AN EXPLORATION OF PARENTAL SENSITIVITY AND CHILD COGNITIVE
AND BEHAVIORAL DEVELOPMENT

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The current study attempted to show the relationship of paternal sensitivity and maternal sensitivity and their possible influences on child cognitive and behavioral development. This study used data collected as part of the National Institute for Child Health and Human Development (NICHD) Study of Early Child Care, which is a longitudinal, multi-site study. Correlation and regression analyses were computed to examine relationships between the variables at child age 6 and 36 months. Results indicated paternal sensitivity was a significant positive predictor of child cognitive abilities and a negative predictor of both fathers' reports of children's externalizing and internalizing behaviors. Maternal sensitivity was a significant negative predictor of mothers' reports of children's externalizing behaviors. Interpretations of these results and directions for future research are discussed.

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CHAPTER I

INTRODUCTION

The concentration of research on child development has traditionally focused on mothers and mother-child interactions (e.g. NICHD Early Child Care Research Network, 1997; NICHD Early Child Care Research Network, 1999). Historically, fathers have been viewed as the ‘providers’ and the ‘disciplinarians’ while mothers are often the primary caretaker of the child (Lamb, 2000). This may have contributed to the research focus on maternal influence on the child’s development. More recently, researchers have begun to investigate the role of fathers in the lives of their children (van Ijzendoorn & De Wolff, 1997).

In the past two decades, the composition and dynamics of families have changed (Laflamme, Pomerleau, & Malcuit, 2002). Father involvement has been increasing and they may not be the main source of income for a family (Pleck & Pleck, 1997). Mothers often maintain a job outside the home just as many fathers do. This can result in the father assuming a greater role in the care giving of the children (Lamb, 2000). For some fathers, this may be a difficult task. Since the role of the father is changing rapidly, these men may not have had the opportunity to learn the “new ways” of parenting. These new ways include taking an active role in raising a child and being more of a nurturing parent while also providing financial support (Doherty, Kouneski, & Erickson, 1998; Lamb, 2000). An additional factor could be that many fathers today did not have an appropriate role model for this parenting style (Daly, 1993).

Research so far has focused on the father’s level of job satisfaction, and its association with father-child interactions (e.g., Grossman, 1988). Job satisfaction has been shown to be an important factor in the quality and quantity of parent-child interactions. However, there are many different aspects of a parent that can affect the interaction with his/her child. Parental knowledge,

for example, is necessary to be a responsive parent (Bradley, Whiteside-Mansell, & Brisby, 1997). Likewise, sensitivity, or positive emotional and physical attentiveness, is an important part of any parental interaction with children (Palkovitz, 1984).

As a result of the historical lack of research on the role and influence of fathers on child development, construct of paternal sensitivity has not been systematically explored (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). The majority of previous research in this area centered on fathers' level of social interaction with children, and did not explore the underlying issue of emotionality or sensitivity (Bailey, 1994). Also, Heermann, Jones, and Wikoff (1994) found that mothers were more sensitive to their infants in all areas examined than fathers were. This finding, along with other researchers' similar conclusions, may have been a contributing factor to the lack of research concentrating on paternal sensitivity. However, as Lamb (1997) discussed, the ratings and behaviors that were measured may have been biased in favor of more maternal styles. Research that has been conducted in the area of paternal sensitivity shows that the level of paternal sensitivity a father has may be a significant factor in the quality of parent-child interactions, regardless of the frequency of those interactions (Lamb, 2000). The role that paternal sensitivity can play in child's development is a positive one, and can help facilitate the development of children.

Hawkins, Christiansen, Sargent, and Hill (1993) viewed the relationship between paternal sensitivity and child development from a perspective different from previous researchers. The authors critiqued how fathers are currently viewed, and examined the developmental implications for fathers' underinvolvement in childcare. This conceptual article utilized Eric Erickson's (1982) theory of human development and the achievement of generativity, or learning to care for others. Erickson's theory of psychosocial stages suggests that every person progresses

through distinct stages during his/her lifetime. Each stage employs a developmental task that a person must achieve (Erickson, 1982). If the task is achieved successfully, then the person can move onto the next stage with more self-awareness and self-confidence. The authors posed that fathers' involvement with their children may not occur initially. Fathers are not expected to be as involved as mothers are in the beginning, and therefore can take more time in assuming an important role in the child's life. However, it is important for fathers to be intimately involved in caring for children (Lamb, 1982). This involvedness not only facilitates the child's development, but it can strengthen the relationship between the father and the mother, as well as promote the fathers' generativity. The authors advised the need for a longitudinal study of fathers' transition through stages in parenthood, and the child's concurrent development.

An important point in understanding the relationship between paternal sensitivity and child development is the attachment that develops between a father and his child. Attachments are formed between parents and children when the children are very young (Ainsworth, Blehar, Waters, & Wall, 1978). Secure attachment is developed by means of the parent being a consistent, supportive, and nurturing figure in the child's life. However, other types of attachment styles, avoidant and insecure-ambivalent, are possible when the parent is not as consistent or supportive (Ainsworth, Blehar, Waters, & Wall). These less secure attachment styles can lead to a variety of difficulties for the child, including low self-esteem and problems interacting with others. Lamb (1982) found that children form attachments to their fathers, even if the fathers spend very little time with them. A child's attachment to parental figures can influence how he/she interacts with others in the future (van Ijzendoorn & De Wolff, 1997). For instance, a father's level of sensitivity to his child can influence the child's later social development (Phares & Compas, 1992). In addition, Nelson and Simmerer (1984) found that

paternal involvement, responsiveness, and intimacy were each associated with a child's increase in behavioral adaptability and a decrease in emotional intensity.

Operational Definitions and Terminology

Paternal Sensitivity

Paternal sensitivity has been shown to be an important component of paternal investment (Lamb, 2000). Paternal sensitivity can be defined as the amount of emotional attentiveness and support that a father gives a child (van Ijzendoorn & De Wolff, 1997). Specifically, sensitivity relates to how a father meets the child's needs, and interacts with the child in such a way as to facilitate growth and development. Thus, it is the father's sensitive responsiveness to the child's signals and needs (Lamb, 1982).

Maternal Sensitivity

Maternal sensitivity can be defined in much the same way as paternal sensitivity. Many researchers (see De Wolff & van Ijzendoorn, 1997 for a review) have employed the definition first composed by Ainsworth, Bell, and Stayton (1974), which stated that sensitivity is the mother's ability to first perceive her infants signals accurately and second be able to respond to these signals in an appropriate and timely manner. Past research has shown a consistent link between maternal sensitivity and various aspects of child development (e.g. Belsky & Fearon, 2002; De Wolff & van Ijzendoorn, 1997; Murray, Hipwell, Hooper, Stein, & Cooper, 1996b; NICHD Early Childcare Research Network, 1997). For the purposes of the current study, maternal sensitivity is included to provide a point of comparison for paternal sensitivity in relation to child developmental outcomes. This comparison will facilitate a more thorough understanding of the role of paternal sensitivity in children's lives.

Child cognitive development

Cognitive development is defined as the changes that occur in children's mental skills and abilities over the course of their lives (Shaffer, 1999). According to Piaget, children progress through four major periods of cognitive development: the sensori-motor stage, the preoperational stage, the concrete operational stage, and finally the formal operational stage (Piaget & Inhelder, 1969). Within each stage there are many small advances that children make. For example, during the sensori-motor stage, a child learns that objects do not really disappear when hidden from their view, a development known as object permanence (Piaget, 1954). While this is an important feature of the sensori-motor stage, the child learns many other things during this time, such as modifying ingrained reflexes to better suit various situations. Piaget believed that all children progress through these four main stages in the same order, without variation, since each stage builds on knowledge or skills acquired during the previous one. However, Piaget posed that children do not progress through the stages at the same rate as one another (Piaget & Inhelder). He believed that cultural and environmental factors played a major role in either enabling or inhibiting a child's rate of intellectual growth (Shaffer).

Children are active participants in the learning process. Whenever children come in contact with a novel stimulus, they develop some understanding of that stimulus's basic components. Children must construct their knowledge of the world for themselves (Shaffer, 1999). However, depending on which developmental stage a child is in when the stimulus is presented will influence how it is interpreted (Piaget & Inhelder, 1969). Also, cultural and environmental factors can influence how a child acquires knowledge (Shaffer). In particular, parents are a key component of young children's environments.

Although Piaget viewed parents as a part of the child's learning experience, it was Lev Vygotsky who emphasized the significance of parent-child interactions on childhood cognitive development. Vygotsky (1997) viewed cognition and cognitive processes in part as a result of interactions and interrelationships with others in a culture. He proposed intelligence was not a fixed and inborn quality. Rather, intelligence results from the ongoing interactions between children and their environments (Papalia, Olds, & Feldman, 1998). Vygotsky believed that an individual builds and participates in relationships with others, and these relationships help to develop the individual's cognitions (Rowe & Wertsch, 2002). This cyclic phenomenon was particularly evident in children, whose cognitive development was mediated through a combination of natural, cultural, and social processes.

Vygotsky viewed cognitive development as occurring on two different planes or levels, a social plane and a psychological plane. These two planes are inherently connected. The social plane is representative of a child's interactions with other members of society, most importantly his/her mother and father (Rowe & Wertsch, 2002). Through these interactions, children learn and develop their own thoughts and ideas. As the child grows and learns, the new information shifts from outside the child to within the child's mental ability, or to the child's psychological plane. This process can be viewed as a shift from intermental functioning to intramental functioning. Initially, information, problem solving processes, etc. are being shared from the teacher to the child. Eventually, this information is internalized, and the child can utilize the information without help from others (Vygotsky, 1997).

Social relationships and interactions may be responsible for this shift in information processing (Vygotsky, 1997). During a learning activity, the child transforms from novice to expert with the help of a teacher or parent. In order for this transfer of information and

transformation to take place, both the child and the teacher must be active participants in the learning process. The idea that parents or teachers facilitate a child's cognitive growth is related to a central feature of Vygotsky's theory of cognitive development. Specifically, the zone of proximal development is the distance between the performance level of a child operating independently and the level of performance of the child when the task also involves a teacher to help the child (Shaffer, 1999).

Thomas (1985) also discussed the two levels of cognitive development as posed by Vygotsky. What the child can currently do is defined as the actual development level. This level is what is measured by means of standard IQ tests. However, examining this level alone leaves out a second component of cognitive development. The level of evolving development is just as crucial as the actual development level. The evolving development level is representative of how well that child responds or handles help from the expert, and is revealed through a child's interactions with parents or teachers (Vygotsky, 1997). The zone of proximal development represents those functions that have not yet matured, but are in process. For example, a child who has mastered numbers is having trouble with addition. The teacher can help the child learn addition by teaching him some skills, such as counting on his fingers, to assist him in developing the knowledge of addition. Once the child begins to understand the concept of addition, he needs less help to continue the mastery of that task. With the right kind of teaching, the child can learn to complete the task successfully (Papalia, Olds, & Feldman, 1998). A metaphor that is commonly used to describe the zone of proximal development is that of a scaffold. A parent or teacher provides a child with temporary support in order to complete a task. Once the child masters the task, the scaffold can be taken away. However, if the assistance had not been there,

then the child could not have reached the level to successfully complete the task (Papalia, Olds, & Feldman).

Child Behaviors

Children exhibit many behaviors, some are adaptive and some are maladaptive. Children may develop these behaviors by watching others, receiving feedback on behaviors, or by acting out something that they may be feeling inside. In the study of child psychopathology, different types of symptoms and behaviors seem to cluster together. Clinicians and researchers have conceptualized these clusters as externalizing behaviors, internalizing behaviors, and mixed behaviors (Achenbach, 1991b).

Externalizing behaviors

The externalizing dimension of behaviors and symptoms includes a mix of impulsive, aggressive, overactive, and delinquent actions. The externalizing dimension is often separated in two related subdimensions – “delinquent” and “aggressive” (Achenbach, 1991b). Behaviors that are characteristic of the delinquent subdimension include setting fires, skipping school, stealing, and vandalism (Mash & Wolfe, 1999). Behaviors that are associated with the aggressive subdimension include fighting, destruction of property, being disruptive at school, and defying authority figures (Achenbach, 1991b; Mash & Wolfe).

Internalizing behaviors

The internalizing dimension of behaviors is usually more subtle than those of the externalizing dimension. This subtleness is because children with problems on the internalizing dimension tend to focus inward rather than outward. In other words, they direct the maladaptive thoughts, beliefs, or behaviors at themselves. The internalizing dimension has been operationalized with three factors, Withdrawal, Somatic Complaints, and Anxious/Depressed

(Achenbach, 1991b). Characteristics associated with the Withdrawal factor include feelings of sadness and preferring to be alone rather than be around people. Behaviors or feelings that are associated with the Somatic Complaints factor include a child frequently complaining of a stomachache, headache, or dizziness. Anxious/Depressed factor characteristics include crying, a pessimistic view of self, and feelings of guilt or worthlessness (Achenbach, 1991b).

Mixed behaviors

The mixed behaviors refer to those behaviors that do not correlate highly with either the externalizing or internalizing dimensions, for example social problems, thought problems, and attention problems (Achenbach, 1991b, Erickson, 1998).

Paternal Sensitivity

Research on Paternal Sensitivity

A review by Marsiglio, Day, and Lamb (2000) was one of the first to suggest the importance of paternal involvement and sensitivity in children's lives. Children's own perceptions of the relationships with their fathers were positively influenced by the fathers' displays of caring and willingness to engage in play. These findings suggest that paternal involvement and sensitivity may be more important than originally thought by some researchers. This idea was reflected in a conceptual article by Marsiglio and Cohan (2000), who stated that broader interpretations of father involvement and paternal influence needed to be adopted.

Amato (1994) conducted a study to determine if adult children's closeness to fathers is positively associated with their psychological well being, independent of the children's closeness to mothers. The participants consisted of 2,033 married people who were first contacted by telephone in 1980. The researcher employed a random digit dialing procedure to choose the participants. These participants were re-interviewed in 1983, 1988, and 1992. One thousand, one

hundred eighty three of the original participants were successfully re-interviewed in 1992. Of these, 575 had a child who was 19 years of age or older who lived in the household at the time of the first interview in 1980. In total, 471 children were interviewed.

Results indicated that closeness to fathers was positively associated with happiness and life satisfaction. Closeness to father was negatively associated with psychological distress. The results remain significant after accounting for closeness to the mother. However, results showed that closeness to fathers was not associated with self-esteem once the closeness to mothers was taken into account. Even with this fact, the results demonstrated that fathers contribute to their children's lives in unique and important ways (Amato, 1994).

Woodworth, Belsky, and Crnic (1996), examined different determinants associated with fathering, including paternal sensitivity. The participants consisted of 64 father-child dyads, primarily Caucasian, middle-class two parent families. The average age for the fathers at the time of enrollment was 30.1 years, and the children were 10 months of age. The researchers chose to work with only first-born male children, and observed the children with their fathers at 10 months of age and 23 months of age. Results indicated that an important aspect of fathering involved skilled versus unskilled parenting, and this was thought to be reflected in the father-child relationship. Fathers who start out with more social and psychological resources are men who display more child-oriented, positive interactions. These men also displayed more skilled parenting behaviors as their children age. This finding suggests that fathers who possess the necessary resources to be responsive fathers can positively influence their child's development.

Research on Child Cognitive Development and Paternal Factors

There is a paucity of research examining paternal sensitivity and child cognitive development. Pleck (1997) stated that high levels of paternal involvement were associated with

increased cognitive competence in children. In addition, Lamb, Pleck, Charnov, and Levine (1987) found that children of fathers who were actively involved and engaging showed more cognitive competence at pre-school age (see also Radin, 1994). Gottfried, Gottfried, and Bathurst (1988) found significant positive relationships between father presence and intelligence scores, academic achievement, and social maturity at ages six and seven. Lewis, Newson, and Newson (1982) found that the level of involvement a father reported with his child at the ages of 7 and 11 positively predicted that child's performance on a large and important cognitive achievement test taken at age 16. These findings taken together seem to provide support for the idea that children of involved fathers exhibit better cognitive abilities. The following three studies further examine this relationship.

Dubowitz et al. (2001) examined the relationship between father involvement and children's functioning in a high-risk sample. The participants consisted of 855 African American or Caucasian children and their primary caregivers who were recruited from five geographically distant sites. Two groups of child participants were identified. First, the participants were chosen if they had previously been identified as high risk. In addition, a control group was selected at two of the five participating sites in order to compare the high-risk participants to a normative sample. The mothers of the child participants completed a 2-hour interview, and the children were assessed cognitive development, depression, and perceived competence. Results indicated that children who had a supportive father figure had higher cognitive scores and perceived themselves as more competent and better accepted by peers than those who did not have a supportive father figure. However, the degree of the support given by the father figure was not significantly associated with cognitive scores, although the researchers suggested that this lack of

association may have been due to the fact that the measure used to assess the level of involvement was not sensitive to slight changes (Dubowitz et al.).

Crockett, Eggebeen, and Hawkins (1993) examined the father-child relationship to determine for which groups of children father presence made a difference and if the effects of father presence were attributable to background factors, such as socio-economic status. The participants were from the 1986 mother-child supplement section of the National Longitudinal Survey of Youth. During the 1986 data collection, a thorough assessment battery was administered to 4,971 children of the female participants. Of those children, 1,688 were between the ages of 4 and 6, and these are the participants included in the analyses. In addition, the presence or absence of the father could be determined for these children. The mothers additionally completed a survey regarding the children's behaviors, and answered questions pertaining to the father's entry into the child's life as well as the amount of time the father had been involved.

Results from this study indicated that early and continuous father presence has various effects with regard to ethnicity. For example, continuous father presence has a positive impact on Caucasian children's cognitive development, as well as children born to older mothers. The presence of the father also had a positive relationship with verbal development in Hispanic children. There was no relationship between father presence and cognitive development in African-American children. The authors speculated that the father's presence may be less important in African-American families. However, the researchers reported that they did not employ a sensitive measure in evaluating father's involvement, and in doing so they may not have a complete picture of what role fathers play in children's lives.

Blanchard and Biller (1971) examined the effect of father presence and involvement on academic performance in third-grade sons. The boys were grouped into categories based on the amount of father availability: early father absent (before age 3), late father absent (after age 5), low father present (less than six hours of contact per week), or high father present (more than two hours per day). The groups were stratified in order to control for extraneous variables such as birth order, intelligence test scores, or socio-economic status. Results showed that the boys in the high father present group had superior grades and were achieving approximately one year above their grade level. The boys in both the late father absent and the low father present groups scored slightly below their grade level. The boys in the early father absent group scored most below their grade level than any other group. These results suggest that not only do fathers need to be present in their sons' lives, but also do they need to be available and involved in order for the child to receive the most benefits (Blanchard & Biller).

Not all of the research that has been conducted in the area of paternal involvement and child cognitive abilities demonstrates the presence of a relationship between these two constructs. For example, Williams and Radin's (1993) study examined academic achievement in adolescents and its relation to maternal employment, as well as father involvement. The participants of this study were 32 intact, middle-class, Caucasian families with pre-school children aged 3-5 years. These families were re-contacted when the children were ages 7-9, and a third time when the children were 14-16 years of age. The parents were interviewed at each time, whereas the children were only interviewed at time three. Results suggest that greater father involvement when the children were 3-5 and 7-9 years old was not significantly associated with higher self-reported grades at a later time. Williams and Radin suggested as a possible explanation for this lack of association that many of the fathers reported feeling that they had

sacrificed their careers to be more involved with their children. It is possible that these feelings may have had a negative impact on the adolescent's academic goals and expectations. However, their findings suggested an association between the amount mothers worked and children's grades.

In summary, of the research that has been conducted, the findings generally support the idea that higher levels of paternal involvement are positively related to child cognitive abilities. However, little of the previous research has examined what role paternal sensitivity, not just involvement, may play in child cognitive abilities.

Research on Paternal Sensitivity and Child Behaviors

The research on children's behaviors as related to paternal sensitivity is scarce. Clarke-Stewart (1980) examined a father's contribution to his child's cognitive and social development. The participants in this study consisted of 14 children and their families. Families were picked at random from hospital birth records and invited by letter to participate. All of the parental participants were Caucasian, married, and of various socioeconomic status. All of the fathers worked full-time jobs, and the mothers were full-time caregivers to the participating children. The child participants consisted of seven boys and seven girls, and participated in the study from the age of 1 year to 2.5 years. Data was gathered through natural observations, semi-structured situations, records kept by the mothers, attitudinal questionnaires completed by both parents, and standardized developmental tests for the children. The researcher examined the different contributions that the mother and the father made to the child's cognitive and social development. Clarke-Stewart found that children prefer to engage their fathers over their mothers in play activities. These play activities seemed to be more unstructured and less cognitively stimulating than the play activities with the mother. It was also found that fathers had a

significant positive contribution mainly to their child's later social development, including reducing negative behaviors. The mothers had a significantly positive contribution to both their child's cognitive and social development. These findings indicate that children's social and cognitive development is positively associated with more involvement from their mothers and fathers.

A review by Phares and Compas (1992) examined the possible link between child psychopathology and paternal characteristics. The review divided the research in this area into three categories: clinically referred children, clinically referred fathers, and nonreferred fathers and children. Studies that involved the referred samples found that paternal characteristics related more to externalizing behaviors than internalizing problems in the children. However, when just the nonreferred participant studies were examined, the paternal characteristics were negatively related to a wide range of both externalizing and internalizing behaviors. For example, adaptive paternal characteristics were negatively associated with children's problem behaviors. Studies of this nonreferred group also indicated that there is a substantial association between various paternal factors and child problem behaviors. The type of paternal behavior determines the type of relationship to child problem behaviors, in that adaptive paternal factors have a negative relationship to problem behaviors, whereas maladaptive paternal factors have a positive relationship to problem behaviors. However, the authors did point out that although previous research has indicated that fathers play a significant role in the occurrence of problem behaviors and psychopathology in their children, the mechanisms through which the effects are exerted are not clear (Phares & Compas; see also Culp, Schadle, Robinson, & Culp, 2000; Pleck, 1997; Lamb, 1982; Blanchard & Biller, 1971; Marsiglio, Day, & Lamb, 2000).

Culp, Schadle, Robinson, and Culp (2000) examined the relationship between father involvement and children's perceived self-competence and behavior problems. The participants consisted of 25 kindergarten and first grade children (15 boys and 10 girls). The participating families were all intact and dual-career, and of middle class to upper middle class socioeconomic status. Twenty-four families self-identified as Caucasian, with one family labeling themselves as Native American. The fathers of the participants averaged 37.4 years of age and the mothers averaged 35.6 years of age at the time of enrollment. The time spent at work per week averaged 47.0 hours for fathers and 40.2 hours per week for mothers. Education and income were not reported.

The participating families were tested simultaneously at one meeting. The father independently completed the Child Behavior Checklist© assessment tool (CBCL; Achenbach System of Empirically Based Assessment, Burlington, VT, www.ASEBA.org) and the Parent Involvement and Child Care Index. The mother also completed these forms independently, and was asked to score the Parent Involvement and Child Care Index as it applied to the father. A trained tester administered the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children to the child.

Results showed that as parents perceive more father involvement, both mother and father report less externalizing behavior problems. However, the researchers listed a surprising finding: mother's perception of father involvement was positively correlated with mother reports of internalizing behavior problems in the child. In addition, a trend was observed in the father's perception of his involvement with the child as positively associated with the father's reports of internalizing behavior problems. Additionally, mother and father's (both separately and combined) perceptions of paternal involvement were positively related to children's perceptions

of paternal acceptance. However, the parents' perceptions of father involvement (both separately and combined) were not significantly related to children's perceptions of cognitive competence, physical competence, or peer competence. One possible explanation for this finding as posed by the researchers was the relative advantages these families possess in education, wealth, and intactness.

There were several notable limitations to this study. First, the sample size was small with only 25 participants. In addition, the inclusion criteria consisted of first-born kindergarten or first grade children in intact dual-earner families from a small Midwest town. These factors seemingly produced a fairly homogeneous sample. All of the participating families' income was above \$24,000 per year, and the majority of the couples were college-educated professionals. Consequently, the results obtained in this study have low generalizability.

In summary, of the research that has been conducted with paternal sensitivity and child problem behaviors, the results appear to be consistent. The findings support the idea that higher levels of paternal sensitivity are negatively related to child problem behaviors. However, since research in this area is fairly sparse, additional studies, like the present one, need to be conducted to strengthen these findings.

Maternal Sensitivity

Research on Maternal Sensitivity

Maternal sensitivity is often studied in relation to a child's attachment development, which in turn is related to other aspects of child development, such as cognitive and behavioral development. Children develop different attachments (e.g. secure, insecure-ambivalent, insecure-avoidant) as a result of parenting characteristics and a child's interactions with the mother. Children are thought to develop secure attachments as a result of experiencing sensitive and

responsive parenting during infancy (generally before 1 year). This secure attachment style is thought to reflect more confidence on the child's part in his/her mother's emotional stability, availability and consistent responsiveness. This, in turn, allows the child to develop a positive and trusting outlook toward the mother, the self, and the world as a whole (Belsky & Fearon, 2002). This orientation tends to be more adaptive and studies have shown that children and adults with secure attachments function better than those with other attachment styles in a variety of aspects (Franzoi, 2003).

Many researchers have studied the relationship between maternal sensitivity and child attachment. In a review by De Wolff and van Ijzendoorn (1997) 66 of these studies were analyzed to further examine the relationship between these two constructs. Results from this meta-analysis showed that maternal sensitivity is an important parenting antecedent for the development of secure attachment. Furthermore, when the researchers evaluated effect sizes from the analyses, they found that infants whose mothers responded appropriately and timely improved those infants' chance of developing a secure attachment style from 38% to 62%. Conversely, an infant whose mother did not display these characteristics decreased their chances of a secure attachment from 62% to 38%. These findings highlight the importance of sensitive mothering in relation to developing a secure attachment. As mentioned earlier, it is this resulting attachment style that has been studied with regard to later child developmental outcomes (see Arend, Gove, & Sroufe, 1979; Lohaus, Keller, Ball, Voelker, & Elben, 2004; NICHD Early Childcare Research Network, 1997).

Research on Maternal Sensitivity and Child Cognitive Development

Erickson, Egeland, and Sroufe (1985) found that children who received insensitive mothering after a secure attachment had been established developed less well than would be

expected based on their attachment security. Relatedly, children with insecure attachment who subsequently received sensitivity mothering developed better than expected.

Murray et al. (1996b) tested the relationship between depressed mothers and subsequent child cognitive development. The applicability of this study to the current project is that depressed mothers tend to also be less sensitive and responsive to their babies' needs. The researchers posited that early mother-child interactions influence the way a child's cognitive experience is organized. The adaptiveness of this organization may then affect a child's cognitive ability in the future. Participants of this study were 61 new mothers who reported having experienced an episode of depression after the time of delivery. There was also a control group of 42 women who did not report a depressive episode. There were no significant differences between the depressed and control group on any demographic variable. Mother-child interactions were observed at child age 2 months, and again at child age 5 years. In addition, the children's cognitive ability was evaluated at age 18 months and 5 years. Finally, the mothers were interviewed at child age 18 months and again at child age 5 years to evaluate depressive symptoms. Results from this study indicated that children who experienced insensitive mothering at an early age also exhibited poorer cognitive functioning, even at 5 years of age. In another study by Murray, Fiori-Cowley, Hooper, and Cooper (1996b), similar results were found. Mothers who experienced postnatal depression were more likely than non-depressed mothers to act insensitively towards their infants during interactions. Also, results showed that quality of interactions (e.g. high levels of responsiveness and sensitivity) was positively associated with child cognitive outcomes at 18 months.

Belsky and Fearon (2002) examined the relationship between attachment styles and later child development. However, these researchers also examined what role continued maternal

sensitivity (after attachment style has developed) plays in relation to developmental outcomes. Participants of this study were a subsample taken from the NICHD Study of Early Child Care. The subgroup consisted of 1,053 children and their mothers. The majority of the participants were Caucasian (84.2%) and most of the participating mothers were married. Level of attachment was assessed at 15 months, mother-infant interactions (level of sensitivity) was evaluated at child age 24 months, and finally the children were assessed for cognitive and behavioral development at three-years-old.

Results from this study indicated that children with secure attachments at 15 months who subsequently experienced high levels of sensitivity when examined at 24 months exhibited fewer behavior problems and showed greater cognitive ability than children who were insecurely attached at 15 months and had low levels of maternal sensitivity at 24 months. Perhaps one of the more intriguing findings in this study was that children who were securely attached and experienced high levels of sensitivity functioned significantly better in all outcome areas tested than children with secure attachments who subsequently experienced low levels of maternal sensitivity. However, it is important to note that these children with discrepant maternal sensitivity experiences still functioned better than those children who had never experienced high levels of maternal sensitivity, again highlighting the importance that this variable has with regard to children's developmental outcomes. Taken together, these results demonstrate that it may not be solely a child's attachment style that later influences child developmental outcomes. These results demonstrated that changing the level of maternal sensitivity after attachment has been established could significantly influence cognitive and behavioral outcomes.

In summary, previous research consistently shows a positive relationship between maternal sensitivity and child cognitive abilities. Belsky and Fearon (2002) further demonstrated

that maternal sensitivity, not child attachment security, had a direct effect on child cognitive abilities.

Research on Maternal Sensitivity and Child Behaviors

Mothers are often seen as more nurturing and caring towards their children than fathers. For example, Lewis and Lamb (2003) reported in a review of existing literature that, while mothers and fathers engage in many of the same parenting behaviors, mothers seem to be more attentive and responsive to their children. Johnston, Murray, Hinshaw, Pelham, Jr., and Hoza (2002) found that mothers who were more sensitive and responsive to their children at the age of 7-10 reported less behavioral problems during this period. Murray et al. (1999) examined the relationship between mothers' early postnatal depression and later problem child behaviors. Results from this study found that mothers who experienced postnatal depression reported more behavior problems of their children at age 5 than non-depressed mothers. The researchers suggested that it is the lack of quality of mother-infant/mother-child interactions that may be driving this relationship. The literature in this area seems to consistently show a link between maternal sensitivity and child behavioral development. The following two studies further support this relationship.

A study by Bohlin and Hagekull (2000) examined the connection between maternal sensitivity and child behavior. The participants in this study were 105 families in the country of Uppsala, Sweden. Families were recruited from a local hospital. The participants were studied from the time the child was born until the age of 4 years. The mothers of the child participants ranged from 19-44 years of age at the start of the study, and had a moderately high education level. Also, 98% of the families that participated in the study were intact. No information on the ethnicity or socioeconomic status of the families was available. The families were visited when

the child was 6 weeks, 4, 10, 15, 29 months, and 4 years of age. The mothers completed questionnaires, and also participated in observational play interactions with the child. The family was observed interacting at mealtime in the home, and the child was observed in social interactions.

The researchers found that the type of maternal sensitivity displayed by the mother changes as the child develops. Maternal sensitivity when the child was younger and older gave independent contributions to the explanation of behavior problems, indicating that sensitivity continues to be important in a child's life after infancy. It was also found that low levels of maternal sensitivity and less physical contact were associated with more behavior problems when the child was age 4 years. Interestingly, the developmental stage the child was in when the low levels of sensitivity were displayed impacted the type of behaviors exhibited by the child. If the level of maternal sensitivity was low at 6 weeks and 4 months of age, the child displayed more internalizing behaviors at age 4. However, if the level of maternal sensitivity was low when the child was 10 months old, the child later displayed more externalizing behaviors. These findings indicate that the level of maternal sensitivity needs to stay high throughout a child's development. It is also important that the mother adapt her sensitivity style to adequately fulfill her child's needs. In light of these findings concerning maternal sensitivity, it will be important to identify what impact paternal sensitivity has on a child's behavior.

A study conducted by researchers of the NICHD Early Child Care Research Network (1997) took participants from the ten sites involved with the NICHD Study of Early Child Care. These participants consisted of 1364 families, with 52% sons and 48% daughters in the study. The majority of the families were Caucasian, with 24% of the sample consisting of ethnic-minority families. Also, only 14% of the mothers were single. The researchers made home visits

to the families when the children were ages 1, 6, and 15 months. The researchers also conducted observations of the children alone and interacting with their mothers in a lab when the children were age 6 and 15 months. Telephone interviews with the mothers were conducted; and the mothers completed one questionnaire. Results indicated high levels of maternal sensitivity had a significant effect on infant attachment security. High levels of maternal sensitivity have also been associated with better child development, better child behavior, and better quality time spent with the children (NICHD Early Child Care Research Network, 1999). Therefore, since the factor of maternal sensitivity seems to be highly associated with favorable outcomes in children, paternal sensitivity may play a significant role as well.

To summarize the previous studies, research seems to agree that there is a negative relationship between maternal sensitivity and child problem behaviors. Furthermore, maternal sensitivity can positively or negatively affect child behaviors throughout a child's youth (Bohlin and Hagekull, 2000) and is not limited to early infancy.

Limitations of Existing Research and Research Rationale

Paternal sensitivity as a separate construct appears infrequently within the literature, and has not been consistently defined by researchers (Lamb, 2000). Of the studies that have been conducted, there are several limitations. First, some of the studies have used fairly homogeneous samples. For example, Culp, Schadle, Robinson, and Culp (2000) used 25 intact, middle-class families. In addition, other studies consisted of relatively small sample sizes that were often not representative of the general population (e.g. Corwyn & Bradley, 1999; Woodworth, Belsky, & Crnic, 1996), thereby decreasing the scope of generalizability. Moreover, some studies have employed measures to study paternal sensitivity that were not validated on the appropriate

population. For example, Heermann, Jones, and Wikoff (1994) evaluated levels of paternal sensitivity based on measures that were designed to assess levels of maternal sensitivity.

Studies of maternal sensitivity in relation to child cognitive and behavioral development consistently show a relationship between these constructs. However, studies examining this direct relationship are fairly recent phenomena (e.g. NICHD Early Child Care Research Network, 1997; Belsky & Fearon, 2002).

The current study defines paternal sensitivity in accordance with the largely accepted definition given by Lamb (1982; 2000): the father's sensitive responsiveness to the child's signals and needs. The current study addresses the problem of homogenous samples by utilizing a multi-site data set that is fairly diverse in age, socio-economic status, education level, and ethnicity. Also, because the data was collected at a number of different sites, the sample size is expected to be large. In addition, the assessment of levels of paternal sensitivity will be done two ways: via a score on a self-report measure that was designed to assess levels of paternal sensitivity and via a score on an observation of father-child interactions. Maternal sensitivity will also be assessed via a score on an observation of mother-child interactions. The current study explores the relationship between parental sensitivity and two distinct areas of child development. The relationship between father and child is a complex one, and the more dimensions of this relationship that can be taken into account and studied the better our understanding of paternal sensitivity and child development will be. Given that the research is more consistent in the area of maternal sensitivity, this construct will be used in the current study largely to provide a basis of comparison. Since many researchers accept the link between maternal sensitivity and child developmental outcomes, being able to directly compare these

relationships with paternal sensitivity and child developmental outcomes will give a better, more complete frame of reference.

Research Questions and Hypotheses

Research Question 1a.

Are parental sensitivity at child age 6 months and child cognitive development related?

Hypothesis 1. Self-report paternal sensitivity at 6 months will be positively correlated with children's cognitive abilities assessed at first grade.

Hypothesis 2. Observed paternal sensitivity at 6 months will be positively correlated with children's cognitive abilities assessed at first grade.

Hypothesis 3. Observed maternal sensitivity at 6 months will be positively correlated with children's cognitive abilities assessed at first grade.

Research question 2a.

Are parental sensitivity at child age 6 months and externalizing behaviors related?

Hypothesis 4. Self-report paternal sensitivity at 6 months will be negatively correlated with mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 5. Self-report paternal sensitivity at 6 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Hypothesis 6. Observed paternal sensitivity at 6 months will be negatively correlated with mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 7. Observed paternal sensitivity at 6 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Hypothesis 8. Observed maternal sensitivity at 6 months will be negatively correlated with mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 9. Observed maternal sensitivity at 6 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Research question 3a.

Are parental sensitivity at child age 6 months and internalizing behaviors related?

Hypothesis 10. Self-report paternal sensitivity at 6 months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Hypothesis 11. Self-report paternal sensitivity at 6 months will be negatively correlated with fathers' reports of children's internalizing behaviors at first grade.

Hypothesis 12. Observed paternal sensitivity at six months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Hypothesis 13. Observed paternal sensitivity at 6 months will be negatively correlated with fathers' reports of children's internalizing behaviors at first grade.

Hypothesis 14. Observed maternal sensitivity at 6 months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Research Question 1b.

Are parental sensitivity at child age 36 months and child cognitive development related?

Hypothesis 15. Self-report paternal sensitivity at 36 months will be positively correlated with children's cognitive abilities assessed at first grade.

Hypothesis 16. Observed paternal sensitivity at 36 will be positively correlated with children's cognitive abilities assessed at first grade.

Hypothesis 17. Observed maternal sensitivity at 36 months will be positively correlated with children's cognitive abilities assessed at first grade.

Research question 2b.

Are parental sensitivity at child age 36 months and externalizing behaviors related?

Hypothesis 18. Self-report paternal sensitivity at 36 months will be negatively correlated with mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 19. Self-report paternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Hypothesis 20. Observed paternal sensitivity at 36 months will be negatively correlated with mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 21. Observed paternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Hypothesis 22. Observed maternal sensitivity at 36 months will be negatively correlated mothers' reports of children's externalizing behaviors at first grade.

Hypothesis 23. Observed maternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's externalizing behaviors at first grade.

Research question 3b.

Are parental sensitivity at child age 36 months and internalizing behaviors related?

Hypothesis 24. Self-report paternal sensitivity at 36 months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Hypothesis 25. Self-report paternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's internalizing behaviors at first grade.

Hypothesis 26. Observed paternal sensitivity at 36 months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Hypothesis 27. Observed paternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's internalizing behaviors at first grade.

Hypothesis 28. Observed maternal sensitivity at 36 months will be negatively correlated with mothers' reports of children's internalizing behaviors at first grade.

Hypothesis 29. Observed maternal sensitivity at 36 months will be negatively correlated with fathers' reports of children's internalizing behavior at first grade.

The relationships between the independent and dependent variables, both at child age 6 and 36 months, were explored between cultures and genders.

CHAPTER II

METHOD

Phase I

Participants

The participants used for this study came from a subset of the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care. The study began recruiting participants in January of 1991. The major goal of the overall study was to examine the concurrent, long-term, and cumulative influences of variations in early child care experiences on the cognitive, linguistic, social, emotional, and physical development of infants and toddlers. It was the hope that the information obtained from the larger study could aid in the process of child-care advocacy and future child-care policy. The Study of Early Child Care participants were selected from mothers giving birth to full-term babies in study hospitals during the selected sampling periods. Of the 8,986 mothers who gave birth during the 10-month recruitment period, 1,364 families were selected to participate in this study, which averaged to approximately 136 per site (partially from Bradley et al., 1997).

The participants selected were done so using a conditional random sampling plan. The participants were selected from ten research sites located across major regions of the United States. The sites that participated in the study were Little Rock, Arkansas, Orange County, California, Lawrence and Topeka, Kansas, Boston, Massachusetts, Philadelphia, Pennsylvania, Charlottesville, Virginia, Morganton and Hickory, North Carolina, Seattle, Washington, and Madison, Wisconsin. These sites included urban, suburban, and rural settings, as reflected in the general population. The participants included single parent as well as two-parent families. There was also a wide range of socioeconomic status and racial backgrounds.

The infants were enrolled in the study at birth, and included families who did not plan to use child care during the first year of the infant's life, as well as families who did plan to use child-care on a full-time or part-time basis. The exclusion criteria included mothers under 18 years old, families who did not plan to stay in the area for 3 years, children who were born with disabilities, and mothers who had difficulty speaking English. The sample was somewhat diverse, with 11% of the mothers not completing high school, 24% ethnic minority children, and 14% single-mother families (NICHD Early Child Care Research Network, 2003). At six months, the infants who were enrolled in a non-maternal child-care arrangement were observed in that environment. This non-maternal child-care arrangement included fathers, grandparents, in-home sitters, and organized child-care facilities. Since the sample was obtained through conditionally random sampling means, it is not nationally representative. However, the sample does include research sites from major regions through out the United States, there by increasing the generalizability of the results.

The HHS study was performed at six of the ten participating Study of Early Child Care sites. The six sites that constituted this study were the University of Arkansas, Little Rock, University of California, Irvine, University of Kansas, Penn State/University of Pittsburgh, Western Carolina Center, and University of Wisconsin, Madison. Each site had between 123-150 participating families. The inclusion and exclusion criteria for this sub-study were the same as that of the larger study. Of the 1,364 participants that made of the entire Study of Early Child Care sample, 813 families additionally took part in the HHS study.

Of the 813 HHS study families, 421 children were male and 392 were female. At the time of enrollment, the participating mothers' marital status was as follows: 77.9% of the mothers were married, 8.6% were living with a significant other, 6.3% were not involved in a

relationship, 5.5% had a significant relationship but did not live with the person, 0.7% were separated from a partner, 0.2% were either divorced or widowed, and 0.7% were classified as other (not specified). Nearly 86% of the mothers reported that the father of the participating child lived in the home. The ethnic make-up of the sample was somewhat diverse, with 0.5% American Indian, 1.1% Asian, 12.3% African American, 82% Caucasian, and 4.1% classified as other (not specified). Seven percent of the 813 participating children were identified as Hispanic.

The HHS study included six of the participating ten sites, as stated above. However, only five of the six HHS study sites administered the My Time Spent as a Parent questionnaire to fathers. For the purpose of this study, only the families with fathers who completed the My Time Spent as a Parent measure at either child age 6 or 36 months and also were observed at either child age 6 or 36 months in structured interactions were included. An additional criteria for inclusion in the current study was the completion of a structured interaction between mothers and children at either child age 6 or 36 months.

Therefore, this study consisted of 326 families from five different locations. Each site had between 47 – 79 participating families. Of the 326 participants that took part in the HHS study, 167 children were male and 159 were female. The ethnic make-up of the sample was somewhat diverse, with 0.6% American Indian, 1.2% Asian, 10.1% African American, 84.7% Caucasian, and 3.4% other (not specified). Of these participants, 4.9% identified the participating child as Hispanic. At the time of enrollment, the participating mothers' marital status was as follows: 1.2% had a significant relationship but did not live with the person, 8.6% were living with a significant other, and 90.2% of the mothers were married. Nearly 99% of the mothers reported that the father of the participating child lived in the home. The income of the participating families at the time of enrollment varied widely. The incomes ranged from \$2500 per year to

\$250,000 per year. These values are also compared with the United States general population in 1990. These values are displayed in Table 1. Based on the comparison of the HHS participants and the US population of 1990, the HHS participants appear to be a representative sample for gender, race, and ethnicity.

At the completion of Phase I, after four times of measurement, some demographic information had changed. At 36 months, the mother's marital status was reported as follows: 0.3% were divorced, 0.9% were involved in a relationship with someone outside of the home, 4% were separated, 6.7% lived with a significant other, and 83.4% were married. Additionally, the number of fathers living with the mothers had changed. At the completion of Phase I, the percentage of mothers who lived with the participating child's father had dropped to 92.3%.

Measures

There were a wide variety of measures used throughout the duration of the NICHD Study of Early Child Care, including observations and self-report measures. The current study examines the relationship between paternal sensitivity, maternal sensitivity, and child development. Paternal sensitivity was evaluated through a self-report measure, as well as an observational measure. In addition, maternal sensitivity was evaluated via observation, and utilized the same variables as those to evaluate observed paternal sensitivity.

My Time Spent as a Parent (Parts 1 and 2) Fathers Only (Glysh & Vandell, 1990). Glysch and Vandell developed this scale specifically for use with the NICHD Study of Early Child Care. The internal consistency of the Part 1 scale was very good, with Cronbach alpha at .86 for fathers (NICHD Early Child Care Research Network, 1996). However, since this scale was developed specifically for the NICHD Study of Early Child Care, no validity or reliability information, besides the Cronbach alphas, was available. Part 1 examined the division of

childcare responsibilities within the family and includes 16 items. These items are scored as (1) *partner's job*, (2) *mostly partner's job*, (3) *we share it equally*, (4) *mostly my job*, (5) *my job*, or (6) *not applicable*. The higher the score obtained on this measure indicates higher levels of paternal involvement.

Part 2 of this measure assessed the division of responsibilities for household activities within the family for items such as who pays the monthly bill or who does the grocery shopping. Cronbach alpha for this subscale is 0.76 (NICHD Early Child Care Research Network, 2000). Part 2 includes 14 items that are scored as (1) partner's "job", (2) mostly partner's "job", (3) we share it "equally", (4) mostly my "job", (5) my "job", or (6) not applicable.

The My Time Spent as a Parent Part 1 questionnaire has good internal consistency. An internal consistency reliability analysis was performed for each administration time. The resulting Chronbach's alphas were as follows: 0.87, 0.76, 0.84, and 0.83 respectively. This measure was given only to fathers and examined the total amount of time spent with the child, including intimate father involvement. This measure assessed paternal sensitivity demonstrated by the amount of time a father spends with his child. This measure also included items that look at the amount of time a father spends doing other household chores. The NICHD researchers performed a factor analysis on this measure at 6 and 15 months, which yielded three factors. At 6 months, the three factors were "physical stimulation," "external stimulation," and "emotional stimulation." The factors at fifteen months were titled "physical needs," "external stimulation," and "child care." The researchers renamed the first factor of both the 6 and 15-month analyses "father's intimate involvement." The items included in this factor likely reflect aspects of the father-child relationship that most closely represent the construct of paternal sensitivity. Therefore, it is this variable that will be used in the analyses. The internal reliability consistency

and the intercorrelations of the overall measure and the three factors at child age 6 and 36 months are presented in Tables 2 and 4. In addition, alpha-if-item-deleted coefficients for the intimate involvement factor at child age 6 and 36 months are available in Tables 3 and 5.

Structured Interaction Qualitative Rating Scale (Father and Child). Father and child behaviors, which were videotaped as part of the HOME interviews, were coded by trained researchers for the HHS study. The behaviors were coded at two times: during the child age 6 and 36 month visits. At 6 months, each behavior was coded using a 4 point Likert scale, with 1 = *Not at all characteristic* and 4 = *Highly characteristic*. This scale was used to code five child behaviors, such as Positive mood and Activity level, and eight father behaviors, such as Intrusiveness, Sensitivity to distress, and Negative regard for the child. From these eight coded father behaviors, the NICHD researchers developed a child age 6-month sensitivity composite variable (Father's Sensitivity at 6 Months). This father sensitivity variable is the sum of three observed behaviors derived theoretically: Sensitivity to non-distress, reflected Intrusiveness, and Positive regard. This composite variable has a range of 4-12, with higher scores indicating increased father sensitivity. Chronbach's alpha indicates that the internal reliability for this composite was moderate, $\alpha = .71$. Corrected item total correlation and alpha-if-item-deleted coefficients for the paternal sensitivity composite at child age 6 months are available in Table 6. In addition, kurtosis and skewness levels for this variable are within normal limits (NICHD Early Childcare Research Network, 1996).

At 36 months, researchers coded videotaped father and child behaviors using a seven-point rating, with 1 = *Very low* and 7 = *Very high*. At this observation time, five measures of child behaviors were coded, including Enthusiasm, Persistence, and Security. In addition, five measures of father behaviors were coded, including Supportive presence, Stimulation of

cognitive development, and Confidence. From the aforementioned coded variables, a composite variable, entitled Father's Sensitivity at 36 Months, was created. This variable is the sum of Supportive presence, Respect for child's autonomy, and reflected Hostility. Values of this variable range from 7 to 21, with larger values indicating increased levels of paternal sensitivity. Chronbach's $\alpha = .75$ for this variable, indicating a moderate level of internal reliability (NICHD Early Childcare Research Network, 1996). Corrected item total correlation and alpha if item deleted coefficients for this composite variable at child age 36 months are displayed in Table 7.

Structured Interaction Qualitative Rating Scales (Mother and Child). This variable was administered at all ten participating NICHD sites. For the purposes of the current study, only sites that also participated in the HHS study will be included. Mothers and their children were observed in free play situations during HOME interviews at child age 6 and 36 months. These observations were videotaped, and trained researchers then coded five child behaviors and eight mother behaviors. At the 6-month administration, these behaviors were coded using a 4-point Likert scale, with 1 = *Not at all characteristic* to 4 = *Highly characteristic*. The child behaviors that were coded include: Positive mood, Activity level, and Sociability. The mother behaviors that were coded include: Sensitivity to distress, Detachment/disengagement, and Stimulation for cognitive development. The NICHD researchers then developed a composite variable, entitled Quality of Maternal Care: Sensitivity at 6 Months, is comprised of three mother behaviors: Sensitivity/responsivity to non-distress, Positive regard for the child, and reflected Intrusiveness. Internal reliability for this composite is moderate, with standardized Chronbach's $\alpha = .75$ (NICHD Early Childcare Research Network, 1996). In addition, corrected item total correlation and alpha-if-item-deleted coefficients for the maternal sensitivity composite at child age 6

months are available in Table 8.

At the 36-month administration, mothers and their children were observed and videotaped during a structured interaction as part of the HOME interview. Trained observers then rated five mother behaviors and six child behaviors using a 7-point rating scale, with 1 = *Very low* and 7 = *Very high*. Again, NICHD researchers identified three variables to comprise a composite variable reflecting maternal sensitivity at child age 36 months. The items that make up this composite variable are: Supportive presence, Respect for autonomy, and reflected Hostility. Scores of these three variables were summed to obtain the composite variable. Scores for this composite variable can range from 3 to 21, with higher scores indicating more maternal sensitivity. The standardized Chronbach's alpha for this variable is .81, indicating a moderately high level of internal reliability (NICHD Early Childcare Research Network, 1996). Corrected item total correlations and alpha if item deleted coefficients for observed maternal sensitivity at child age 36 months are available in Table 9.

Procedure

The current study is a secondary data analysis of the NICHD Study of Early Child Care. At the time of the original study, informed consent was provided to all participants, families, and child-care centers. Demographic data was collected from all of the participants at the beginning of the project, and certain demographic variables were collected at every testing date. Data was collected in two main phases, thereby making the NICHD study a longitudinal one. Phase One consisted of the time period from birth of the infant through 36 months. The My Time Spent as a Parent questionnaire was given to fathers when their children were 6, 15, 24, and 36 months old. This questionnaire was given as part of a larger survey packet. The information collected from the My Time Spent as a Parent survey was separated into different components of paternal time.

One of the components, entitled father's intimate involvement, is made up of the data that most closely reflects paternal sensitivity.

In addition, fathers and mothers were observed in separate structured interaction with their children at 6 and 36 months. Behaviors that were exhibited by the father or mother and child were then coded. Three of the fathers' behaviors were grouped together to form a paternal sensitivity composite variable. This same procedure was repeated for mothers and their children, yielding a composite variable reflecting maternal sensitivity. The fathers that completed the questionnaire and participated in the structured interactions were part of a sub-study entitled "The HHS Study." The HHS study was carried out in addition to the Study of Early Child Care at six of the ten participating sites. The HHS study involved gathering information concerning fathers, their adult relationships, and the father-child relationship.

Phase II

Participants

The participants who did not attrite during Phase I of the study constituted the sample in Phase II. Again, the participants were involved in the NICHD Study of Early Child Care. When the children were 4.5 years old, there were 1,081 children and their parents remaining in the study. The participants differed from the 283 children that originally were recruited, but lost on follow-up. The mothers of the continuing participants had significantly more education, and were more likely to have a husband or partner living in the household (NICHD Early Child Care Research Network, 2003). The continuing participants were also less likely to be African-American, non-Hispanic. Additionally, the remaining families had higher family incomes.

When the participating children reached kindergarten, 1,058 participants and their families remained in the study. These participants differed from the 308 originally recruited but

lost to follow-up. The mothers of the participants again had significantly more education and higher family incomes when compared to the lost participants. Also, the mothers were more likely to have a husband or partner living in the home. The continuing children were significantly less likely to be African-American, non-Hispanic when compared to the lost children (NICHD Early Child Care Research Network, 2003). Of the remaining families, 20% were minority and 25% had incomes that were not greater than 200% of the poverty level. With regards to the mothers of the remaining children, 27% had no more than a high school education at the time of enrollment in the study (NICHD Early Child Care Research Network, 2003).

The subsample that comprised the current study was also evaluated for attrition. When the participating children reached the first grade, 284 of the original 326 participants remained. The 284 remaining participants did not differ from the 42 lost to follow-up on any demographic variable.

Measures

Woodcock-Johnson Psycho-Educational Battery – Revised (WJ-R). The Woodcock-Johnson Psycho-educational Battery – Revised© (Riverside Publishing Co., Itasca, IL, www.riverpub.com) assessment tool was given to obtain an assessment of the child's cognitive and achievement abilities (Woodcock & Johnson, 1989). The WJ-R has two major components: the Tests of Cognitive Ability (WJ-R COG) and the Tests of Achievement (WJ-R ACH) (as cited in the NICHD Early Child Care Network, 1996). Parts of both of these components were given to the children at the age of 4 ½ years and again when the children were in the first grade.

The Woodcock-Johnson Psycho-educational Battery – Revised was chosen because of its relative advantages over similar measures. The WJ-R assesses a wide range of skills, it can be used for both the 4 ½ year and first grade assessments, and the WJ-R subtests have a relatively

short administration time comparatively. Also, the norming procedures used for the WJ-R are exemplary (NICHD Early Childcare Network, 1996).

The internal consistency of the WJ-R COG using the split half method ranged from 0.91 to 0.96 for the WJ-R Broad Cognitive Ability (BCA) score. Internal consistency estimates for the individual subtests were as follows: Memory for Sentences at ages 4-7 years, 0.86 to 0.94; Incomplete Words, 0.89 to 0.92; Picture Vocabulary, 0.70 to 0.82; and Memory for Names at ages 4-7 years, 0.88 to 0.92. The individual subtests test-retest reliability ranged from 0.63 to 0.78 (NICHD Early Childcare Network, 1996). The WJ-R ACH internal consistency reliability was evaluated using the split half method. The internal consistency reliability ranged from 0.94 to 0.98 for the Skills Cluster. The individual subtests' test-retest reliability ranged from 0.80 to 0.87.

The WJ-R COG was reported to have excellent predictive validity in that it predicts reading achievement, writing achievement, and mathematics achievement (as cited in NICHD Early Childcare Network, 1996). The WJ-R COG BCA score was compared to similar assessments, and yielded a correlation in the 0.70s (as cited in NICHD Early Childcare Network, 1996). The WJ-R ACH Skills Cluster was found to have a correlation with the Boehm Test of Basic Concepts and the Bracken Basic Concepts Scale in the high 0.60s.

Three subtests of the WJ-R COG were given to the children during the 54-month administration. These subtests were Memory for Sentences, Incomplete Words, and Picture Vocabulary. The Memory for Sentences subtest was used primarily to evaluate a child's short-term memory, and secondarily to evaluate comprehension-knowledge. The Incomplete Words subtest was given to assess the child's auditory processing. Finally, the Picture Vocabulary Subtest was given to measure the child's verbal comprehension. During the first grade

administration, the three aforementioned subtests were again given, as well as the Memory for Names subtest. This subtest is a measure of long-term retrieval.

Two subtests from the Early Developmental Scales tests of the WJ-R ACH were administered to the children at 4 ¹/₂ years of age. The subtests given were: Letter-Word Identification and Applied Problems. The Letter-Word Identification subtest was given to assess the child's reading skills. The Applied Problems subtest was a measure of the child's mathematics skills. These two subtests were re-administered when the children were in the first grade. Additionally, the Word Attack subtest was given to measure the child's ability to apply phonic and analytic skills to the pronunciation of unfamiliar printed words.

Child Behavior Checklist/4-18 (CBCL). The Child Behavior Checklist is a widely used measure to assess problem behaviors and social skills of children ages 4-18 years (Achenbach, 1991a). A series of behaviors are rated on three-point scales from 0 – not true of the child and 2-very true of the child. The behaviors are broken down into three broad categories: internalizing behaviors, externalizing behaviors, and mixed behaviors. Within each category, there is a breakdown of certain symptoms. In the internalizing behaviors cluster there are Withdrawn, Somatic Complaints, and Anxious/Depressed. The symptoms that cluster in externalizing behaviors are Delinquent Behavior and Aggressive Behavior. The child also receives a total problem score, based on the category scores and other information obtained by the CBCL.

While two different forms were used in the NICHD Study of Early Child Care, only one version of this measure is included in the current study. The form was the CBCL – Parent Version. This version is a self-administered measure that is completed by the mother, father, or both. The test-retest reliability for the CBCL was obtained through the administration to 72 mothers of non-referred children. The test was given at a 1-week interval. Non-referred children

were used to assess the test-retest reliability because their scores would be less susceptible to regression towards the mean. The overall intraclass correlation coefficient was 0.996 for the 20 competence items and 0.952 for the 118 specific problem items. These coefficients indicate strong test-retest reliability in the scores obtained for each item relative to the scores obtained for each other item (Achenbach, 1991b).

Test-retest reliability was also assessed regarding both the rank orderings and the magnitude of scale scores. These reliabilities were computed from mothers' ratings of 80 non-referred 4 to 16-year-olds with a mean interval of 7 days. Seventy-two of the 80 participants were also used to compute the intraclass correlation coefficients from above. The mean reliability coefficient for all the competence scales was 0.87, and the mean for all the problem scales was 0.89 (Achenbach, 1991b). There were significant declines in some scores on the problem scales over the 7-day interval. Practice effects can account for the decline in some scores on the problem scales. This practice effect has been found in many ratings scales and structured psychiatric interviews of children and adults (as cited in Achenbach, 1991b). Even so, the declines in the CBCL problem scale scores were small. The decrease was 10.7% from the Time 1 score to the Time 2 score (Achenbach, 1991b). Construct validity was assessed by testing associations that the CBCL had with other, similar measures. The correlation between the CBCL and the Connors syndrome scales ranged from 0.59 to 0.86 for the specific problem scales. The total problem score from the CBCL and the Connors syndrome scales correlated at 0.82 (Achenbach, 1991b). The correlations of the Externalizing and Internalizing scores compared to the Connors scales that correspond to them ranged from 0.56 to 0.86. When the CBCL was compared to the Quay-Peterson, the total problem scores from each correlated 0.81. The correlations of the CBCL Internalizing and Externalizing scores corresponded with the Quay-

Peterson scales at a range of 0.52 to 0.88.

A second version of the CBCL, the Teacher version, was administered to many of the participating children's teachers. However, the sample size in the HHS study is too small to be adequately analyzed. Therefore, for the purposes of the current study, only the mothers and fathers' reports of their children's internalizing and externalizing behaviors were included.

Procedure

Phase Two of the early child care study began at 54 months and continued through the time when the children were in the first grade. Measures were given at designated 9-month intervals. Not every measure was given at every 9-month interval, and a few measures were given more frequently than the established time interval. The measures were all given by trained experimenters who were working in conjunction with one of the participating sites.

The current study will take the information obtained through the administration of the, My Time Spent as a Parent (Parts 1 and 2) Fathers Only, Observed Paternal Sensitivity, Observed Maternal Sensitivity, Woodcock-Johnson Tests of Cognitive Ability and Achievement, and the Child Behavior Checklist (Parent Version). The My Time Spent as a Parent (Parts 1 and 2) was given to the fathers when their child was 6, 15, 24, and 36 months of age. Fathers were observed with their children when the child was 6 and 36 months of age. Mothers also were observed with their children when the child was 6 and 36 months old. The CBCL was given to the mother and father when the children were 54 months, kindergarten age, and first grade age. The WJ-COG and ACH was administered to the child when he/she was 54 months old and again when they were in the first grade. For the purposes of the current study, only the independent variables assessed at child age 6 and 36 months will be used and the dependent variables assessed at first grade age will be included. Table 10 contains additional information about the

measures used in this study. Correlation and hierarchical regression analyses were computed in order to examine the relationship between self-reported paternal sensitivity, observed paternal sensitivity, maternal sensitivity and child cognitive and behavioral development.

CHAPTER III

RESULTS

Due to the nature of the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care, not all measures were administered to all the participants at each testing time (see Table 11). Consequently, many of the participants have missing data. Therefore, the following analyses were computed utilizing the data present and were not limited to only those participants who had completed every measure at each administration under analysis. This means that the results obtained from each correlation and regression analysis are based on different sample sizes.

Descriptive Statistics

For all independent and dependent variables (self-reported paternal sensitivity, observed paternal sensitivity, maternal sensitivity, externalizing and internalizing behaviors, and cognitive abilities), sample sizes, means, standard deviations, skewness, kurtosis, standard error, observed minimum, observed maximum, and percentages were calculated. These statistics were computed for each variable and are presented in Tables 12-16. These results were utilized in exploring descriptive data pertaining to the sample.

Inferential Statistics

Dependent variables and demographics

A series of independent t-tests and correlations were computed for each dependent variable to ensure that child gender (2 levels: male and female); ethnicity (2 levels: Caucasian and non-Caucasian); mother's marital status (2 levels: married and not married); total family income (ranging from \$2,500 to \$250,000 yearly, $SD = 30,122$) and maternal education (ranging from 7 – 21 years of education) were not moderators, mediators, or covariates. A series of

independent-samples t-tests were run to determine any relationship between child gender and the dependent variables. Results indicated a significant difference between gender groups for mother's report of externalizing behaviors, $t(277) = 2.47, p = .014$. Specifically, mothers endorsed more externalizing behaviors for their male children ($n = 141, M = 9.56, SD = 7.82$) than female children ($n = 138, M = 7.49, SD = 6.16$). All other t-tests indicated no significant relationship between child gender and the dependent variables.

A series of independent-samples t-tests were computed to explore any relationship between ethnicity and the dependent variables. Results indicated a significant difference across ethnicity for cognitive abilities, $t(276) = 2.72, p = .007$. Therefore, Caucasian children ($n = 228, M = 105.56, SD = 9.75$) scored higher on a cognitive ability measure than non-Caucasian children ($n = 50, M = 101.26, SD = 11.66$). There were no other significant ethnic differences across the remaining dependent variables.

In order to examine the relationship between mother's marital status and the dependent variables a set of independent-samples t-tests were run. Results indicated a significant difference across marital status for cognitive abilities, $t(276) = 3.66, p < .001$. Therefore, children of married mothers ($n = 250, M = 105.52, SD = 9.8$) exhibited a higher cognitive ability score than children of non-married mothers ($n = 28, M = 98.23, SD = 11.82$). Results indicated no other significant relationships between marital status and the dependent variables.

A series of correlations were run to determine the relationship between total family income and the dependent variables. Results showed a significant positive relationship between income and cognitive abilities, with $r = .2, p = .001$. Total family income was also negatively related to both father's reports of externalizing behaviors, $r = -.17, p = .008$, and mothers' reports

of externalizing behaviors, $r = -.21, p < .001$. There were no significant relationships between mothers' or father's reports of children's internalizing behaviors and total family income.

A series of correlations were computed to determine the relationship between mother's education level and the dependent variables. Results indicated a significant positive relationship between maternal education and child cognitive abilities, with $r = .35, p < .001$. In addition, there was a significant negative relationship between mother's level of education and mother's reports of externalizing behaviors, with $r = -.21, p < .001$. There was also a significantly negative relationship between maternal education and father's reports of externalizing behaviors, with $r = -.16, p = .02$. There were no significant results for either mother or fathers' reports of children's internalizing behaviors.

Correlations between independent variables at 6 months

A series of correlations and partial correlations were computed to determine any relationship between the independent variables of self-report paternal sensitivity, observed paternal sensitivity, and observed maternal sensitivity. Correlation coefficients ranged from $-.06$ to $.18$ (displayed in Table 17). When variance due to total family income and maternal education was controlled, the correlation coefficients remained in this range, $r = -.03$ to $.08$ (displayed in Table 18). Since these values are in the low range, the independent variables are considered to be separate constructs.

Correlations between independent variables at 36 months

A series of correlations and partial correlations were also computed among the three independent variables at child age 36 months. Correlation coefficients for these variables ranged from $-.17$ to $.26$ (displayed in Table 19), and after controlling for total family income and maternal education, values ranged from

-.22 to .23 (displayed in Table 20). Again, these correlation coefficients are considered to be in the low to moderate range and thus the independent variables can be considered discrete constructs.

Correlations among dependent variables

In order to assess any differences between the participating child's mother and father's reports of the same construct, correlations and partial correlations were computed. In addition, a series of correlations and partial correlations were run between mothers' and fathers' reports of children's externalizing and internalizing behaviors and child cognitive abilities. Correlation coefficients for these variables ranged from -.17 - .64, and are displayed in Tables 13 and 15. When possible effects of total family income and maternal education were controlled, coefficients ranged from -.11 - .64. These results are displayed in Tables 14 and 16. In general, the correlation coefficients are in the low range and therefore indicate conceptual independence. The higher correlation exists between mothers' report of externalizing and internalizing behaviors as well as fathers' report of externalizing and internalizing behaviors. However, these correlation coefficients are still in a range acceptable to treat these dependent variables as separate constructs.

Analyses at six months

Relationships between the independent and dependent variables using correlation

A number of correlations were run to answer each research question and hypothesis. A Bonferroni correction was used in order to control for Type 1 error across the fifteen correlations ($p = .003$). First, correlations were computed to answer the research question: are parental sensitivity at six months and child cognitive development related? It was predicted that higher levels of paternal sensitivity at six months will have higher levels of cognitive development.

Paternal sensitivity was evaluated via two means 1) self-report and 2) observation at two different times. Neither the correlation between self-report paternal sensitivity and children's cognitive abilities or the correlation between observed paternal sensitivity and children's cognitive abilities was significant. Partial correlations were also computed after controlling for total family income and maternal education. Again, results were not significant.

In addition, it was predicted that higher levels of maternal sensitivity at six months would be positively related to child cognitive abilities. Results indicated that there was no significant relationship between observed maternal sensitivity at 6 months and child cognitive development. This relationship remained non-significant after total family income and maternal education were controlled.

A second series of correlations were computed to answer the research question: Are parental sensitivity at six months and externalizing behaviors related? It was predicted that higher levels of paternal sensitivity would be negatively correlated with mothers' reports of children's externalizing behaviors. Results did not indicate a significant relationship for either the self-report or the observed paternal sensitivity constructs and mother's reports of children's externalizing behaviors. Results were unchanged after controlling for total family income and maternal education. It was also predicted that paternal sensitivity at six months would be negatively related to fathers' reports of children's externalizing behaviors. Results were not significant, even after controlling for total family income and maternal education.

Also, it was hypothesized that maternal sensitivity would be negatively related to mothers' reports of children's externalizing behaviors. Results approached significance, $r = -.17$, $p = .004$. After controlling for total family income and maternal education, this relationship became non-significant. In addition, it was predicted that maternal sensitivity at six months

would be negatively related to fathers' reports of children's externalizing behaviors. Results were not significant before or after controlling for total family income and maternal education.

A third set of correlations was run to determine if parental sensitivity and internalizing behaviors were related. First, correlations were computed in order to determine the relationship between paternal sensitivity at six months and mother's reports of internalizing behaviors. It was predicted that higher levels of paternal sensitivity would be negatively related to mothers' reports of children's internalizing behaviors. Results showed no significant relationship between either self-reported or observed paternal sensitivity and mothers' reports of internalizing behavior. Another set of correlations was run between paternal sensitivity (self-report and observation) and fathers' reports of children's internalizing behavior. It was predicted that paternal sensitivity would be negatively correlated to fathers' reports of internalizing behaviors. Again, results did not indicate a significant relationship. Partial correlations were also computed between the independent variables of self-report and observed paternal sensitivity and the dependent variables of mothers' and fathers' reports of internalizing behavior. After controlling for total family income and maternal education, all correlations remained non-significant.

Additionally, a series of correlations was computed to determine the relationship between maternal sensitivity and reports of internalizing behaviors. Correlations were run between observed maternal sensitivity at six months and mothers' reports of children's internalizing behaviors. Results were not significant. It was also predicted that maternal sensitivity would be negatively correlated with fathers' reports of children's internalizing behaviors. Results indicated no significant relationships among these variables. Partial correlations computed among these variables also failed to yield any significant relationships. Results for all of the aforementioned correlations are displayed in Table 17 and 18.

Relationships between independent and dependent variables using hierarchical multiple regression

A hierarchical multiple regression was then computed because this model is theoretically based and allows for the entering of variables in a predetermined order. For the current study, demographic variables were entered in first, and then the theoretical variables of interest were entered in various combinations (Cohen, Cohen, West, & Aiken, 2003). Entering the theoretical variables during the final steps makes it more difficult for these variables to achieve significance. Therefore, any variable that remains significant throughout the model should be given particular attention.

A hierarchical multiple regression was computed for the three independent variables: self-reported paternal sensitivity, observed paternal sensitivity, and observed maternal sensitivity, and the dependent variable of child cognitive abilities. This analysis also included two significant demographic variables: maternal education and total family income. These variables were entered into the hierarchical regression in a number of different ways. Results indicated that putting in observed paternal sensitivity on the final step after: maternal education and total family income (step 1), observed maternal sensitivity (step 2), and self-report paternal sensitivity (step 3), observed paternal sensitivity remained a significant predictor of child cognitive abilities ($\beta = .16, p = .01$). Maternal education also remained a significant predictor of child cognitive abilities ($\beta = .29, p < .001$). This overall model was significant ($F = 7.56, df = 5, 219, p < .001$), and accounted for 13% of the variance.

An additional hierarchical multiple regression was run for the three independent variables and the dependent variable of mothers' reports of children's externalizing behaviors. Results indicated that entering observed maternal sensitivity on the final step after: maternal education

and total family income (step 1), observed paternal sensitivity (step 2), and self-reported paternal sensitivity (step 3) this variable remained a significant predictor of mothers' reports of children's externalizing behaviors ($\beta = -.15, p = .02$). Maternal education ($\beta = -.15, p = .03$), self-reported paternal sensitivity ($\beta = .13, p = .04$), and total family income ($\beta = -.14, p = .04$) also remained significant predictors. However, it should be noted that the relationship between self-reported paternal sensitivity and mothers' reports of children's externalizing behaviors is in the opposite direction from what was hypothesized. This overall model was significant ($F = 5.6, df = 5, 221, p < .001$), and accounted for 9% of the variance.

For the dependent variables of fathers' reports of children's externalizing behaviors, mothers' reports of internalizing behaviors, and fathers' reports of internalizing behaviors, separate hierarchical regressions were also computed. Each regression included one dependent variable and the three predictor variables at six months, in addition to the two demographic variables. These variables were entered into the hierarchical regressions in a variety of ways. However, all of the attempts failed to reach significance.

Analyses at 36 months

Relationships between the independent and dependent variables using correlation

A number of correlations were run to answer each research question and hypothesis. A Bonferroni correction was used in order to control for Type 1 error across the fifteen correlations ($p = .003$). First, correlations were computed to answer the research question: are parental sensitivity at child age 36 months and child cognitive development related? It was predicted that higher levels of paternal sensitivity at 36 months would be positively related to levels of child cognitive ability. Results indicated a significant positive relationship between observed paternal sensitivity at 36 months and child cognitive abilities, with $r = .3, p < .001$. It was also

hypothesized that higher levels of maternal sensitivity at child age 36 months would be positively related to child cognitive abilities. This hypothesis was also supported, indicating a positive relationship between maternal sensitivity and child cognitive abilities, with $r = .35, p < .001$. These results are displayed in Table 19. Partial correlations were computed to control for total family income and maternal education. Results approached significance for observed paternal sensitivity and child cognitive abilities, $r = .26, p = .004$. The relationship between observed maternal sensitivity and child cognitive abilities remained significant, with $r = .25, p < .001$. Results did not show a significant relationship between self-reported paternal sensitivity and child cognitive abilities before or after controlling for total family income and maternal education. These results are displayed in Table 20.

A second series of correlations was computed to answer the research question: Are parental sensitivity at child age 36 months and externalizing behaviors related? It was predicted that higher levels of paternal sensitivity would be negatively correlated with mothers' reports of children's externalizing behaviors. Results were not significant for either measure of paternal sensitivity. It was also predicted that higher levels of paternal sensitivity would be negatively correlated with fathers' reports of children's externalizing behaviors. Again, results showed no significant relationship between either measure of paternal sensitivity and fathers' reports of externalizing behaviors.

It was also hypothesized that maternal sensitivity at child age 36 months would be negatively related to mothers' reports of children's externalizing behaviors. Results indicated a significant negative relationship between these variables, with $r = -.35, p < .001$. Even when total family income and maternal education were controlled, this relationship remained significant, $r = -.28, p < .001$. Furthermore it was hypothesized that maternal sensitivity would be negatively

related to fathers' reports of children's externalizing behaviors. This relationship was also significant in the negative direction, with $r = -.25, p < .001$. After controlling for total family income and maternal education, this relationship remained significant, with $r = -.2, p = .003$.

Finally a third series of correlations were computed to answer the research question: Are parental sensitivity at child age 36 months and child internalizing behaviors related? It was hypothesized that paternal sensitivity (self-report and observed) at 36 months would be negatively related to mothers' reports of children's internalizing behavior. Results were not significant for either of the independent variables. It was also hypothesized that paternal sensitivity would be negatively related to fathers' reports of internalizing behaviors. Again, these results failed to indicate a significant relationship.

Additionally, it was hypothesized that maternal sensitivity at child age 36 months would be negatively related to mothers' reports of children's internalizing behaviors. Results for this relationship were not significant. Finally, it was hypothesized that maternal sensitivity would be negatively related to fathers' reports of children's internalizing behaviors. Again, results were not significant. Results for all of these correlation analyses are displayed in Tables 19 and 20.

Relationships between independent and dependent variables using hierarchical multiple regression

Due to the original researchers lack of continuity in collecting data, many of the participants who comprised this study had incomplete data. Only 32 participants completed all of the measures at 36 months. Therefore, only the two independent variables that showed the strongest relationship to the dependent variables, observed paternal sensitivity and observed maternal sensitivity, were used in the following regression analyses.

A hierarchical multiple regression was computed to further examine the relationship between two independent variables: observed paternal sensitivity and maternal sensitivity and the dependent variable: child cognitive abilities. This analysis also included two demographic variables: total family income and maternal education. All of the variables were entered into the analysis in a variety of ways. Results indicated that entering observed paternal sensitivity after: maternal education and total family income (step 1) and maternal sensitivity (step 2), observed paternal sensitivity at 36 months remained a significant predictor of child cognitive abilities ($\beta = .22, p = .008$). Maternal education also remained a significant predictor of child cognitive abilities ($\beta = .332, p < .001$). This overall model was significant ($F = 12.77, df = 4, 121, p < .001$) and accounted for 27% of the variance.

Another hierarchical multiple regression was run to further examine the relationship between observed paternal and maternal sensitivity and mothers' reports of children's externalizing behaviors. Again, two demographic variables were also included in the analysis (maternal education and total family income). These variables were entered into this analysis in a variety of ways. Results indicated that putting observed maternal sensitivity into the analysis even after entering: maternal education and total family income (step 1) and observed paternal sensitivity (step 2), only maternal sensitivity remained a significant predictor of mothers' reports of children's externalizing behaviors ($\beta = -.31, p = .001$). This overall model was significant ($F = 7.22, df = 4, 120, p < .001$), and accounted for 17% of the variance.

A third hierarchical regression was computed between the two independent variables (paternal and maternal sensitivity) and the dependent variable of fathers' reports of children's externalizing behaviors. Maternal education and total family income were again included in this analysis. These variables were put into the regression in a variety of ways. Results showed that

entering observed paternal sensitivity after: maternal education and total family income (step 1) and observed maternal sensitivity (step 2), observed paternal sensitivity remained the only significant predictor of fathers' reports of children's externalizing behaviors ($\beta = -.21, p = .03$). This overall model was significant ($F = 4.33, df = 4, 105, p = .003$), and accounted for 11% of the variance.

A hierarchical multiple regression was run to further examine the relationship between observed paternal and maternal sensitivity and mothers' reports of children's internalizing behaviors. These variables, as well as maternal education and total family income, were entered into the analysis in many different ways. Results failed to reach significance for any variation.

Finally, a hierarchical multiple regression was computed between observed paternal and maternal sensitivity and fathers' reports of children's internalizing behaviors. Results demonstrated that entering observed paternal sensitivity into the analysis after: maternal education and total family income (step 1) and observed maternal sensitivity (step 2), the variable of paternal sensitivity remained the only significant predictor of fathers' reports of children's internalizing behaviors ($\beta = -.21, p = .04$). However, the overall model was not significant ($F = 1.54, df = 4, 105, p = .2$).

CHAPTER IV

DISCUSSION

The purpose of the current study was to examine the relationship between parental sensitivity and two areas of child development: cognitive abilities and behavioral development. The data used to test these relationships was from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care that began in 1991, which is a longitudinal, multi-site study originally designed to investigate multiple aspects of childcare, both from parents and from organizations. Few studies have looked at both maternal and paternal sensitivity in relation to later child cognitive abilities and behavioral development. A main advantage of the current study was that it evaluated both maternal and paternal sensitivity using the same measure, allowing for easy and direct comparison of these two constructs. Another advantage of the current study is that since the larger NICHD study was longitudinal in nature, this allowed for the exploration of relationships between the variables over time. Also, since the data collection sites were spread out throughout the United States, this increases the generalizability of the results. These advantages allow for a more complete and in-depth examination of parental sensitivity and the role that it may play in children's development.

This study yielded a variety of significant results. Based on a review of previous literature, it was hypothesized that parental sensitivity would be positively related to child cognitive abilities. This hypothesis was tested using levels of parental sensitivity assessed at child age 6 and 36 months. None of the simple correlations between either self-reported paternal sensitivity, observed paternal sensitivity, or observed maternal sensitivity and child cognitive abilities were significant at 6 months, which may partly be due to the use of the conservative Bonferroni correction in order to avoid any chance of Type-I error. The finding from the

regression analysis that, at six months, observed paternal sensitivity was shown to be a significant predictor of child cognitive abilities strengthens the possibility that the conservative Bonferroni use is partially responsible for the non-significant relationships between the aforementioned variables.

The hypothesis that parental sensitivity would be positively related to child cognitive abilities was again tested at 36 months, and there were significant positive relationships between observed paternal sensitivity and child cognitive abilities as well as between observed maternal sensitivity and child cognitive abilities. Further, observed paternal sensitivity was shown to be a significant predictor of child cognitive abilities, even after accounting for demographic variables and maternal sensitivity. Given the scarcity of research on fathers' role in child cognitive development, the finding that higher levels of paternal sensitivity are positive predictors of child cognitive abilities is a very important contribution to the literature.

The finding that maternal sensitivity was not a significant predictor of child cognitive abilities was surprising given the previous literature. However, it should be noted that this variable was significant in the regression analysis before the addition of paternal sensitivity. Thus, after adding paternal sensitivity, maternal sensitivity became a non-significant contributor to child cognitive abilities. Since fathers were not included in most of the previous studies, researchers may have overestimated the role of maternal sensitivity in child cognitive development. Future studies should include both parents' sensitivity in order to ensure the most complete picture possible when exploring relationships between parental sensitivity and child cognitive outcomes.

It was also hypothesized that parental sensitivity would be negatively related to children's externalizing behaviors. This hypothesis was tested using levels of parental sensitivity assessed

at 6 and 36 months, as well as mothers' and fathers' reports of children's externalizing behaviors. There was a significant negative relationship between maternal sensitivity at 6 months and mothers' reports of children's externalizing behavior, although this relationship only approached significance after the Bonferroni correction had been applied. Furthermore, maternal sensitivity at 6 months was shown to be a significantly negative predictor for mothers' reports of children's externalizing behaviors. Self-report paternal sensitivity was also a significant predictor. However, this relationship was in the opposite direction from the one hypothesized.

At child age 36 months, maternal sensitivity had a significant negative relationship to both mothers' and fathers' reports of children's externalizing behavior, even after controlling for total family income and maternal education. Maternal sensitivity was again shown to be a strong negative predictor for mothers' reports of children's externalizing behaviors. Observed paternal sensitivity was a significant negative predictor for fathers' reports of children's externalizing behaviors, which is the only significant finding for this dependent variable.

In summary, parental sensitivity, at least at 36 months, is a significant negative predictor of the respective parents' reports of children's externalizing behavior. While this was also found for mothers at 6 months, this was not the case for fathers. Also, mothers' sensitivity was not related to fathers' reports of externalizing behavior and vice versa (at least not in the expected direction). A possible reason why the relationship among these constructs is weaker than expected is that mothers and fathers may not communicate regularly about their children's externalizing behaviors. Alternatively, what a mother may see as a problem behavior a father may see as physical play and therefore would be less likely to view and report the behavior in a pathological way. Hawkins, Christiansen, Sargent, and Hill (1993) suggested that fathers may not feel a natural connection with their child, and may not become involved with him/her soon

after birth, and may take more time than mothers to become involved in a child's life. This could be an explanation for the non-significant relationship between paternal sensitivity at 6 months and reports of externalizing behavior.

One possible explanation for the surprising finding of a positive prediction relationship between self-report paternal sensitivity and mothers' reports of children's externalizing behaviors is that fathers who are more involved with their children may engage in more physical play (Belsky, Gilstrap, & Rovine, 1984). These play behaviors could be interpreted by the mother as aggressive, and therefore increase her reporting of externalizing behaviors. Another possible explanation for this finding is that the self-report measure designed to assess for paternal sensitivity may not be accurately evaluating this construct. Since there was a lack of association between the self-report measure and the observation measure, as well as largely non-significant relationships between self-reported paternal sensitivity and child developmental outcomes, one might question whether or not the self-report measure is in fact assessing the construct of paternal sensitivity. Given that the findings of the present study raise critical issues about the validity of the self-report measure and that the measure was developed for the NICHD Study of Early Child Care, it seems imperative that more reliability and validity be done to determine its accuracy in measuring the construct of paternal sensitivity.

Further, it was hypothesized that parental sensitivity would be negatively related to children's internalizing behaviors. Previous research has shown that higher levels of maternal sensitivity are negatively associated with children's internalizing behaviors (e.g. Bohlin & Hagekull, 2000). Research evaluating the relationship between paternal sensitivity and children's internalizing behaviors has also shown a negative relationship (Culp, Schadle, Robinson, & Culp, 2000; Phares & Compas, 1992). This hypothesis was tested using levels of parental

sensitivity assessed at 6 and 36 months as well as mothers' and fathers' reports of children's internalizing behaviors. Only observed paternal sensitivity at 36 months was a significant negative predictor of fathers' reports of children's internalizing behaviors.

One possible explanation for the lack of significant relationships between these variables is the nature of internalizing behaviors. Unlike aggression, internalizing behaviors tend to be less noticeable since they are directed inward instead of outward (Mash & Wolfe, 1999). Therefore, even if a parent is sensitive and responsive to their child's needs and signals, the internalizing behaviors may go unnoticed. These non-significant relationships highlight the need for children to be able to self-report their symptoms. Currently, the Child Behavior Checklist (CBCL) only allows children older than age eleven to report on their own experiences. Had the children in this study been able to self-report, the results may have been different and/or more accurate.

Although mothers' reports of externalizing and internalizing behaviors were considered to be two separate constructs, they were highly correlated and significant in many of the analyses. The same is true of fathers' reports of externalizing and internalizing behaviors. The finding that these variables were correlated is not surprising given the subject matter. Achenbach (1991b) and others have shown that children with elevated scores on one of the scales will be more likely to have elevated scores on other scales. If a child is experiencing difficulties, he/she is likely having problems in a variety of areas and may express those problems in a variety of different ways (externally and internally).

In summary, the results from the current study demonstrated significant relationships between parental sensitivity and child developmental outcomes. Perhaps one of the most important findings from the current study is that parental sensitivity at 36 months showed stronger relationships and were stronger predictors of child developmental outcomes than

parental sensitivity assessed at 6 months. Many researchers believe parental sensitivity is only important during early infancy in order to establish a secure attachment (e.g. Arend, Gove, & Sroufe, 1979; Belsky & Fearon, 2002; Lohaus et al., 2004). The current study showed that high sensitivity is an important aspect of parent-child interactions long after early infancy, and its contribution to child outcomes should to be given more attention. Additionally, results from this study indicated the need to accurately measure the construct of parental sensitivity, especially paternal sensitivity, as well as the benefits of measuring this construct in multiple ways.

Limitations of the current study cannot be discussed without including limitations of the larger NICHD Study of Early Child Care. The sample of the current study as well as the larger study did not reflect cultural, ethnical, or financial diversity that is present in the general population. Furthermore, the researchers who conducted the HHS study, the study that was performed in conjuncture with the NICHD study, did not track the fathers across testing intervals. For example, fathers who were given the self-report questionnaire at child age 6 months were not necessarily administered that measure at 36 months. The same is true for the father-child observation. Only the mothers were consistently assessed during these time periods. The lack of stability in testing the fathers represents a limitation of the current study. Therefore, while direct relationships could be tested, these relationships could not be compared longitudinally due to the lack of follow-up testing of the participating fathers. In addition, this lack of consistency on the part of the researchers renders any attrition analysis invalid, since any significant differences between the continuing participants and those lost could be due to individual characteristics or due to the data collection practices of the researchers. However, despite these limitations, results showed that parental sensitivity, both from the mother and the father, makes a significant contribution to later child development.

The current study focused closely on parental sensitivity and its relationship to aspects of child development: cognitive abilities and behavioral development. The results obtained in this study indicated that parental sensitivity is an important component of these two developmental areas. While professionals and researchers have long encouraged maternal sensitivity and involvement, this is not the case with regard to paternal sensitivity and involvement. This study draws attention to the many benefits that children can reap from having involved and sensitive fathers. Currently there are many programs and services that offer training and support to mothers (e.g. training in hospital after birth, Mothers Day Out, Mothers of Pre-Schoolers, baby Yoga, and New Moms Support Group), both prenatal and as their children develop. Although organizations are beginning to provide classes for fathers (e.g. “Boot Camp”), there does not seem to be the same amount of resources for them during this same time frame. Given that children can benefit from having fathers who are sensitive to their needs, it may be advantageous to implement training and support groups for fathers in which they feel comfortable.

The NICHD Study of Early Child Care has much data that can, and should, be analyzed to further understand a child’s development and the different parts of his/her environment that can positively or negatively affect that development. Since previous research regarding maternal sensitivity has focused on the child’s attachment style, it would be interesting to include attachment in a study similar to the current one. Also, including individual parent characteristics and a measure of the quality/stability of the mother-father relationship could provide an understanding of why some parents are sensitive to their children while others are not. Additionally, this data set could provide information about maternal and paternal sensitivity in relation to other aspects of child development, such as emotional regulation or social skills.

Longitudinal, multi-location data sets such as the one being collected by NICHD possess many advantages to researchers. Thorough analysis of this data will likely produce many important findings and provide researchers with a clearer picture of children's lives.

APPENDIX

TABLES

Table 1

Demographic Comparisons of Phase I Sample Participants at Child Age 1 Month and U.S. General Population

Descriptive Information	N in study	U.S. population Percentages. 1990 Census
Child Gender		
Males	167 (51.2%)	49%
Females	159 (48.8%)	51%
Race		
Caucasian	276 (84.7%)	80%
Non- Caucasian	50 (15.3%)	20%
African American	33 (10.1%)	12%
Asian American	4 (1.2%)	3%
Native American	2 (0.6%)	1%
Other	11 (3.4%)	4%
Ethnicity		
Non-Hispanic	310 (95.1%)	91%
Hispanic	16 (4.9%)	9%
Maternal Education		
No College	90 (27.6%)	
Less than high school	21 (6.4%)	
High school graduate or GED	69 (21.2%)	
College or beyond	236 (72.3%)	

(table continues)

Table 1 (*continued*)

Descriptive Information	N in study	U.S. population Percentages. 1990 Census
Partial college	105 (32.2%)	
College graduate	73 (22.4%)	
Graduate level training	58 (17.7%)	
Family Structure		
Partnered	326 (100%)	
Married	294 (90.2%)	
Cohabiting	28 (8.6%)	
Not Cohabiting, but involved	4 (1.2%)	
Gross 1991 family annual income	<i>Mean</i>	
	\$35,581 (<i>SD</i> = \$30,121)	

Note. *N* = 326 total children. 1990 U.S. population data not shown was not available.

Table 2

Intercorrelations of the Three Factor Model of My Time Spent as a Parent at Child Age 6 Months

	My Time Spent as a Parent (20 item)	Physical Stimulation (6 item)	External Stimulation (4 item)	Emotional Stimulation (5 item)
My Time Spent as a Parent (20 item)	(.79)			
Physical Stimulation (6 item)	.54	(.72)		
External Stimulation (4 item)	.66	.33	(.79)	
Emotional Stimulation (5 item)	.70	-.02	.12	(.55)

Note. Values on the diagonal are alpha internal consistency reliability coefficients.

Table 3

Individual Items in Intimate Involvement Factor at Child Age 6 Months

	CD	BB	FB	DB	GUAN	GBS
Corrected item total correlation	0.46	0.33	0.53	0.54	0.31	0.45
Alpha if item deleted	0.61	0.65	0.60	0.60	0.71	0.61

Note. $N = 425$

CB = Change Diaper

BB = Give Baby Bath

FB = Feed Baby

DB = Dress Baby

GUAN = Get Up At Night

GBS = Get Baby to Sleep

Table 4

Intercorrelations of the Three Factor Model of My Time Spent as a Parent at Child Age 36 Months

	My Time Spent as a Parent (18 item)	Physical Needs (6 item)	External Stimulation (6 item)	Emotional Stimulation (4 item)
My Time Spent as a Parent (18 item)	(.74)			
Physical Needs (6 item)	.74	(.53)		
External Stimulation (6 item)	.56	.34	(.61)	
Child Care (4 item)	.72	.15	.14	(.53)

Note. Values on the diagonal are alpha internal consistency reliability coefficients.

Table 5

Individual Items in Intimate Involvement Factor at Child Age 36 Months

	CD	BB	FB	DB	GUAN	GBS
Corrected item total correlation	0.20	0.23	0.26	0.27	0.23	0.23
Alpha if item deleted	0.48	0.35	0.32	0.35	0.33	0.35

Note. $N = 268$

CB = Change Diaper

BB = Give Baby Bath

FB = Feed Baby

DB = Dress Baby

GUAN = Get Up At Night

GBS = Get Baby to Sleep

Table 6

Individual Items in Observed Paternal Sensitivity at Child Age 6 Months

	SN	PRC	RI
Corrected item total correlation	0.73	0.51	0.38
Alpha if item deleted	0.34	0.65	0.78

Note. $N = 278$, Chronbach's $\alpha = 0.71$

SN = Sensitivity to Non-distress

PRC = Positive Regard for Child

RI = Reflected Intrusiveness

Table 7

Individual Items in Observed Paternal Sensitivity at Child Age 36 Months

	SP	RCA	RH
Corrected item total correlation	0.65	0.62	0.56
Alpha if item deleted	0.60	0.60	0.74

Note. $N = 184$, Chronbach's $\alpha = 0.77$

SP = Supportive Presence

RCA = Respect for Child's Autonomy

RH = Reflected Hostility

Table 8

Individual Items in Observed Maternal Sensitivity at Child Age 6 Months

	SN	PRC	RI
Corrected item total correlation	0.77	0.45	0.54
Alpha if item deleted	0.43	0.80	0.71

Note. $N = 1272$, Chronbach's $\alpha = 0.75$

SN = Sensitivity to Non-distress

PRC = Positive Regard for Child

RI = Reflected Intrusiveness

Table 9

Individual Items in Observed Maternal Sensitivity at Child Age 36 Months

	SP	RCA	RH
Corrected item total correlation	0.71	0.71	0.59
Alpha if item deleted	0.68	0.66	0.80

Note. $N = 1161$, Chronbach's $\alpha = 0.81$

SP = Supportive Presence

RCA = Respect for Child's Autonomy

RH = Reflected Hostility

Table 10

Organization of the Measures

Type of variable	Construct	Variable name	Measure	Time given
Independent variables				
Paternal Sensitivity	Father's perceived sensitive responsiveness to child	Self-report Paternal Sensitivity	My Time Spent as a Parent	6 & 36 Months
Paternal Sensitivity	Father's observed sensitive responsiveness to child	Observed Paternal Sensitivity	Structured Interaction Qualitative Rating Scale	6 & 36 Months
Maternal Sensitivity	Mother's observed sensitive responsiveness to child	Observed Maternal Sensitivity	Structured Interaction Qualitative Rating Scale	6 & 36 Months
Dependent Variables				
Child Cognitive Abilities	Child Cognitive Abilities and Achievement	Child Cognitive Abilities	Woodcock-Johnson Tests of Cognitive Ability and Achievement	First Grade Age
Child Externalizing Behavior (Mom report)	Child Problem Behaviors, such as aggression	Mothers' reports of children's externalizing behaviors	Child Behavior Checklist	First Grade Age

(table continues)

Table 10 (*continued*)

Type of variable	Construct	Variable name	Measure	Time given
Child Externalizing Behavior (Dad report)	Child Problem Behaviors, such as aggression	Fathers' reports of children's externalizing behaviors	Child Behavior Checklist	First Grade Age
Child Internalizing Behavior (Mom report)	Child Problem Behaviors, such as depression	Mothers' reports of children's internalizing behaviors	Child Behavior Checklist	First Grade Age
Child Internalizing Behavior (Dad report)	Child Problem Behaviors, such as depression	Fathers' reports of children's internalizing behaviors	Child Behavior Checklist	First Grade Age

Table 11

Data Collection Sites and Times of Independent Variables

Site	6 mo. SR (fathers)	6 mo. OBS (fathers)	6 mo. OBS (mothers)	36 mo. SR (fathers)	36 mo. OBS (fathers)	36 mo. OBS (mothers)
University of Arkansas	YES	NO	YES	NO	YES	YES
University of Kansas	YES	YES	YES	YES	NO	YES
Penn State	YES	YES	YES	YES	YES	YES
Western Carolina Center	YES	YES	YES	YES	NO	YES
University of Wisconsin	YES	YES	YES	NO	YES	YES

SR = Self-Report Measure

OBS = Observation Measure

Table 12

Independent Variables for Six Month Analyses

	Self-report Paternal Sensitivity	Observed Paternal Sensitivity	Observed Maternal Sensitivity
N	323	277	325
Missing	3	49	1
Mean	2.48	9.51	13.52
Standard error	0.03	0.09	0.18
SD	0.50	1.54	3.15
Obs. Minimum	1.00	4	5
Obs. Maximum	5.00	12.00	17.00
Skewness	0.11	-0.63	-1.00
Kurtosis	1.55	0.62	-0.28
Percentages			
25	2.17	9.00	11.00
50	2.50	10.00	15.00
75	2.83	10.00	16.00
100	5.00	12.00	17.00

Table 13

Independent Variables for Thirty-Six Month Analyses

	Self-report Paternal Sensitivity	Observed Paternal Sensitivity	Observed Maternal Sensitivity
N	152	143	301
Missing	174	183	25
Mean	2.72	17.43	17.46
Standard error	0.04	0.18	0.15
SD	0.49	2.19	2.59
Obs. Minimum	1.60	7.00	7.00
Obs. Maximum	3.83	21.00	21.00
Skewness	-0.15	-1.22	-1.21
Kurtosis	-0.31	3.58	1.69
Percentages			
25	2.40	16	16
50	2.80	18	18
75	3.00	19	19
100	3.83	21	21

Table 14

Dependent Variable for Six and Thirty-Six Month Analyses

Woodcock-Johnson – Revised Cognitive and Achievement Scores

	Child Cognitive Abilities
N	278
Missing	48
Mean	104.79
Standard error	0.61
SD	10.23
Obs. Minimum	72.20
Obs. Maximum	132.40
Skewness	-0.01
Kurtosis	0.28
Percentages	
25	98.20
50	104.60
75	111.25
100	132.40

Table 15

Dependent Variables for Six and Thirty-Six Month Analyses

CBCL - Mother's reports on participating child

	Externalizing Behaviors	Internalizing Behaviors
N	279	279
Missing	47	47
Mean	8.53	5.19
Standard error	0.43	0.26
SD	7.11	4.30
Obs. Minimum	0	0
Obs. Maximum	45	20
Skewness	1.38	1.13
Kurtosis	3.13	0.96
Percentages		
25	3	2
50	7	4
75	13	7
100	45	20

Table 16

Dependent Variables for Six and Thirty-Six Month Analyses

CBCL – Fathers’ reports on participating child

	Externalizing Behaviors	Internalizing Behaviors
N	235	235
Missing	91	91
Mean	8.68	4.65
Standard error	0.43	0.29
SD	6.58	4.47
Obs. Minimum	0	0
Obs. Maximum	34	36
Skewness	1.38	2.46
Kurtosis	1.67	10.88
Percentages		
25	4	2
50	7	4
75	12	6
100	34	36

Table 17

Correlation Matrix for Independent and Dependent Variables, Income, and Maternal Education at Six Months

Variable	1	2	3	4	5	6	7	8	9	10
1. Self-report Paternal Sensitivity	-									
2. Observed Paternal Sensitivity	.05 (<i>n</i> = 275)	-								
3. Observed Maternal Sensitivity	-.06 (<i>n</i> = 322)	.18** (<i>p</i> = .002) (<i>n</i> = 276)	-							
4. Child Cognitive Abilities	-.03 (<i>n</i> = 275)	.16** (<i>p</i> = .01) (<i>n</i> = 235)	.11 (<i>n</i> = 278)	-						
5. Mothers' Reports of Child Externalizing Behavior	.16** (<i>p</i> = .008) (<i>n</i> = 276)	-.04 (<i>n</i> = 237)	-.17** (<i>p</i> = .004) (<i>n</i> = 279)	-.17** (<i>p</i> = .004) (<i>n</i> = 276)	-					
6. Fathers' Reports of Child Externalizing Behavior	-.03 (<i>n</i> = 232)	-.02 (<i>n</i> = 199)	-.07 (<i>n</i> = 235)	-.02 (<i>n</i> = 229)	.5** (<i>p</i> < .001) (<i>n</i> = 232)	-				

(table continues)

Table 17 (continued)

Variable	1	2	3	4	5	6	7	8	9	10
7. Mothers' Reports of Child Internalizing Behaviors	.10 (<i>n</i> = 276)	-.10 (<i>n</i> = 237)	-.06 (<i>n</i> = 279)	-.03 (<i>n</i> = 276)	.54** (<i>p</i> < .001) (<i>n</i> = 279)	.16* (<i>p</i> = .02) (<i>n</i> = 232)	-			
8. Fathers' Reports of Child Internalizing Behaviors	-.04 (<i>n</i> = 232)	-.13 (<i>n</i> = 199)	-.03 (<i>n</i> = 235)	.03 (<i>n</i> = 229)	.25** (<i>p</i> < .001) (<i>n</i> = 232)	.64** (<i>p</i> < .001) (<i>n</i> = 235)	.22** (<i>p</i> = .001) (<i>n</i> = 232)	-		
9. Total Family Income	-.12* (<i>p</i> = .04) (<i>n</i> = 315)	.16** (<i>p</i> = .01) (<i>n</i> = 269)	.11* (<i>p</i> = .05) (<i>n</i> = 317)	.2** (<i>p</i> = .001) (<i>n</i> = 270)	-.21** (<i>p</i> < .001) (<i>n</i> = 271)	-.17** (<i>p</i> = .008) (<i>n</i> = 229)	-.09 (<i>n</i> = 271)	-.10 (<i>n</i> = 229)	-	
10. Maternal Education	-.08 (<i>n</i> = 323)	.15* (<i>p</i> = .01) (<i>n</i> = 277)	.23** (<i>p</i> < .001) (<i>n</i> = 325)	.35** (<i>p</i> < .001) (<i>n</i> = 278)	-.21** (<i>p</i> < .001) (<i>n</i> = 279)	-.16* (<i>p</i> = .02) (<i>n</i> = 235)	-.08 (<i>n</i> = 279)	-.08 (<i>n</i> = 235)	.31** (<i>p</i> < .001) (<i>n</i> = 318)	-

Note. *N* = 199-325. * = $p \leq .05$, ** = $p \leq .01$ (before Bonferroni correction). † = $p \leq .003$ (with Bonferroni correction).

Table 18

Partial Correlation Matrix for Independent and Dependent Variables Controlling for Income and Maternal Education at 6 Months

Variable	1	2	3	4	5	6	7	8
1. Self-report Paternal Sensitivity	-							
2. Observed Paternal Sensitivity	.08 (<i>n</i> = 263)	-						
3. Observed Maternal Sensitivity	-.03 (<i>n</i> = 310)	.04* (<i>p</i> = .02) (<i>n</i> = 264)	-					
4. Child Cognitive Abilities	.005 (<i>n</i> = 263)	.13* (<i>p</i> = .05) (<i>n</i> = 223)	.06 (<i>n</i> = 266)	-				
5. Mothers' Reports of Child Externalizing Behavior	.13* (<i>p</i> = .03) (<i>n</i> = 264)	-.003 (<i>n</i> = 225)	-.13* (<i>p</i> = .03) (<i>n</i> = 267)	-.11 (<i>n</i> = 264)	-			
6. Fathers' Reports of Child Externalizing Behaviors	-.04 (<i>n</i> = 222)	.03 (<i>n</i> = 189)	-.04 (<i>n</i> = 225)	.03 (<i>n</i> = 219)	.47** (<i>p</i> < .001) (<i>n</i> = 222)	-		

(table continues)

Table 18 (continued)

Variable	1	2	3	4	5	6	7	8
7. Mothers' Reports of Child Internalizing Behaviors	.08 (<i>n</i> = 264)	-.08 (<i>n</i> = 225)	-.04 (<i>n</i> = 267)	.008 (<i>n</i> = 264)	.53** (<i>p</i> < .001) (<i>n</i> = 267)	.13 (<i>n</i> = 222)	-	
8. Fathers' Reports of Child Internalizing Behaviors	-.03 (<i>n</i> = 222)	-.10 (<i>n</i> = 189)	-.02 (<i>n</i> = 225)	.05 (<i>n</i> = 219)	.24** (<i>p</i> < .001) (<i>n</i> = 222)	.64** (<i>p</i> < .001) (<i>n</i> = 225)	.21** (<i>p</i> = .001) (<i>n</i> = 222)	-

Note. *N* = 120-310. * = $p \leq .05$, ** = $p \leq .01$ (before Bonferroni correction). † = $p < .003$ (with Bonferroni correction).

Table 19

Correlation Matrix for Independent and Dependent Variables, Income, and Maternal Education at Thirty- Six Months

Variable	1	2	3	4	5	6	7	8	9	10
1. Self-report Paternal Sensitivity	-									
2. Observed Paternal Sensitivity	-.17 (<i>n</i> = 45)	-								
3. Observed Maternal Sensitivity	-.10 (<i>n</i> = 144)	.26** (<i>p</i> = .002) (<i>n</i> = 139)	-							
4. Child Cognitive Abilities	-.01 (<i>n</i> = 138)	.30***† (<i>p</i> < .001) (<i>n</i> = 132)	.35***† (<i>p</i> < .001) (<i>n</i> = 271)	-						
5. Mothers' Reports of Child Externalizing Behavior	.06 (<i>n</i> = 139)	-.14 (<i>n</i> = 131)	-.35***† (<i>p</i> < .001) (<i>n</i> = 272)	-.17** (<i>p</i> = .004) (<i>n</i> = 276)	-					
6. Fathers' Reports of Child Externalizing Behaviors	.06 (<i>n</i> = 127)	-.21* (<i>p</i> = .03) (<i>n</i> = 114)	-.25***† (<i>p</i> < .001) (<i>n</i> = 232)	-.02 (<i>n</i> = 229)	.50** (<i>p</i> < .001) (<i>n</i> = 232)	-				

(table continues)

Table 19 (continued)

Variable	1	2	3	4	5	6	7	8	9	10
7. Mothers' Reports of Child Internalizing Behaviors	-.01 (<i>n</i> = 139)	-.07 (<i>n</i> = 131)	-.10 (<i>n</i> = 272)	-.03 (<i>n</i> = 276)	.54** (<i>p</i> < .001) (<i>n</i> = 279)	.16* (<i>p</i> = .02) (<i>n</i> = 232)	-			
8. Fathers' Reports of Child Internalizing Behaviors	.04 (<i>n</i> = 127)	-.17 (<i>n</i> = 114)	-.06 (<i>n</i> = 232)	.03 (<i>n</i> = 229)	.25** (<i>p</i> < .001) (<i>n</i> = 232)	.64** (<i>p</i> < .001) (<i>n</i> = 235)	.22** (<i>p</i> = .001) (<i>n</i> = 232)	-		
9. Total Family Income	-.11 (<i>n</i> = 148)	-.03 (<i>n</i> = 139)	.24** (<i>p</i> < .001) (<i>n</i> = 294)	.20** (<i>p</i> = .001) (<i>n</i> = 270)	-.21** (<i>p</i> < .001) (<i>n</i> = 271)	-.17** (<i>p</i> = .008) (<i>n</i> = 229)	-.09 (<i>n</i> = 271)	-.10 (<i>n</i> = 229)	-	
10. Maternal Education	.08 (<i>n</i> = 152)	.22** (<i>p</i> = .01) (<i>n</i> = 143)	.39** (<i>p</i> < .001) (<i>n</i> = 301)	.35** (<i>p</i> < .001) (<i>n</i> = 278)	-.21** (<i>p</i> < .001) (<i>n</i> = 279)	-.16* (<i>p</i> = .02) (<i>n</i> = 235)	-.08 (<i>n</i> = 279)	-.08 (<i>n</i> = 235)	.31** (<i>p</i> < .001) (<i>n</i> = 318)	-

Note. *N* = 45-326. * = $p \leq .05$, ** = $p \leq .01$ (before Bonferroni correction). † = $p \leq .003$ (with Bonferroni correction).

Table 20

Partial Correlation Matrix for Independent and Dependent Variables Controlling for Income and Maternal Education at 36 Months

Variable	1	2	3	4	5	6	7	8
1. Self-report Paternal Sensitivity	-							
2. Observed Paternal Sensitivity	-.22 (<i>n</i> = 39)	-						
3. Observed Maternal Sensitivity	-.12 (<i>n</i> = 137)	.23** (<i>p</i> = .009) (<i>n</i> = 131)	-					
4. Child Cognitive Abilities	-.03 (<i>n</i> = 130)	.26** (<i>p</i> = .004) (<i>n</i> = 124)	.25**† (<i>p</i> < .001) (<i>n</i> = 260)	-				
5. Mothers' Reports of Child Externalizing Behavior	.07 (<i>n</i> = 131)	-.10 (<i>n</i> = 123)	-.28**† (<i>p</i> < .001) (<i>n</i> = 261)	-.11 (<i>n</i> = 264)	-			
6. Fathers' Reports of Child Externalizing Behaviors	.07 (<i>n</i> = 120)	-.21* (<i>p</i> = .03) (<i>n</i> = 107)	-.20**† (<i>p</i> = .003) (<i>n</i> = 222)	.03 (<i>n</i> = 219)	.47** (<i>p</i> < .001) (<i>n</i> = 222)	-		

(table continues)

Table 20 (*continued*)

Variable	1	2	3	4	5	6	7	8
7. Mothers' Reports of Child Internalizing Behaviors	-.03 (<i>n</i> = 131)	-.04 (<i>n</i> = 123)	-.06 (<i>n</i> = 261)	.008 (<i>n</i> = 264)	.53** (<i>p</i> < .001) (<i>n</i> = 267)	.13 (<i>n</i> = 222)	-	
8. Fathers' Reports of Child Internalizing Behaviors	.07 (<i>n</i> = 120)	-.18 (<i>n</i> = 107)	-.03 (<i>n</i> = 222)	.05 (<i>n</i> = 219)	.24** (<i>p</i> < .001) (<i>n</i> = 222)	.64** (<i>p</i> < .001) (<i>n</i> = 225)	.21** (<i>p</i> = .001) (<i>n</i> = 222)	-

Note. *N* = 120-310. * = $p \leq .05$, ** = $p \leq .01$ (before Bonferroni correction). † = $p \leq .003$ (with Bonferroni correction).

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