale almost always have a moment of shared emotion that is pleasurable. They are often engaged in the same activity and share experiences with the toys or activities (e.g., infant shows parent toy, parent comments and/or expands on the child's activity). They often show interest in and accept the bids for interaction from the partner. At the high end, there is also a clear synchronous back and forth between the partners, such that both partners are open to the behaviors and emotions of each other. The partners are in tune to each other's signals and respond appropriately.

1 = Not at all characteristic. This rating should be given to dyads whose interaction is largely devoid of any shared experience. The interactions may be characterized by one of the following three descriptions: 1) the dyad appears disengaged (e.g., play independently; sit passively, not participating; rare eye contact); 2) there is underlying conflict or ambivalence within the dyad (e.g., either partner may reject or ignore the other partner by pushing away; looking away; failing to look at the other partner when attention is sought; disapproval of the other's behavior); or 3) parent and child have very little coordinated play or emotion and appear disconnected from each other. When the interaction is "off," attempts to recover synchrony are rare and when they do occur, they are often unsuccessful.

2 = Minimally characteristic. This rating should be given to dyads that exhibit low levels of synchrony, but are not as severe in their rejection or level of ignoring the partner as evinced in a score of 1. The parent and/or child makes some attempts at recovery of synchrony. There is some clear evidence, although brief, of shared experience (e.g., positive affect; eye contact; acceptance of toys/activities). There are often signs of disengagement, rejecting, or ignoring behavior by the parent or child. Or, the dyad may just be "off" in terms of timing, without exhibiting rejecting or ignoring behavior.

DYADIC MUTUALITY continued

3 = Somewhat characteristic. This rating should be given to dyads that show a mixture of synchronous and non-synchronous behaviors. Parent and child are clearly synchronous/engaged for a period of time, but there are some instances during which synchrony is lost and not recovered. Attempts at synchrony are sometimes unsuccessful or delayed. There may be moments of tension, disengagement, or passivity by either partner making synchrony difficult. Dyads may appear to be struggling to get or keep in sync.

4 = Moderately characteristic. This rating should be given to dyads that show some break in their level of synchrony, but still are largely engaged and accepting of each other. There is an underlying warmth and appreciation between the two partners that is expressed, even without clear overt signs. Brief periods of independent play, disengagement, passivity, or rejection may be noted, but they rarely break the flow of the interaction, and the interaction is otherwise relaxed. The dyad may have one or two interchanges during which the interaction is out of sync, but there is an attempt to reconcile the synchrony of the interaction, although there may be some delay to the recovery of the interaction.

5 = Highly characteristic. This rating should be given to dyads that exhibit a clear, synchronous interaction with clear evidence of shared positive affect. Both parent and child exhibit clear interest and acceptance in one another and the shared activities. There are clear instances of mirroring and a give and take between partners. The interaction is largely enjoyable for both partners. Moments of non-synchrony are rare and when they do occur, they are very brief and the recovery is swift. There are almost no negating or rejecting behaviors by either partner, so that the interaction flows freely and maintains synchrony