

**TRAJECTORIES OF OBSERVED MATERNAL AND PATERNAL SENSITIVITY IN  
EARLY AND MIDDLE CHILDHOOD:  
PREDICTING CHILDREN'S SOCIAL COMPETENCE FROM SENSITIVE  
PARENTING**

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Submitted to the Graduate Faculty of  
Arts and Sciences in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy

University of Pittsburgh

2008

UNIVERSITY OF PITTSBURGH  
FACULTY OF ARTS AND SCIENCES

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EARLY AND MIDDLE CHILDHOOD: PREDICTING CHILDREN'S SOCIAL  
COMPETENCE FROM SENSITIVE PARENTING**

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The present longitudinal study of parental sensitivity had three primary goals: 1) to delineate the developmental trajectories of paternal and maternal sensitivity across early and middle childhood using data from the National Institute of Child Health and Human Development Study of Early Childcare (N = 513); 2) to identify demographic and family context variables that differentiate among trajectories; 3) to examine the degree to which trajectories of maternal and paternal sensitivity predicted children's social competence in middle school, over and above demographic and family correlates. A group based trajectory analysis of parental sensitivity obtained from separate observations of father-child and mother-child interaction across a seven year study period revealed four distinct, yet similar, trajectories of fathers' and mothers' sensitivity. These included groups defined by high-stable, moderate-stable, moderate-decreasing, and low-increasing levels of sensitivity. The majority of fathers and mothers in this sample exhibited high to moderately stable levels of sensitivity with their children during early and middle childhood. Parents in these trajectories were characterized by higher overall SES, and they reported using less harsh parenting practices as compared to parents in trajectory groups characterized by either low or moderate levels of sensitivity that increased or decreased over time. Also, mothers showing moderate decreasing sensitivity reported significantly more depressive symptoms. No additional family context variables predicted to either paternal or maternal sensitivity over

time. Finally, trajectories of both paternal sensitivity and maternal sensitivity predicted different aspects of children's social competence in sixth grade after significant covariates, previous child functioning, and the opposite parent's sensitivity were taken into account.

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## **PREFACE**

This project would not have been possible without the patience, guidance, and support of my advisor and mentor, Dr. Susan Campbell. Drs. Kay Jennings, Daniel Shaw, Joan Vondra, and JeeWon Cheong also offered excellent direction and assistance on refining my project as dissertation committee members. Jay Lambert, my partner of 16 years, willingly relocated to Pittsburgh and offered continual support throughout my graduate school experience. His love and confidence in my abilities helped me to achieve my goals in higher education. My mother, father, and brother also played a central role in my achievements through their love and encouragement. My friendships with Camilla von Stauffenberg, Roli Mohan, Stephanie Zerwas, Mary Nied, Keiran Rump, Ella Vanderbilt, and Susan Gillo helped to keep me sane throughout this process and have enriched my life immeasurably. Finally, I am indebted to the families of the NICHD Study of Early Childcare for their participation in longitudinal research which has helped us to learn more about child development.

## **STUDY AIMS**

A substantial literature provides empirical support for a clear link between sensitive parenting and positive child outcomes (Maccoby, 2000). More specifically, parenting has been shown to be central in the early development and maintenance of young children's regulatory behaviors and social competence (Maccoby & Martin, 1983). Much of this work, however, has concentrated primarily on the mother-child relationship and has neglected investigations of father-child relations. Research that has examined both maternal and paternal sensitivity and its relationship to children's regulatory and social skills has focused almost exclusively on the infancy and preschool periods (Lamb, 2004). Furthermore, the vast majority of studies which have examined relationships between maternal and paternal caregiving and children's social competence have utilized cross-sectional or concurrent correlational data, which has severely limited our understanding of parental sensitivity over time and its potential role in the development of children's social skills.

Specific aims of the current study were: 1) to delineate the developmental trajectories of maternal and paternal sensitivity across early and middle childhood; 2) to identify potential demographic and family correlates (i.e., parental depression, marital harmony) of trajectories of maternal and paternal sensitivity; and 3) to examine the degree to which trajectories of maternal and paternal sensitivity predict children's social competence in middle school over and above these demographic and family correlates.

The introduction begins with a discussion of the theoretical importance of sensitive parenting in children's development. Research which has examined paternal sensitivity explicitly is also summarized and compared with research on maternal sensitivity. Next, the unique challenges and goals of parenting during the early and middle childhood periods are discussed, with particular emphasis on managing peer relationships, a paramount goal for children during this period of development. This is followed by a discussion of demographic and family variables which research has shown to be associated with parenting quality. The concept of children's social competence is then presented. Research which has examined the association between parenting quality and children's social competence is then reviewed and potential parenting processes which may help to explain this relationship are discussed. Next, a section which addresses the existing limitations found in this literature and a summary of the methodological improvements of the present study are offered. Study hypotheses are subsequently presented.

## I. INTRODUCTION

### A. The Importance of Parenting in Child Development

The almost exclusive role of parents as caregivers and social partners in early childhood has historically led researchers to examine parenting as a paramount influence on children's development. Several prominent theories of development including attachment theory (Bowlby, 1973), family systems theory (Minuchin, 1974; Sameroff, 1983), ecological theory (Bronfenbrenner, 1979), and social learning theory (Bandura, 1977) assert that through various processes parents have both direct and indirect influences on their children's functioning. These theoretical perspectives have informed a wealth of research during the twentieth century, which has subsequently shown clear and substantial associations between parenting and positive child outcomes (Maccoby, 2000).

Studies have sought to clarify this relationship further by delineating which aspects or "qualities" of parenting appear most salient to the promotion of healthy child development. Seminal work by Baumrind and colleagues (1967) indicates that parents who offer high levels of warmth and support, adequate monitoring, and non-coercive control tend to have children who fare better in both school and home settings. Defined as "authoritative" parenting, this particular parenting style has been shown to be related to better emotional, social, and cognitive skills in children throughout their development in a vast number of studies (Maccoby & Martin, 1983). Alternatively, "authoritarian" parenting, a style defined by low warmth and excessive demands and control, has been shown to be related to poorer outcomes for most children, although some studies have found that this parenting style is associated with positive outcomes for African-American school children (Baumrind, 1972; Lamborn, Dornbusch, & Steinberg, 1996).

Researchers have examined several of these dimensions of parenting (i.e., warmth, respect for the child's autonomy or individuality, and hostility or harsh control) further in an effort to clarify their association with child outcomes and identify possible process variables to help explain these relations. Longitudinal research conducted by Gottman and colleagues (1997) found supportive, warm, and engaged parenting in early childhood by both mothers and fathers to be related to children's social and cognitive competencies both concurrently and predicatively. Parental sensitivity has also been shown to promote secure attachment in children, which in turn has been related to better child outcomes (DeWolff & van IJzendoorn, 1997; Thompson, 1999). Researchers have highlighted that parental warmth and sensitivity appear to promote parent-child cooperation and emotion sharing and understanding, which are thought to promote the development of self-regulation and empathy skills (Campbell, 2002; Denham, Workman, Cole, Weissbrod, Kendziors, & Zahn-Waxler, 2000).

In addition, Sroufe (1995) postulated that in early childhood a parent's acceptance of their child's growing autonomy, as well as their continued warmth, reassurance, and availability are central to the development of the child's self-regulation and later social competence. Recent research examining parental respect for child autonomy within the context of supportive parenting has supported this claim. Hastings and colleagues (2008) found that mothers and fathers observed to be more supportive and less controlling with their preschoolers, had children with fewer internalizing behaviors (i.e., anxious difficulties) according to teacher reports. Similarly, the NICHD Early Child Care Research Network (2004) found that sensitivity and support for autonomy displayed by fathers during parent-child interactions at 54 months and first grade significantly predicted teacher's positive perceptions of their children's social skills and

behavior in second grade. Both of these studies again underscore the need for warmth and support in combination with respect for the child's individuality.

Given the substantial literature suggesting a clear relationship between parents' positive emotional expression and warmth and children's better self-regulation and social competence, it seems likely that parents' negative emotional expression or hostility would be associated with higher levels of dysregulation and limited social competence in children. Research to date supports this assertion. Specifically, Bradley and Corwyn (2007) found that less maternal sensitivity and more parental harshness were related to parent and teacher reports of more externalizing behavior during middle childhood. In addition, a cross-sectional study by Foster and colleagues (2007) reported that more negative expressiveness by fathers was associated with more aggressive and disruptive behavior by sons.

All of these findings underscore the need to focus on qualitative aspects of parenting and the parent-child relationship such as maternal and paternal sensitivity, which include behaviors such as supportive presence or warmth, respect for the child's autonomy and individuality, and an absence of hostility or harsh control.

#### *Paternal Parenting Research*

Despite the existence of a significant literature on maternal parenting quality and child outcomes, few studies have examined paternal caregiving practices. Early father research focused on father absence or quantitative aspects of the father-child relationship such as financial contributions (e.g., income/child support) or amount of paternal involvement (Parke, 2000; Pleck & Masciadrelli, 2004). More recently researchers have recognized the need to expand their understanding of paternal caregiving by investigating not only father involvement, but also the quality of paternal parenting (Lamb, 2004). Specifically, studies have explored authoritative

parenting styles in fathers and potential relationships between these styles and various child outcomes. Similar to findings from maternal caregiving studies, recent reviews of the literature on fathers by Lamb (2004) and Parke (2000) provide empirical support for a link between paternal caregiving quality (i.e., sensitive parenting) and young children's social and emotional development.

As noted by Marsiglio and colleagues (2000), however, several limitations are evident in this literature. First, most studies examining father-child relationships have utilized cross-sectional or concurrent correlational data, thereby making the direction of effects between fathering and children's outcomes unclear. Second, most studies which have included large samples and cross-sectional designs have been developmentally insensitive and have not considered how paternal caregiving quality may vary at different periods of development based on children's unique age-appropriate needs and goals. For example, fathers may show sensitivity to their infants by providing them with a secure and consistent support base, while fathers may show sensitivity to their school-aged children by promoting more autonomy and sense of self or offering more instrumental support (i.e., problem solving). Last, very few studies have examined the relationship between paternal caregiving quality and children's outcomes over and above maternal caregiving quality. Without controlling for maternal parenting it is impossible to determine if paternal caregiving quality provides any unique contribution to child outcomes.

A few notable exceptions exist in the literature on fathers, namely studies which have examined the relationships between father sensitivity and children's social competence and child behavior problems (Amato & Rivera, 1999; Hastings et al., 2008; McDowell et al., 2003, McElwain et al., 2007; NICHD Early Child Care Research Network (ECCRN), 2004). For

example, McDowell et al. (2003) found that fathers' advice giving (i.e., number of solutions offered and warmth of communication) predicted peer and teacher ratings of their children's social competence over and above mothers' advice giving, both concurrently (in third grade) and one year later. A study by McElwain and colleagues provided evidence that both maternal and paternal supportive parenting make independent contributions to greater child-friendly coordinated play, a measure of friendship quality. In addition, Amato and Rivera (1999) used a cross-sectional design and reported that responsive, supportive, and involved parenting by fathers was related to fewer parent-rated behavior problems after controlling for maternal parenting quality and involvement. Finally, a recent study by Hastings and colleagues (2008) found that fathers' supportiveness contributed to the prediction of their children's internalizing problems independent of maternal socialization.

In spite of some of this recent work, there remains a significant absence of longitudinal research focusing on paternal sensitivity during middle childhood that also controls for maternal behavior. The current study is designed to begin to address these gaps in the literature.

#### *Similarities and Differences in Maternal and Paternal Sensitivity*

A few studies have examined the similarities and differences between maternal and paternal caregiving styles, primarily during infancy. Results indicate few differences in sensitivity between mothers and fathers in an infant's first year in a variety of activities including the still-face (Braungart-Rieker et al., 1998), free play (Crawley & Sherrod, 1984), or while preoccupied with questionnaires during a parent-infant interaction (Notaro & Volling, 1999). In addition to similarities in sensitivity, most research has shown that maternal and paternal caregiving styles are moderately correlated during infancy (for review see Lamb, 2004).

In contrast to the infancy period, several differences between mothers' and fathers' parenting styles have been noted with preschoolers and school-aged children. For example, several studies have shown that fathers tend to engage in more "rough and tumble" play with their children as compared to mothers (MacDonald & Parke, 1984; Pettit et al., 1998). Also, a study by Russell et al. (1998) found that mothers of preschoolers were more likely to identify their parenting styles as authoritative, whereas fathers were more likely to describe their discipline styles as authoritarian.

In addition to the similarities and differences noted in maternal and paternal sensitivity and caregiving styles, evidence also suggests that fathering may have differential effects on child development, specifically on social competence. For example in two of the studies mentioned above, the children whose fathers engaged in more physically stimulating play were rated by their peers as more popular and were observed by teachers to have more "social skillfulness" (MacDonald & Parke, 1984; Pettit et al., 1998). These same correlations were not found for mothers and children. Parke has suggested that fathers, unlike mothers, may have a less scripted parenting role when interacting with their children. This may expose children to a broader array of emotional states during play, which in turn, may help children to identify their partners' emotional expressions, thereby facilitating better peer interactions. Finally, a study by Gottman, Katz, and Hooven (1997) found that fathers who were more sensitive to their school-aged children's emotional states had children with more competent peer relationships, while no associations were found between mothers' awareness of their children's emotional states and their children's social competence. These results underscore the need to examine both maternal and paternal caregiving styles when investigating the relationship between parenting and children's social competence.

## **B. Contextual Variables Associated with Parental Caregiving Styles**

In addition to similarities and differences in actual parenting behavior, research suggests that different aspects of the family context are related to paternal and maternal caregiving quality. Building on earlier conceptual models of child development which stress the influence of multiple contextual factors on child development (i.e., ecological and family systems theory); Belsky (1984) proposed a multi-determined, ecological process model of parenting in which the parent-child relationship is influenced by several factors including contextual sources of stress and support within the family. Belsky identified variables such as socioeconomic status, child gender and temperament, parental mental health (i.e., parental depression), and the marital relationship (i.e., relationship intimacy), which have been shown to be both directly and indirectly related to children's developmental outcomes, as potential influences on parenting. Subsequent research has found these factors to be related to parenting quality and, therefore, they will be examined in the proposed study as potential correlates of maternal and paternal sensitivity. Relevant research findings for these variables are summarized below.

### *Socioeconomic Status*

Socioeconomic status (SES) is a measure of social class based on a person's income and education. The construct of SES has been shown to be associated with both parenting quality and child outcomes. Research on parenting quality and SES has shown that lower SES parents tend to use more authoritarian (i.e., harsh) child-rearing styles, whereas parents higher in SES tend to utilize a style that is more authoritative, accepting, and democratic (Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000; Shaw, Criss, Schonberg, & Beck, 2004). It is important to note, however, that some studies have shown that while authoritarian parenting styles are related to poorer outcomes for white, middle-class families, they are associated with more positive

outcomes in African-American children, particularly adolescent girls (Baumrind, 1973; Lamborn, Dornbusch, & Steinberg, 1996). In the current study, education and income will be examined in relation to trajectories of maternal and paternal sensitivity.

### *Child Gender and Temperament*

Child characteristics such as gender and temperament have been proposed as influences on parenting (Belsky, 1984). In particular, several researchers have reported a differential relationship between child gender and parenting in fathers (Doherty et al., 1998, Parke, 1996). For example, studies have shown that fathers prefer to interact with their sons, and are more often involved with their sons as compared to daughters (Cox et al., 1989, Lamb, 1977; NICHD ECCRN, 2000; Parke & Sawin, 1980; Pleck & Masciadrelli, 2004). This difference has been found more consistently with infants and younger children (Lytton & Romney, 1991), although some studies with school-aged children have reported that fathers' sensitivity is differentially related to their children's social competence as rated by teachers and/or peers (Isley et al., 1999; McDowell et al., 2002; NICHD ECCRN, 2004).

Child temperament has been defined as "constitutionally based individual differences in emotional, motor, and attentional reactivity and self-regulation" (Rothbart & Bates, 1998, pp109). This definition underscores several key features of temperament including the biological basis for behaviors which are influenced by genetics as well as maturation and experience. Child temperament has been shown to be relatively stable over time, and is often correlated with parental caregiving quality and later social competence (Bates, 2001). More specifically, fathers of children identified as having difficult temperaments characterized by negative affect (i.e., anger and frustration) tend to have less positive parent-child interactions than fathers with temperamentally easy infants (Grych & Clark, 1999), while mothers with

highly irritable infants have been shown to provide less sensitive care (Crockenberg, 1986, van den Boom, 1994). Similarly, children with difficult temperaments during preschool were more likely to display aggression in elementary school (Eisenberg et al., 1995). Increased aggression in children has been associated with peer rejection (Bates et al., 1991). Given these findings, it is important to consider underlying child characteristics such as temperament (negative affectivity) when investigating parenting quality (i.e., sensitivity) and children's later social competence. This study will include a measure of child temperament, specifically anger and frustration, as a possible correlate when investigating the association between trajectories of parental sensitivity and children's later social competence.

### *Parental Depression*

Belsky (1984) noted that several individual characteristics such as a parent's psychological well-being can affect their ability to parent. Empirical research on maternal and paternal depression has supported this claim. Studies have shown that depressed mothers tend to be less sensitive and less likely to engage in playful and affectively positive interactions with their young children during observations of mother-child play and caretaking (Campbell et al., 2007; Carter et al., 2001; Cohn & Campbell, 1992; DeMulder & Radke-Yarrow, 1991; Murray, 1992; Teti & Gelfand, 1991). In families with older school-aged children, research has also shown that depressed mothers, compared with their nondepressed counterparts, have lower tolerance for their children's behavior and are more punitive and critical in their parenting styles (Forehand et al., 1986, Goodman et al., 1994).

Similarly, a recent meta-analysis of the paternal depression literature (Kane & Garber, 2004) revealed that paternal depression was significantly related to father-child conflict, although the limited amount of work in this area (n = 6 studies) made calculating an effect size difficult.

In support of this finding, previous work by Cox and colleagues (1999) suggested that lower levels of depression in fathers were associated with more supportive and warm parenting as compared to fathers with poorer psychological adjustment. In the current study, both maternal and paternal reports of depressive symptoms will be examined as potential correlates of trajectories of sensitivity.

### *The Marital Relationship*

In Belsky's process model of parenting, he identifies the marital relationship as the "first-order or paramount source of support" with its intrinsic potential for exerting both positive and negative effects on parenting (Belsky, 1984). Studies appear to substantiate this claim demonstrating a clear relationship between marital and parenting quality (Erel & Burman, 1995; Frosch & Manglesdorf, 2001; Goldberg & Easterbrooks, 1984). When marriages were described as harmonious, parents displayed more positive parenting attributes whereas parents in conflicted marriages utilized more negative parenting styles. These results provide evidence for Belsky's suggestion that the marital relationship offers either support or stress which may subsequently influence parenting.

Researchers have taken this a step further by suggesting that the marital relationship is a particularly important support system for the father, and may have differential effects on his parenting role as compared to mothers (Doherty et al., 1998; Cox et al., 1989). A study by Belsky and colleagues (1991) found that as their marriages deteriorated, fathers became more negative and intrusive, while a previous analysis conducted with the NICHD Study of Early Childcare dataset found that fathers who rated their marriages as more harmonious were observed to be more sensitive when interacting with their children (NICHD ECCRN, 2000). The same relationship was not found for mothers.

### *Summary*

Belsky's (1984) process model of parenting suggests that several family and contextual sources of stress and support can have an impact on parenting. Research has offered empirical support for this model by identifying associations between parenting styles and various factors including SES, child gender and temperament, parent depression, and marital harmony, respectively. Given evidence of correlations between these variables and parenting, the proposed study will seek to distinguish which of these demographic and family correlates (i.e., parental depression, marital harmony) are associated with maternal and paternal sensitivity over time.

### **C. Parenting during Middle Childhood**

As mentioned earlier, most research examining maternal and paternal caregiving quality has been conducted with infants and toddlers. Children's basic needs change with development, and, therefore, require parents to alter their parenting styles and practices in order to meet those changing needs. This suggests that optimal parenting may look different at different periods of children's development. For example, the NICHD Study of Early Child Care measured maternal and paternal sensitivity during interactions with infants using a coding scheme which included sensitivity to non-distress, positive regard, and low levels of intrusiveness, while maternal sensitivity coded during interactions with mothers and their school-aged children included supportive presence, respect for autonomy, and an absence of hostility (NICHD ECCRN, 1999). These conceptually similar yet more developmentally appropriate measurement techniques highlight the need to examine parenting quality during various stages of child development. The proposed study seeks to examine parenting quality during preschool and the understudied developmental period of middle childhood.

Middle childhood is marked with its own unique parent and child challenges and expectations given the expansion of the child's social environment, which changes greatly with the introduction of preschool or kindergarten beginning around 4 ½ to 5 years of age. Formal instruction allows children the opportunity to interact with a variety of peers and adults (i.e., teachers) in a setting that is different from their home environment. These new relationships with peers and teachers afford children the opportunity to further develop their self-regulation skills (i.e., attention, emotion regulation), their ability to work and play with others (i.e., cooperation), and allows the child greater autonomy. Given these new opportunities for growth, researchers have suggested that the goal for parents during the transition from preschool-age to middle childhood is to provide children with the foundation for successful relationships and experiences outside the family (Collins, Madsen, & Susman-Stillman, 2000). Researchers have sought to clarify the role of parenting in children's social development by investigating the relationship between maternal and paternal caregiving quality and children's social competence and friendship quality.

#### **D. Children's Social Competence**

Social competence is a complex and sometimes murky construct which has been defined more broadly in recent investigations (Rubin et al., 1998). Although there appears to be no consensus on a single definition, most researchers have used the term "social competence" to imply a wide range of behavioral proficiencies including children's abilities to initiate and maintain positive interactions with peers while reducing their own negative behaviors, form and sustain warm and close friendships and acceptance by peers, and avoid peer rejection, victimization, and social isolation (Ladd, 2005). Research indicates that for children to gain the

necessary skills to engage in socially competent behaviors they must learn to maintain equilibrium between their own personal wants and needs, and the wants and needs of others. In addition, they must understand the social consequences and the implications of their own behaviors (Rubin et al., 1998).

The majority of processes thought to contribute to the development of social competence (i.e., increased emotion regulation, inhibitory control, perspective taking) begin to develop in early childhood and become elaborated by the time the child enters school. Given that school is often an important social outlet for children, most studies which have assessed social competence have collected data in the school setting. In general, most outcome measures of social competence are obtained via teacher or peer reports and include ratings of peer relations (i.e., popularity, rejection) and/or social skills such as sharing, helping, and controlling one's temper (Rubin, Bukowski, & Parker, 1998). Despite the use of multiple methods and informants in this literature, sizeable correlations have been reported between peer sociometric ratings and teacher ratings of social competence (Coie, Dodge, & Kupersmidt, 1990).

In keeping with the broad definition of social competence mentioned above, recent research has examined the association between children's social competence and later adjustment by measuring both children's behavior and dispositions (i.e., cooperative, aggressive) and their peer status (i.e., popularity, peer rejection) (Ladd, 2005). Results from these studies have shown that children's social competence and peer relationships go hand in hand. Specifically, children who are rated by their teachers as more socially competent (i.e., cooperative, helpful, friendly) tend to be viewed as more popular by peers and to report more close friendships (Rubin et al., 1998). In contrast, children who are more aggressive and disruptive (i.e., externalizing) or more anxious and withdrawn (i.e., internalizing) are more likely

to be rated as unpopular or rejected by peers (Coie & Kupersmidt, 1983, Dishion, 1990; Rubin et al., 1998) and to have poorer quality friendships (Parker & Asher, 1993). For this reason the current study will include teacher ratings of internalizing and externalizing behaviors as indirect measures of social competence.

### *Children's Friendship Quality*

As previously mentioned, children's social competence has also been assessed in terms of the maintenance and quality of children's friendships. These dyadic relationships are different from peer group interactions in that they typically afford children the opportunity to engage in mutual affection, reciprocity, and commitment in a more intimate one-on-one relationship (Hartup, 1993). Friendships are thought to serve at least three basic functions (Hartup, 1992). First, friendships are thought to provide an opportunity for the acquisition of social and emotional competencies. Second, they fulfill an emerging need for intimacy, particularly in early adolescence, and they provide a sense of self-validation and ultimate well-being through their shared sense of equality, which is largely absent from parent-child relationships (Hartup, 1992; Sullivan, 1953). Last, preadolescent friendships, through their cognitive and social scaffolding, have been shown to serve as models or precursors for later relationships in adulthood and adolescence (Hartup, 1996).

Although the bulk of work on friendship quality has emanated from later childhood and adolescent samples, early seminal work by Gottman and colleagues provided one of the first empirical links between early social competence and children's friendships at school-age. Gottman's (1983) longitudinal research examining preschoolers indicated that joint communication, cooperation, and the ability to successfully resolve conflict were qualities associated with the formation and maintenance of friendships during early and middle childhood.

These findings highlight the role of social skills in forming and maintaining friendships (Ladd, 2005). Current research which assesses friendship quality uses many of these same behaviors in their measurement of this construct including: instrumental help, support and security, intimacy and affection, companionship, and conflict resolution (Parker & Asher, 1993). The current study will include child self-reports of friendship quality in the 6<sup>th</sup> grade as an additional measure of social competence.

### **E. Parenting and Children's Social Competence**

Overall research has provided clear empirical support for an association between parenting styles and children's social competence (Parke & Buriel, 1998). Most studies, which have examined relationships between paternal and maternal caregiving quality and children's social competence, have focused on the separate and distinct periods of early childhood (Parke, 2000) and adolescence (Steinberg, 1993), the earlier of which will be discussed here. Studies of preschool children have primarily utilized observational methods to assess the parent-child relationship, but have often done so at only one time point. These studies provide support for an association between parenting quality and preschoolers' social competence. Specifically, fathers and mothers who appeared engaged, attentive, positive, more child focused, less directive, and exhibited less anger had children who were rated as more socially skilled by teachers and more likeable by peers, and were shown to engage in more socially skillful peer interactions (Boyum & Parke, 1995; MacDonald & Parke, 1984; Pettit et al., 1998). Conversely, fathers and mothers who responded to their child's negative affect with their own displays of negative affect had children who shared less, were more verbally aggressive, and avoided others according to their teachers (Carson & Parke, 1996).

Although most research in this area has been conducted with preschool children, a few studies (Booth-LaForce et al., 2006; Bradley & Corwyn, 2007; Isley et al., 1999; McDowell et al., 2002; NICHD ECCRN, 2004) have examined associations between parental caregiving (including fathers) and children's social competence during middle childhood. Results parallel those found in studies with preschool samples. Interestingly, results from the majority of these studies varied by parent and child gender.

McDowell et al. (2002) reported that boys who were rated more positively by their teachers had fathers who used more positive behaviors during parent-child interactions, whereas girls rated more positively by their teachers had mothers who interacted more positively. Similarly, a study by Isley and colleagues (1999) found that fathers' expressed negative affect was related to lower social competence ratings for boys by both teachers and peers, while mothers' expressed negative affect was associated with lower social competence ratings for girls by peers and teachers. Last, the NICHD Early Child Care Research Network (NICHD ECCRN, 2004) found that greater observed paternal sensitivity (i.e., supportive presence, respect for autonomy, and absence of hostility) at 4½ years and in first grade predicted higher levels of teacher-rated social competence in children both concurrently and across the transition to school, over and above demographic controls and maternal sensitivity. In contrast, maternal parenting beliefs, but not sensitivity, were associated with their children's social adjustment during the transition to school.

In summary, most of the research has examined maternal and paternal caregiving quality during early childhood and has not assessed parenting quality longitudinally. Despite these limitations, results have shown that engaged, positive, attentive, child-focused fathers and mothers who offered fewer directives had children who were viewed as more likeable by peers

and more socially skilled by teachers. In contrast, fathers and mothers who displayed more negative and derogatory behaviors during parent-child interactions had children who were rated by their teachers and peers as less socially competent. The few studies which have examined maternal and paternal parenting quality in middle childhood have found similar results although child gender may moderate this relationship.

### *Theories and Processes Linking Parenting and Children's Social Competence*

Several theorists have speculated about the parental processes that may account for the relationship between parenting and children's social development. These perspectives offer direct or indirect mechanisms to explain the importance of parenting for children's social competence. Direct approaches such as social learning theory (Bandura, 1977) and behavior genetics (Plomin, 1986) suggest that parents affect their children's social development and subsequent competence through straightforward actions such as modeling appropriate behaviors, managing their children's activities, and by contributing to their genetic predisposition towards sociability, behavioral inhibition, and aggression. Indirect approaches, however, such as attachment (Bowlby, 1972) and family systems theories (Minuchin, 1974, Sameroff, 1983), suggest that children learn about their social environment more implicitly through parenting. For example, attachment theory has suggested that parenting quality (i.e., parental sensitivity) provides young children with a sense of felt security and self-efficacy that aids them in the exploration of their environment and facilitates trust in others and the formation of new relationships. It is likely that both direct and indirect parenting processes are central to the development of children's social competence. However more methodologically sound studies with both mothers and fathers are needed to help tease apart these parental processes.

### *Limitations in the Existing Literature*

Several methodological and conceptual limitations have been highlighted in this literature review. First and foremost is the small number of studies that have simultaneously examined parenting quality in both mothers and fathers, and then also assessed children's social competence. Although clear and substantial associations between parenting quality and children's social competence have been found in these studies, most of this work has been cross-sectional in nature or has measured parenting at only one time point. This severely limits our understanding of what parental sensitivity may look like over time and the parental processes that may account for its relationship with later social competence. In addition, predominantly preschool aged children were studied in this work and therefore more complex aspects of social competence (i.e., children's friendship quality) were not assessed. Finally, these studies rarely employed adequate controls for confounding variables, thereby limiting our ability to comprehend the true nature of any association found between parenting quality and children's social competence. For example, studies that did not control for maternal parenting could not clearly state that associations between paternal caregiving quality and child outcomes were due to unique paternal contributions over and above the contribution of maternal behavior and vice-versa. Likewise, these same relationships may be accounted for by pre-existing child characteristics unless earlier child competencies or temperament are controlled for in some way.

## **F. Summary and Hypotheses**

Parental sensitivity, defined in previous research as warm, supportive parenting, which includes respect for a child's autonomy and an absence of hostility, has been shown to be highly correlated with children's social competence. The majority of this work, however, has focused primarily on mother-child relationships and has often neglected the examination of father-child

relationships. Furthermore, much of the literature investigating father-child relationships and children's social competence has focused on earlier periods of development (i.e., infancy and toddlerhood) and has overlooked the period of middle childhood. While a few studies have utilized longitudinal data sets to investigate the relationship between parenting and children's social competence, no studies to date have attempted to clearly delineate the developmental course of both maternal and paternal sensitivity beginning in early childhood and continuing into middle childhood. Moreover, few of these studies assessed known correlates of parenting (i.e., SES, parental depression, marital harmony, child temperament) and also included additional relevant controls (i.e., previous child functioning and maternal parenting quality) in their analyses, which would help to clarify our understanding of the unique association between parental sensitivity and children's social competence.

To this end, the current study utilized a semi-parametric group-based modeling approach that allowed for the identification of distinct trajectories of paternal and maternal sensitivity which differed in their underlying pattern and level, thus delineating the developmental course of parental sensitivity in early and middle childhood. Furthermore, theoretically derived and empirically supported correlates of parental sensitivity (i.e., SES, parent mental health, parental discipline practices, marital harmony, child temperament) were examined as potential variables to differentiate the sensitivity trajectory groups. Last, trajectories of observed paternal and maternal sensitivity were examined as predictors of children's later social competence after controlling for significant demographic and parenting correlates, as well as earlier child temperament and social competence. Follow-up analyses also examined maternal and paternal sensitivity over and above the other parent's contributions (i.e., maternal sensitivity was controlled in paternal sensitivity analyses).

This study utilized a subset of families (N= 513) participating in the NICHD Study of Early Child Care, who were followed longitudinally from child ages 4 ½ to 11 to examine trajectories of observed paternal and maternal sensitivity, their correlates, and child outcomes. The present study extends current literature by examining both paternal and maternal sensitivity over a much longer (i.e., 7 years) and less studied period of child development (i.e., middle childhood). Given that children begin to form enduring friendships and spend a greater proportion of their time with peers in middle childhood, a more detailed understanding of the relationship between parenting behaviors and children's social competence in middle childhood is needed. In addition, the present study employed a robust methodology including multiple informants (i.e., parents, child, and teachers) and types of data (i.e., observational and questionnaires), which served to reduce the number of confounds present in earlier research such as shared method variance. Based on the research reviewed herein, the following three groups of hypotheses were tested.

1. Identifying trajectories of paternal and maternal sensitivity.

A limited amount of longitudinal research conducted on parental quality during infancy has identified few differences between observed levels of paternal and maternal sensitivity during this period of development (Lamb, 2004), while a scarce to nonexistent literature has examined observed maternal and paternal quality in middle childhood and found mixed results (Parke, 2000). These inconsistent findings suggest that specific hypotheses regarding trajectories of paternal and maternal sensitivity during early and middle childhood may be premature. However, additional factors such as the study sample's relatively low level of demographic risk (e.g., more education, higher household income) and high level of family stability (i.e., father

remained in the home from 54 months – 6<sup>th</sup> grade) provided a rationale for the assumption that many parents would have high and stable levels of parental sensitivity.

Therefore, it was hypothesized that most fathers and mothers in this study would be identified as showing stable and high levels of sensitivity when observed interacting with their children. In addition to these high and stable groups, it was expected that some fathers and mothers would be classified as exhibiting moderate to low levels of sensitivity during parent-child interactions although it was unclear whether or not these patterns would increase or decrease over time.

## 2. Correlates of sensitivity trajectory groups.

Consistent with the literature reviewed above, it was expected that mothers and fathers classified in the stable high trajectory group would have significantly more demographic resources, report better overall mental health (i.e., fewer depressive symptoms), higher relationship intimacy, less use of harsh control discipline practices, and perceive their children as having less difficult temperaments as compared to the parents in trajectory groups characterized with persistently low or mixed levels (either increasing or decreasing) of observed sensitivity. Mothers and fathers in trajectory groups with low or mixed levels of sensitivity would be characterized by significantly fewer demographic resources, a greater number of depressive symptoms, lower relationship intimacy, greater use of harsh control, and would rate their children as showing more irritability.

## 3. The association between trajectories of paternal and maternal sensitivity and children's social competence in 6<sup>th</sup> grade.

Research has reported an association between maternal and paternal sensitivity and teacher ratings of children's social competence (Parke, 2000). Similarly, studies have shown that

higher levels of behavior problems (i.e., internalizing and externalizing behaviors) are associated with peer rejection (Coie & Kupersmidt, 1983; Dishion, 1990; Rubin, Bukowski, & Parker, 1998). Finally, research on children's friendships have shown that children who report and maintain friendships over time are more likely to engage in joint communication, cooperation, and successfully resolve conflict, qualities which are similar to skills assessed in social competence research (Gottman, 1983).

It was therefore expected that children whose parents were in the high and stable sensitivity trajectory groups would be rated by their teachers as having significantly better social skills, and fewer internalizing and externalizing problems in the sixth grade as compared to children whose parents were classified as having persistently low or mixed levels of sensitivity. Likewise, children whose parents were in the high trajectory groups would report better overall friendship quality with their best friend in the sixth grade as compared to children whose parents were classified as having persistently low or mixed levels of sensitivity. In an effort to control for autoregressive effects, children's previous levels of social competence at 54 months as rated by their parents was entered as a control variable. Lastly, the average sensitivity score for the opposite parent was entered as a control to determine if differences found between parental sensitivity and children's social competence exist over and above the other parent's sensitivity.

## II. METHODS

### A. Participants

This study examined the association between trajectories of maternal and paternal sensitivity and children's social competence in a subset of families taken from a multi-site study of child development, the NICHD Study of Early Child Care and Youth Development. Participants for the study were recruited throughout 1991 from hospitals located in or near Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. Families were excluded from the initial sample if: (1) the mother was under 18 years of age, (2) the mother did not speak English, (3) the family had current plans to move from the area, (4) the mother had multiple births, (5) the child had an obvious disability or illness immediately following birth, or (6) the mother had a recent history of substance abuse. Upon completion of the recruitment phase, a total of 1,364 families were enrolled into the study during an initial home visit conducted when the infants were one month old. The final sample was comprised of 24% ethnic minorities, 14% single mothers, and 11% mothers without a high school degree.

Beginning when the study children were 54 months old, funding was obtained to collect additional information directly from fathers and mothers at each of the ten sites. Of the initial 1364 families enrolled in the study, 904 had a husband or partner in residence at 54 months and were invited to participate in the additional father protocol. From this subset of families, only 513 (252 girls, 261 boys) were eligible for the current study based on the following criteria: the study child's father (biological or adoptive) resided in the home continuously from 54 months through 6<sup>th</sup> grade, no other adults resided in the home, and both parents participated in at least two of the

four home and laboratory observations at 54 months, 1<sup>st</sup> grade, 3<sup>rd</sup> grade, or 5<sup>th</sup> grade. Of the 391 families who did not qualify to participate in the current study, 318 were missing 3 or more parent observations while the remaining 73 families were not included due to changing family composition throughout the study period (e.g., father moving in and out of the home, additional adults residing in the home).

Attrition analyses were conducted comparing eligible families who did not meet the study criteria ( $n = 391$ ), with families included in the final sample ( $N = 513$ ). Families not included in the current study Families in the present study had a significantly higher income-to-needs ratio ( $M = 4.32$  vs.  $3.50$ ,  $t(893) = -3.82$ ,  $p < .001$ ) at 54 months. Mothers also reported more years of education,  $M = 15.21$  vs.  $13.96$ ,  $t(902) = -7.96$ ,  $p < .001$ , as did fathers,  $M = 15.34$  vs.  $14.19$ ,  $t(882) = -6.44$ ,  $p < .001$ . The racial composition of the children in the final sample was 93% Caucasian, non-Hispanic and 7% other ethnicities.

In summary, families included in this study had significantly more income and education compared with families eligible to participate in the father protocol. This is somewhat expected given the selection of stably married and cohabiting families, and the exclusion of alternate family compositions (i.e., stepfamilies, single families) which have been associated with greater sociodemographic risk (Hetherington & Stanley-Hagan, 2000). Demographic data on the final sample are provided in Table 1.

Table 1. *Demographic Variables of the Final Sample and the Sample of Eligible Nonparticipants*

Demographic Variables	<u>Final Sample<sup>a</sup></u>				<u>Eligible nonparticipants<sup>b</sup></u>			
	<i>N</i>	%	<i>M</i>	( <i>SD</i> )	<i>N</i>	%	<i>M</i>	( <i>SD</i> )
Child Sex								
Male	261	50.9			193	49.4		
Female	252	49.1			198	50.6		
Child Ethnicity								
White, non-Hispanic	476	92.8			324	82.9		
Other	37	7.2			67	17.1		
Maternal Education			15.21	(2.26)			13.96	(2.44)
Less than 12 years	12	2.3			40	10.2		
High School or GED	79	15.4			91	23.3		
Bachelor's degree	166	32.4			65	16.6		
Postgraduate work	115	22.4			43	10.9		
Paternal Education			15.34	(2.60)			14.19	(2.67)
Less than 12 years	17	3.3			37	9.9		
High School or GED	77	15.0			92	24.7		
Bachelor's degree	156	30.4			64	17.2		
Postgraduate work	125	24.3			55	14.7		
Income-to-Needs Ratio <sup>c</sup>			4.32	(3.47)			3.50	(2.89)
>2.0	465	91.5			274	64.9		
≤ 2.0 <sup>d</sup>	74	14.4			117	35.1		

<sup>a</sup> n = 513. <sup>b</sup> n = 391. <sup>c</sup> Income-to-needs collected at 54 mos. <sup>d</sup> scores are indicative of poverty.

## B. Procedures

Data were collected via periodic home visits, laboratory visits, and telephone interviews with the mothers, fathers, and/or study children from 1 month through 6<sup>th</sup> grade. Demographic information such as maternal education level, paternal education level, and child's ethnicity and gender was collected at the initial home visit. Additional information such as the household composition, whether the study child's biological/adoptive father lived in the household, and the family's income to needs ratio (total annual family income divided by the poverty threshold for the family's size) was collected during subsequent telephone interviews with mothers at 54 months, kindergarten, and from 1<sup>st</sup> through 5<sup>th</sup> grade.

Home visits were conducted with fathers and mothers when the study children were 54 months old and in 1<sup>st</sup>, 3<sup>rd</sup>, and 5<sup>th</sup> grades. During these visits, fathers and mothers completed questionnaires that assessed their depression, relationship intimacy, parental discipline strategies as well as impressions of their children's social skills and behavioral adjustment. In addition, fathers and their children were videotaped while participating in a semi-structured parent-child interaction task. Mothers completed the same parent-child interaction tasks during separate laboratory visits they attended with the study children at 54 months, 1<sup>st</sup>, and 5<sup>th</sup> grade and during a home visit in 3<sup>rd</sup> grade.

Finally, children's social competence and behavioral adjustment were assessed again using teacher and child reports in 6<sup>th</sup> grade. Teachers completed the *Social Skills Rating Scale* (SSRS, Gresham & Elliot, 1990) and the *Teacher Report Form* (TRF, Achenbach, 1991). Study children answered a questionnaire about their friendship quality during their visit to the lab in 6<sup>th</sup> grade. All teachers, parents, and children were reimbursed for their time following each assessment. Parents and

teachers provided informed consent at each assessment and children provided assent. The study was approved by Institutional Review Boards at each of the data collection sites.

### **C. Measures**

Demographic and control variables are described first, followed by observational measures of parenting which will be used to construct the paternal and maternal sensitivity trajectories. This is followed by a summary of family context variables and child characteristics which have been identified in the literature as potential correlates of parental sensitivity (i.e., depression, relationship intimacy, parental discipline strategies, child temperament). Finally, child outcome measures assessing children's social competence will be discussed. Descriptive statistics on the measures included in this study are summarized in Table 2. In an effort to minimize shared-method variance, observational and questionnaire data from multiple informants (mothers, fathers, teachers, and the study children) were used in the analyses. In addition, the family context variables that may serve as potential correlates of the sensitivity trajectories were measured during the first year that parental sensitivity trajectories were assessed (i.e., 54 months). This enables us to utilize the family context variables as predictors rather than as concurrent correlates of the sensitivity trajectories. In an effort to predict children's social outcomes from sensitive parenting, child outcomes were assessed in 6<sup>th</sup> grade rather than simultaneously with the sensitivity measures used to construct the parenting trajectories (54 months – 5<sup>th</sup> grade). Finally in an attempt to control for autoregressive effects, children's previous levels of social competence as rated by their parents at 54 months were entered as a control variable in child outcome analyses completed at 6<sup>th</sup> grade.

Table 2. *Study Variables and Descriptive Statistics*

Variables	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Maternal Sensitivity				
54 months	503	17.65	2.39	5 - 21
1 <sup>st</sup> grade	503	17.67	2.49	6 - 21
3 <sup>rd</sup> grade	479	16.92	2.19	9 - 21
5 <sup>th</sup> grade	461	17.13	2.01	10 - 21
Paternal Sensitivity				
54 months	475	17.77	2.17	8 - 21
1 <sup>st</sup> grade	466	17.34	2.45	7 - 21
3 <sup>rd</sup> grade	450	17.31	2.24	6 - 21
5 <sup>th</sup> grade	460	17.16	2.26	7 - 21
Child Temperament <sup>a</sup>	509	4.71	.80	1.6-6.8
CES-D <sup>b</sup>				
Mother	513	7.97	7.06	0 - 44
Father	476	7.08	6.04	0 - 36
Parental Harsh Control <sup>c</sup>				
Mother	504	20.56	3.12	12 - 30
Father	472	21.32	3.18	12 - 31
Relationship Intimacy <sup>d</sup>				
Mother	511	3.86	.84	1 - 5
Father	475	4.01	.79	1.2- 5
Teacher Report Form <sup>e</sup>				
Internalizing Score	425	48.76	8.65	36 - 75
Externalizing Score	425	47.66	7.38	39 - 69
Social Skills Rating Form <sup>f</sup>				
Teacher version	416	106.73	12.86	76-130
Friendship Quality <sup>g</sup>				
Questionnaire – Child report	494	4.26	.55	1.93– 5

<sup>a</sup> Assessed when child age = 54 months

<sup>b</sup> Assessed when child age = 54 months

<sup>c</sup> Assessed when child age = 54 months

<sup>d</sup> Assessed when child age = 54 months

<sup>e</sup> Assessed when child in 6<sup>th</sup> grade

<sup>f</sup> Assessed when child in 6<sup>th</sup> grade

<sup>g</sup> Assessed when child in 6<sup>th</sup> grade

*I. Demographic and other control variables*

Maternal education: The number of years in school completed by the time of the one month home visit was used as an index of maternal education. Education data for mothers and fathers at 1 month was highly correlated with the 54 month education data ( $r = .88$ ), therefore the one month data was utilized due to greater missing data at 54 months.

Paternal education: The number of years in school completed at the time of the one-month home visit was used as an index of paternal education.

Child Gender: The gender of the study child was recorded at the one month home visit.

Child Ethnicity: The study child's ethnicity was reported by their mother at the one month home visit. Children were coded as either American Indian, Eskimo, Aleut (1), Asian or Pacific Islander (2), Black or Afro-American (3), Caucasian, non-Hispanic (4), or Other (5). Due to the limited ethnic variability in this subsample, children were classified as Caucasian, non-Hispanic or Other Ethnicity.

Income-to-needs ratio: Family income and family size were recorded during home visits and phone interviews with mothers conducted when the children were 54 months. Total household income including government payments was divided by the appropriate poverty threshold for that year based on household size (NICHD Early Child Care Research Network, 1999). Scores of  $\leq 2.0$  were indicative of poverty.

Household Type: Only households that were classified as either a (1) Traditional Nuclear Family or (8) Nontraditional Nuclear Family were included in the final sample as they contained the study child's identified biological or adoptive father and mother, who were either married or cohabiting, respectively. No other adults resided in the home.

Father Lives in Household: Families were included in the final sample if the study child's biological or adoptive father was found to reside full-time in the home for the duration of the study period (54 months, kindergarten, and 1<sup>st</sup>- 6<sup>th</sup> grades).

Parent Reported Social Skills: Mothers and fathers were asked to complete the *Social Skills Rating System* (SSRS, Gresham & Elliot, 1990) on their children at 54 months. The measure contains thirty nine items which comprise four subscales (i.e., cooperation, assertion, responsibility, self-control). Parents rated the frequency of each behavior on a three point scale (0 = never, 1 = sometimes, 2 = very often) with higher scores reflecting higher levels of socially competent behavior. The Social Skills Total Standard Score (M=100, SD=15) for each parent was used to create a composite score (i.e., average of the two parents' scores) which represented each child's social skills at 54 months. This score was then utilized as a control variable (to control for autoregressive effects) in subsequent analyses of children's social skills in sixth grade. The SSRS was shown to have high internal consistency in this sample with Cronbach  $\alpha$ 's of .88 and .86 for mothers and fathers, respectively. In addition, mothers' and fathers' ratings of their children's social skills were found to be moderately correlated ( $r = .42$ ) at 54 months.

Child Behavior Checklist 4/18 (CBCL): Parents were also asked to evaluate their children's behavior at 54 months using the CBCL 4/18 (Achenbach, 1991). Children's behaviors over the past six months were rated by their mothers and fathers using a three point scale (0 "Not True" to 2 "Very True"). The CBCL 4/18 is a frequently utilized and well-standardized measure that has been shown to be a highly valid assessment of child adjustment. The measure yields two broad band behavior scales (i.e., Externalizing and Internalizing) which were utilized in this study. Moderate correlations were found between mothers' and fathers' ratings of their children's externalizing behavior problems ( $r = .36$ ) and internalizing behavior problems ( $r = .32$ )

at 54 months. Standard scores from the broad band Externalizing and Internalizing scales for each parent were used to calculate a composite score which denoted each child's level of externalizing and internalizing behaviors at 54 months. These scores were used as a control variable, indicative of each child's previous level of behavior problems, in subsequent outcome analyses of behavior problems in sixth grade.

## *II. Observed Paternal and Maternal Sensitivity*

Paternal Sensitivity: During the 54 month, 1<sup>st</sup>, 3<sup>rd</sup>, and 5<sup>th</sup> grade home visits, 15-minute semi-structured father-child interactions were videotaped and later coded for paternal sensitivity. At each age, the tasks were designed to assess the quality of the father-child relationship by including tasks that were slightly challenging for the study child and thus required some parental assistance and/or teaching. Different age-appropriate activities were selected at each time point. At 54 months, the father-child interaction was comprised of two activities: the first involved building a structure with chutes and ramps for marbles to run through using Marbleworks, and the second task utilized a set of toy African animal families and jungle props to elicit pretend play from the child and parent. During the 1<sup>st</sup> grade visit the interaction included three rule-governed activities: drawing a sailboat using an Etch-a-Sketch (with the father controlling one knob and the child controlling the other), a block building activity using colored cubes and picture cards, and the card game "Slap Jack." Father-child interactions conducted in the home in 3<sup>rd</sup> and 5<sup>th</sup> grade were comprised of two more verbally-based activities: a discussion task and a planning activity. Videotaped father-child interactions at each assessment were sent to a central, non-data collection location for coding. Coders received extensive training and supervision to ensure adequate reliability. In addition, they were blind to any information about the study families and were randomly assigned videotapes for coding (NICHD Early Child Care Research Network [ECCRN], 2003).

Fathers' behaviors during the interactions at each assessment were rated on the following three 7-point global rating scales: supportive presence, respect for autonomy, and hostility (reversed). Scores ranged from 1 (not at all characteristic of the interaction) to 7 (highly characteristic of the interaction). Respect for the child's autonomy was shown when the father acknowledged the child's intentions and displayed respect for the child's individuality. High scores on supportive presence were indicative of emotional support, encouragement, and positive emotional regard. Finally, hostility toward the child signaled the expression of anger, discounting, or rejection. At each age, the seven point ratings for each scale (supportive presence, respect for autonomy, and hostility reversed) were aggregated to form a composite score of paternal sensitivity. Intraclass (reliability) correlations averaged across pairs of raters were .81 at 54 months, .91 at 1<sup>st</sup> grade, .80 at 3<sup>rd</sup> grade, and .86 at 5<sup>th</sup> grade for the sensitivity composite score. Cronbach alphas for the sensitivity composites were .71, .79, .78, and .83 respectively (NICHD ECCRN, 2003), which suggests moderate to high internal consistency, although these scores were somewhat lower than those found for the maternal sensitivity composites. Paternal sensitivity scores were modestly correlated over time ( $r$ 's = .27 to .40). See Table 3 for more details. Overall, 68% of the fathers in the final sample had all four observations, 25% had three observations, and 7% had two observations.

Maternal sensitivity: Similar activities were videotaped with mothers and children during the 54 month, 1<sup>st</sup> and 5<sup>th</sup> grade laboratory visits and the 3<sup>rd</sup> grade home visit. At 54 months the tasks included: completing a maze using an Etch-a-Sketch, building a selection of towers using building blocks, and playing together with six hand puppets. During the first grade interaction, mothers and children were asked to draw a house and a tree using the Etch-a-Sketch (with the mother using one knob and the child the other), to create patterns using blocks of different colors and shapes, and to play a card game. Interactions in 3<sup>rd</sup> and 5<sup>th</sup> grades involved a discussion task and a planning activity, which were

different from the topics discussed during the father-child interactions. Mother-child interactions also were videotaped and sent to the same, non-data collection location for coding as the father-child tapes. Identical procedures for coding were followed. The same three aspects of mothers' sensitivity (respect for child autonomy, supportive presence, and hostility reversed) were evaluated using 7-point global rating scales. A maternal sensitivity composite was created by averaging the three ratings. Interobserver reliability across independent raters was .88 at 54 months, .91 at first grade, .87 at 3<sup>rd</sup> grade, and .86 at 5th grade. The Cronbach alphas for the maternal sensitivity composites were .84, .82, .80, and .85, respectively. Pearson correlation coefficients presented in Table 3 showed low to moderate correlations for maternal sensitivity over time ( $r$ 's = .27 to .37). The final proportion of mothers with all four sensitivity observations was 83%, while 14% had three observations and 3% had two of the four sensitivity observations from 54 months through 5<sup>th</sup> grade.

### *III. Correlates of Parental Sensitivity*

#### *Paternal and Maternal Depression*

Paternal and Maternal Depressive Symptoms: Mothers and fathers each completed the *Center for Epidemiological Studies Depression Scale* (CES-D, Radloff, 1977) at 54 months. The CES-D is a widely used and validated measure of depressive symptomatology for non-clinical samples. The 20-item scale assesses depressive symptoms over the past two weeks on a 4-point Likert scale of frequency from 1 ("Less than once a week") to 4 ("5-7 days a week"). Response values were re-scored to match the standard scoring for the CES-D which ranged from 0 to 3. Scores of 16 or higher on the CES-D are indicative of potentially clinically significant problems with depression. Fathers' and mothers scores on the CES-D were correlated,  $r = .17$ , with high internal consistency ( $\alpha = .86$  for fathers and  $\alpha = .90$  for mothers).

#### *Relationship Intimacy*

Relationship Intimacy: Fathers and mothers completed a self-report scale assessing relationship intimacy; *the Love and Relationship Part A: Personal Assessment of Intimacy in Relationships* (PAIR) (M.T. Schaefer & Olson, 1981) at 54 months. The Love and Relationship subscale utilized in this study contained 6 items (rated on a 1 to 5-point Likert scale) which comprise the emotional intimacy scale. Higher scores were indicative of better mother-partner relationships. Scores were calculated as the mean of responses to items 1 to 6, therefore scores ranged from 1 to 5. Cronbach alphas were .84 for fathers and .86 for mothers. The PAIR has been shown in previous research to be positively correlated with measures of marital satisfaction (Shaefer & Olson, 1981; Greeff & Malherbe, 2001). Relationship intimacy ratings were found to be moderately correlated across partners ( $r = .41$ ).

#### *Parental Discipline Strategies*

Parental Discipline Strategies: At 54 months, mothers and fathers completed a self-report questionnaire designed to assess parental discipline strategies. *The Raising Children Questionnaire* was developed for use in the NICHD SECCYD and is based on an extensive revision of the *Raising Children Checklist* (Greenberger & Goldberg, 1989). The instrument contains 30 statements that describe feelings about raising children. A priori composites were created to classify discipline into three categories: harsh control, firm/responsive control, and lax control, with higher scores denoting a greater use of that discipline strategy. Research has shown that harsh parenting styles are related to greater externalizing behavior problems in children (Spieker et al., 1999). The harsh control composites (8 items – i.e., “Do you expect your child to obey the first time you say something?”) for both mothers and fathers were examined as correlates of parental sensitivity. Cronbach alphas were .67 for mothers and .62 for fathers. Harsh control was found to be moderately correlated for mothers and fathers ( $r = .50$ ) at 54 months.

### *Child Temperament*

Child Temperament: Mothers completed a temperament measure on their children during a visit to the lab when their children were 54 months old. *The Children's Behavior Questionnaire* (CBQ) was designed by Rothbart and colleagues (1994) to assess temperament, reflecting behavior over the past 6 months in children ages 3-8. A modified version of this questionnaire containing 80 items and 8 scales was utilized in the current study. Each question contains a statement that describes children's reactions to different everyday situations. The mother is asked to circle one of seven responses (1 = "Extremely untrue" to 7 = "Extremely true") that best describes her child's reaction to the situation. The choice of "not applicable" is also available for cases where the mother has not witnessed the child in the presented situation.

Previous research has shown that children with difficult temperaments (i.e., anger and frustration) in preschool are more likely to display aggressive behaviors in elementary school (Eisenberg et al., 1995), which subsequently has been identified as a behavior commonly associated with peer rejection (Bates et al., 1991). In addition, a substantial body of research has found a clear association between negative child temperament and less supportive parenting (Crockenberg & Leerkes, 2003; Sanson, Hemphill, & Smart, 2004). Based on these findings, the anger/frustration scale from the CBQ (based on the Negative Affectivity dimension;  $n = 7$  items), was used as an index of child temperament at 54 months and examined as a possible correlate of maternal and paternal sensitivity. The Cronbach  $\alpha$  for this scale is .76.

#### IV. Child outcome measures

Teacher reported social skills: Teachers were asked to complete the *Social Skills Rating System* (SSRS, Gresham & Elliot, 1990) when the study children were in 6<sup>th</sup> grade. This measure contains 30 items assessing various target behaviors (i.e., sharing, helping, initiating

relationships and controlling one's temper) which have been shown to be socially acceptable, learned behaviors that reflect effective interactions with others. Items from the cooperation, assertion, and self-control subscales were rated by teachers on a three point scale (0 = never, 1 = sometimes, 2 = very often) with higher scores reflecting higher levels of socially competent behavior. The Social Skills Total Standard Score (M=100, SD=15) was used in all subsequent outcome analyses. The SSRS has high internal consistency with a Cronbach  $\alpha$  of .94.

Teacher Report Form 4/18 (TRF). Sixth grade teachers were also asked to rate the study child's behavior in school using the TRF 4/18, the teacher version of the *Child Behavior Checklist* (Achenbach, 1991). Study children were rated by their teachers on each item using a three point scale (0 "Not True" to 2 "Very True"), describing behavior during the past 2 months. The TRF 4/18 is a frequently utilized and well-standardized measure that has been shown to be a highly valid assessment of child adjustment. Standard scores from the Externalizing (34 items) and Internalizing Scales (35 items) were used in the analyses. Cronbach  $\alpha$ 's were .87 for the Internalizing Scale and .95 for the Externalizing Scale.

Friendship Quality Questionnaire (FQQ): Study children completed the *Friendship Quality Questionnaire*, (Parker & Asher, 1993) during their visit to the lab in 6<sup>th</sup> grade. The measure was used to assess children's perceptions of their very best friendship. The 29 item questionnaire uses a 5-point likert scale (1 = "not at all true" to 5 = "really true") to measure six qualitative aspects of the friendship: Validation and Caring, Conflict Resolution, Conflict and Betrayal, Help and Guidance, Companionship and Recreation, and Intimate Exchange. Four additional items describe the length, amount of contact, and quality of the friendship. A Friendship Quality Total Score was computed from the weighted average of items with the Conflict and Betrayal score items reflected. Higher scores were indicative of perceptions of a

more positive friendship relationship with the best friend. The Cronbach alpha for this measure was .93.

#### **D. Data Analytic Plan**

Analyses were conducted in several stages. First, separate trajectories of paternal and maternal sensitivity were identified using semi-parametric mixture modeling, a latent class growth curve modeling technique (SPMM: Nagin, 1999). This analytic approach involves estimating growth curves for each individual and then identifying prototypic growth curves for the population from these individual curves. The group curves are selected to represent developmental patterns in a way that optimally describes the data. Once the prototypic developmental trajectories within the population are identified, the degree to which each individual's growth curve resembles each of the prototypic group curves is estimated. Individuals are typically classified into trajectory groups based on the similarity of their individual pattern of scores to one of the prototypic trajectories. These classifications are based on the assumption that within group variations in maternal and paternal sensitivity scores are less informative than between group variations in the pattern of scores over time.

Prior to conducting the analysis several parameters are specified based on theoretical considerations including the number of expected trajectories and the expected shape (e.g., linear, quadratic, cubic) of the different trajectories. Ultimately, however, decisions about the optimal model fit are based on three output criteria: the statistical significance of the trajectory parameter estimates for each group in the model; the Bayesian Information Criterion (BIC); and the posterior (conditional) probability of membership in each group for each individual.

First, the statistical significance of each of the trajectory group parameters (i.e., intercept, slope, or slope<sup>2</sup>) is examined to determine if the parameter is essential to describe each variable precisely over time. If the parameter is nonsignificant, then it is considered extraneous and should be removed to improve the overall fit of the model. Next, SPMM generates the BIC, which is used to determine which model has the optimal number of groups. Nagin (1999) identified the BIC as an alternative goodness of fit test for selecting models which are not nested, as is the case for SPMM models. The BIC value for each model is based on the model's maximized likelihood function minus a penalty for each parameter included in the model, thus promoting prudent solutions with fewer groups. The BIC is the optimal indicator because it utilizes empirical methods for finding the best model as compared to cluster analyses and other ad hoc person-oriented methods. The model with the maximum BIC, but also one that includes relatively fewer groups is preferred (Nagin, 2005).

Finally, the selection of the appropriate model is guided by the posterior probability scores for each trajectory group. These provide an index of how closely each participant's scores fit with those of the trajectory group; in other words, this score indicates the probability that the person belongs in one trajectory group and not another, and thus provides a statistical basis for assigning individuals to trajectory groups (Nagin, 1999). Nagin (2005) specifies that an average probability score below .70 is unacceptable. Consistent with Nagin's recommendations, the final trajectory model for this study was based on the maximum BIC and posterior probabilities of .70 or better.

After the trajectory analyses were complete, several follow-up analyses were conducted to address additional study hypotheses. First, to differentiate among the trajectory groups and to identify potential covariates that may be confounded with parental sensitivity and children's

social competence, demographic variables (i.e., child gender, parental education, and income-to-needs) were examined using analysis of variance (ANOVAs) and chi-square tests. Next, analyses of covariance (ANCOVAs) were performed for each parent separately to assess the association between trajectories of parental sensitivity and the family context variables (parental depression, relationship intimacy, parental harsh control, child temperament) after controlling for significant demographic variables.

Finally, to test the hypothesis that persistently high levels of paternal and maternal sensitivity predicted higher social competence in children during sixth grade, a multivariate analyses of variance (MANOVA) was computed to determine trajectory group differences on child outcome variables. This was followed by a series of ANCOVAs for each trajectory group and child outcome controlling for any significant demographic and family correlates, previous levels of children's social competence at 54 months, and the other parent's average sensitivity score.

### III. RESULTS

The results are presented following the analytic plan outlined above. First, bivariate correlations among the study variables are summarized. Next, maternal and paternal sensitivity trajectories identified using SPMM are presented. To further differentiate these groups, maternal and paternal sensitivity trajectories were compared on demographic and family context variables. Finally, children's social competence at sixth grade as a function of maternal and paternal sensitivity trajectories was examined.

#### A. Bivariate Correlations

Bivariate correlation coefficients between sets of study variables are presented in Tables 3 through 7. Table 3 contains correlations among maternal and paternal sensitivity from 54 months through 5<sup>th</sup> grade. Overall, maternal and paternal sensitivity showed low to moderate positive correlations, with coefficients ranging from .18 to .41,  $p < .001$ . Table 4 presents the correlations among the family context variables. Maternal and paternal reports of depressive symptoms ( $r = .14, p < .01$ ), relationship intimacy ( $r = .39, p < .001$ ), and use of harsh control ( $r = .50, p < .001$ ) were positively correlated, indicating moderate similarity between partners. In addition, mother's reports of depressive symptoms were negatively correlated with her reports of relationship intimacy ( $r = -.40, p < .001$ ), and positively correlated with her use of harsh control ( $r = .12, p < .01$ ). Similar results were noted for paternal reported depressive symptoms and relationship intimacy ( $r = -.42, p < .001$ ), and paternal use of harsh control ( $r = .12, p < .01$ ). Maternal reports of child anger/frustration were correlated positively with maternal reports of depressive symptoms ( $r = .18, p < .001$ ) and negatively with maternal reports of relationship

intimacy ( $r = -.19, p < .001$ ). Correlations among child outcomes were low to moderate (see Table 5). Specifically, children's ratings of friendship quality were modestly correlated with teacher reports of children's social competence ( $r = .16, p < .01$ ), and negatively with teacher reports of children's internalizing behaviors ( $r = -.13, p < .01$ ). Teacher ratings of children's social competence also were negatively related to their ratings of internalizing and externalizing behaviors ( $r = -.46, p < .001$ ), while ratings of internalizing and externalizing behaviors were positively correlated with one another ( $r = .33, p < .001$ ).

Associations between maternal and paternal sensitivity and family context variables are presented in Table 6. Maternal and paternal reported depressive symptoms generally yielded low negative correlations with maternal and paternal sensitivity across assessment periods ( $r$ 's range from  $-.03$  to  $-.18$ , alpha's range from ns to  $p < .01$ ). Correlations between maternal and paternal reported relationship intimacy and maternal and paternal sensitivity were predominately nonsignificant. Maternal and parental reports of harsh control were modestly and negatively correlated with maternal and paternal sensitivity across time ( $r$ 's range from  $-.08$  to  $-.21$ , alpha's range from ns to  $p < .001$ ). Also, child temperament (i.e., anger/frustration) reported by mothers at 54 months was modestly negatively correlated with maternal sensitivity at 3<sup>rd</sup> and 5<sup>th</sup> grades and with father sensitivity at 3<sup>rd</sup> grade. Finally, associations between maternal and paternal sensitivity and child outcomes at 6<sup>th</sup> grade are shown in Table 7. Teacher reported social competence showed low positive correlations with both maternal and paternal sensitivity, while teacher reported externalizing behaviors were negatively correlated with maternal and paternal sensitivity. Correlations between child rated friendship quality, teacher rated internalizing behaviors and maternal and paternal sensitivity were generally not significant.

Table 3. *Correlations among Maternal and Paternal Sensitivity Variables*

Variable	1	2	3	4	5	6	7	8
1. Maternal Sensitivity, 54mo	---	.40*	.32*	.27*	.18*	.24*	.20*	.24*
2. Maternal Sensitivity, GR1		---	.41*	.28*	.21*	.30*	.20*	.24*
3. Maternal Sensitivity, GR3			---	.41*	.23*	.22*	.27*	.27*
4. Maternal Sensitivity, GR5				---	.22*	.27*	.24*	.26*
5. Paternal Sensitivity, 54mo					---	.38*	.32*	.28*
6. Paternal Sensitivity, GR1						---	.39*	.28*
7. Paternal Sensitivity, GR3							---	.38*
8. Paternal Sensitivity, GR5								---

\*p < .01

Table 4. *Correlations among Family Context Variables collected at 54 months*

Variable	1	2	3	4	5	6	7
1. Maternal Depressive Sxs	---	.14*	-.40*	-.12*	.12*	.08	.18*
2. Paternal Depressive Sxs		---	-.19*	-.42*	.07	.12*	.07
3. Relationship Intimacy - M			---	.39*	-.05	-.05	-.19*
4. Relationship Intimacy - F				---	-.02	-.03	-.02
5. Parental Harsh Control - M					---	.50*	-.01
6. Parental Harsh Control - F						---	-.05
7. Child Temperament							---

\*p < .01

1 & 2: CES-D (Radloff, 1977)

3 & 4: PAIR (M.T. Schaefer & Olson, 1981)

5 & 6: Raising Children (Greenberger & Goldberg, 1989)

7: Children's Behavior Checklist (Rothbart et al., 1994) - Anger/Frustration Index

Table 5. *Correlations among Teacher Reported Child Outcome Variables at 6th Grade*

Variable	1	2	3	4
1. FQQ	---	.16*	-.13*	-.06
2. Social Skills Rating Form		---	-.46*	-.46*
3. TRF- Internalizing			---	.33*
4. TRF - Externalizing				---

\*p < .01

1. Friendship Quality Questionnaire (Parker & Asher, 1993)

2. SSRS – Teacher Form (Gresham & Elliot, 1990)

3 & 4: Teacher Rating Form (Achenbach, 1991)

Table 6. *Correlations between Maternal Sensitivity (MS), Paternal Sensitivity (PS), and Family Context Variables at 54 Months*

Variable	MS 54 mos	MS GR 1	MS GR 3	MS GR 5	PS 54 mos	PS GR 1	PS GR 3	PS GR 5
Maternal Depressive Sxs	-.06	-.10*	-.12*	-.18**	-.08	-.08	-.14**	-.09
Paternal Depressive Sxs	-.11*	-.11*	-.05	-.05	-.11*	-.03	-.13**	-.04
Maternal PAIR	.01	.10*	.02	.09	.06	.09	.14**	.02
Paternal PAIR	.03	.04	.14**	.06	.09*	.08	.14**	.05
Maternal Harsh Control	-.12**	-.17**	-.17**	-.14**	-.08	-.09	-.14**	-.16**
Paternal Harsh Control	-.19**	-.18**	-.14**	-.15**	-.19**	-.18**	-.21**	-.19**
CBQ	.01	-.09	-.10*	-.12*	-.03	-.04	-.11*	.03

\* $p < .05$ ; \*\* $p < .01$

Table 7. *Correlations between Maternal Sensitivity (MS), Paternal Sensitivity (PS), and Child Outcome Variables at 6th Grade*

Variable	MS 54 mos	MS GR 1	MS GR 3	MS GR 5	PS 54 mos	PS GR 1	PS GR 3	PS GR 5
FQQ	.04	-.04	.02	.14**	.06	.04	.02	.04
SSRS Teacher Report	.15**	.14**	.15**	.12*	.12*	.11*	.09	.13**
TRF Internalizing	-.14**	-.07	-.09	-.06	-.06	-.05	-.01	-.08
TRF Externalizing	-.07	-.11*	-.15**	-.13*	-.14**	-.16**	-.16**	-.16**

\* $p < .05$ ; \*\* $p < .01$

## B. Trajectories of Maternal and Paternal Sensitivity

The SPMM trajectory analyses were conducted using observational measures of maternal and paternal sensitivity from 54 months through 5<sup>th</sup> grade. Individuals were included in the analyses if two of the four sensitivity observations were collected for each parent, as SPMM accommodates missing data using the maximum likelihood estimation if at least two observations are available. The initial number of maternal and paternal trajectory groups tested in subsequent analyses was based on findings from previous longitudinal research on parental sensitivity including one study which modeled parental sensitivity over time using SPMM and the NICHD SECCYD sample. Hirsh-Pasek and Burchinal (2007) identified a four group model of maternal sensitivity during the period from infancy through six years of age using SPMM. Using these results as a guideline, a more conservative three group model was tested first, followed by four, five, and six group models with the maximum BIC score and posterior probabilities of  $\geq .70$  utilized as criteria to determine the final model. Given the skewness in the parental sensitivity data, a censored-normal distribution model was employed (Jones et al., 2001; Nagin & Tremblay, 1999). Initial models were tested using cubic coefficients to describe each trajectory group in the model (e.g., initial model of  $n = 3$ ), to allow for possible non-linear growth in each trajectory. If a group did not reach significance on the higher order coefficient (e.g., cubic), specifications were changed to lower order coefficients (e.g., quadratic, linear, intercept) until all of the trajectories in the model were significant.

The BIC scores for the three, four, five, and six group models ranged from -4031.88 to -4005.82 for paternal sensitivity and -4226.57 to -4215.72 for maternal sensitivity. The BIC scores continued to improve from the three group to the five group models for both

paternal and maternal sensitivity, but did not improve for the six group model for either paternal or maternal sensitivity. The five group model for paternal sensitivity had a BIC score of -4005.82, which was only slightly better than the BIC for the four group model of -4014.21, and the posterior probabilities for the two models were almost identical ( $M = .84$  for the five group model vs.  $M = .82$  for the four group model). Furthermore, the five group model of paternal sensitivity appeared to divide one of the four trajectory groups into a smaller group, which comprised only 2% of the sample or 10 fathers. Therefore, in the interest of parsimony and the ability to make meaningful comparisons between the paternal sensitivity trajectories, the four group model was selected as the final paternal sensitivity model. Three of the groups in this model followed a linear trajectory, while one group was defined solely by the intercept (i.e., no change).

Results for the maternal sensitivity models were similar. The five group model for maternal sensitivity had a slightly better BIC score of -4215.72 as compared to the BIC of -4230.85 for the four group model. The posterior probabilities for the four group model ranged from .76 to .85 while those of the five group model ranged from .71 to .87. Additionally as was the case with the paternal sensitivity model, the five group model of maternal sensitivity contained a trajectory comprised of only 10 mothers, making subsequent group comparisons difficult. Researchers who have used SPMM to model developmental trajectories frequently select the model with fewer trajectories when forced to choose between a larger and smaller model with similar BICs and posterior probabilities (Nagin, 2005; Campbell et al., 2007; Schonberg & Shaw, 2007). In keeping with this rationale, the four group model was chosen as the final maternal sensitivity trajectory model. Parameter estimates for this model revealed two

linear groups, one quadratic group, and one group which was adequately defined by the intercept (i.e., no change).

Final parameter estimates, posterior probabilities, and estimated group sizes for both the paternal and maternal sensitivity trajectories are presented in Table 8. In addition, Figures 1 and 2 depict observed and predicted paternal and maternal sensitivity trajectories, respectively. Final parameter estimates reported in Table 8 establish the shape of the predicted trajectories in the figures, while the observed trajectories in the figures denote mean paternal and maternal sensitivity scores for the fathers and mothers assigned to each trajectory at the time points assessed.

Table 8. *Estimated Trajectory Parameters, Percentages, and Posterior Probabilities for Paternal and Maternal Sensitivity*

Trajectory Group	Intercept		Slope		Quadratic		Est. % of Population	Posterior Probabilities.	
	B	SD	$\beta$	SD	$\beta$	SD		M	SD
	<i>Paternal Sensitivity</i>								
Low Increasing	13.71**	0.31	0.39**	0.11	----	----	6.9%	.85	.17
Moderate Decreasing	15.63**	0.29	-1.00**	0.14	----	----	5.2%	.84	.17
Moderate Stable	17.24**	.19	----	----	----	----	55.4%	.81	.13
High Stable	19.16**	0.28	-.20**	0.05	----	----	32.4%	.77	.15
<i>Maternal Sensitivity</i>									
Low Increasing	12.52**	0.54	1.04**	0.19	----	----	3.0%	.85	.15
Moderate Decreasing	14.62**	0.46	-0.69**	0.19	0.18*	0.06	11.4%	.81	.16
Moderate Stable	17.31**	0.26	-0.14*	0.04	----	----	49.2%	.76	.13
High Stable	19.06**	0.24	-0.22**	0.04	----	----	36.4%	.78	.15

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

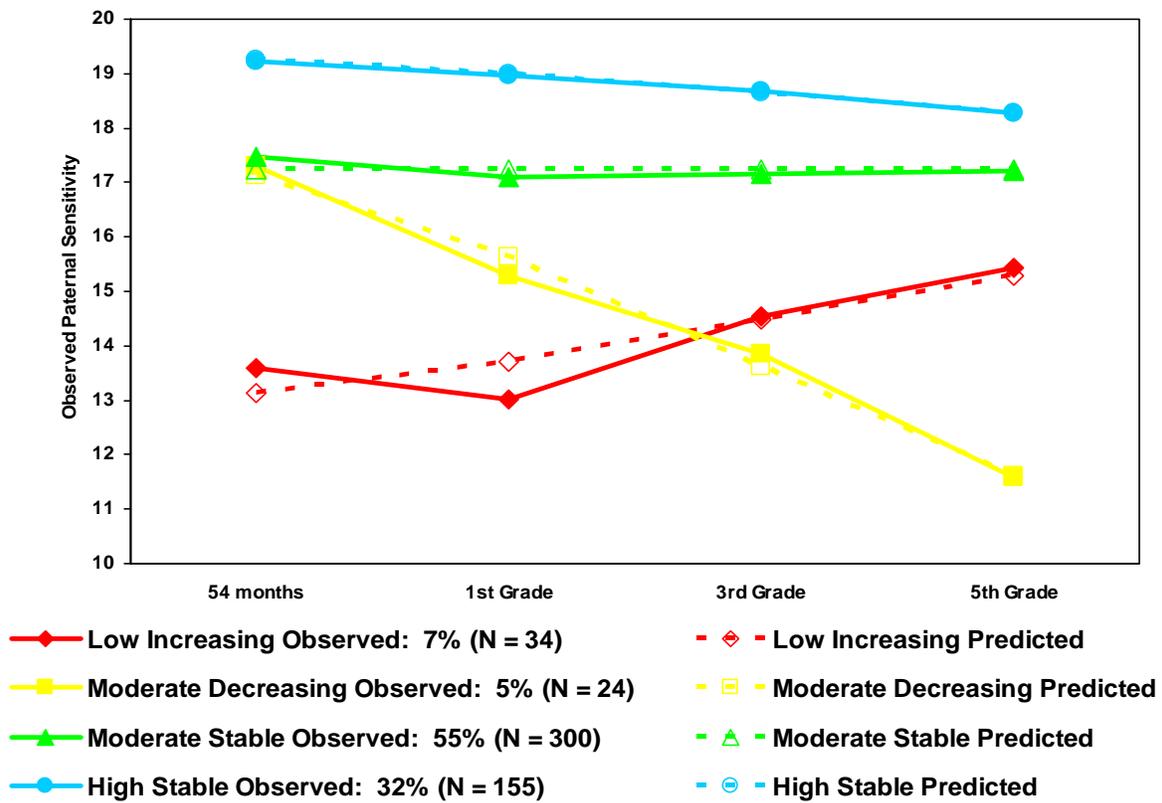


Figure 1. Trajectories of Observed Paternal Sensitivity (54mos - 5th Grade).

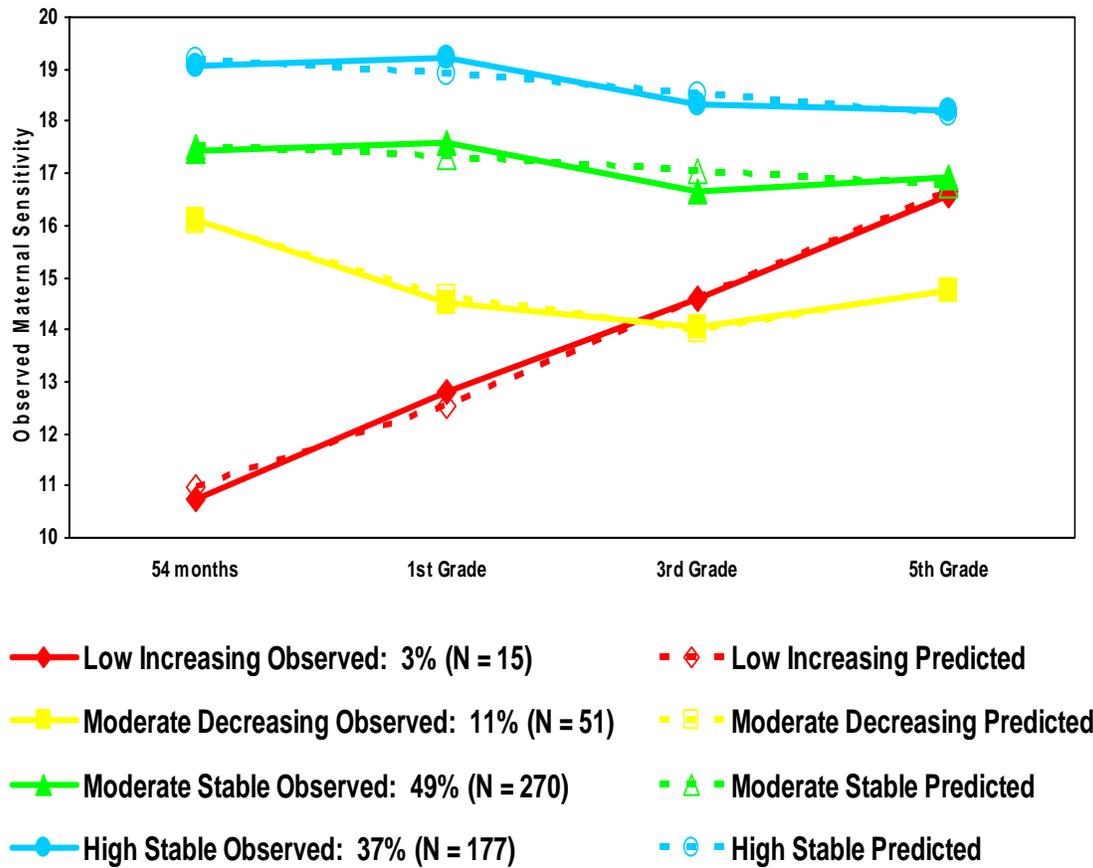


Figure 2. Trajectories of Observed Maternal Sensitivity (54mos - 5th Grade).

For the final four group model of paternal sensitivity, the first trajectory included 6.9% of fathers ( $n = 34$ ) who showed low but increasing levels of sensitivity with their children during father-child interactions from 54 months through 5th grade. This trajectory will be labeled the Low-Increasing paternal sensitivity trajectory. The average sensitivity score for this group was 13.6 at 54 months increasing to 15.4 by 5th grade. A second trajectory consists of fathers who began with moderate levels of sensitivity which decreased over time; they had a mean sensitivity score of 17.3 at 54 months that then declined to 11.6 by 5th grade. This group contained 5.2% ( $n = 24$ ) of the sample and will be designated the Moderate-Decreasing paternal sensitivity trajectory. A third group of fathers showed moderately stable sensitivity over time ( $M = 17.5$  at 54 mos;  $M = 17.2$  at 5th grade). This group comprised over half the sample (55.4%,  $n = 300$ ) and will be referred to as the Moderate-Stable paternal sensitivity trajectory. The final group of fathers identified showed high and stable levels of paternal sensitivity from 54 months through 5th grade. This trajectory contained 32.4% ( $n = 155$ ) of the sample with an average paternal sensitivity score of 19.2 at 54 months and 18.3 at 5th grade. Given the continually high levels of sensitivity in this group, it will be designated the High-Stable paternal sensitivity trajectory. Posterior probabilities of group membership for these four trajectory groups were 84.7%, 83.9%, 80.7%, and 76.8%, suggesting reasonably low classification errors and adequate model fit.

The final maternal sensitivity trajectory model also contained four groups. The first group, labeled the *Low-Increasing* maternal sensitivity trajectory, had a mean maternal sensitivity score of 10.7 at 54 months which increased to 16.6 by 5<sup>th</sup> grade. This was the smallest group of mothers containing only 3% ( $n = 15$ ) of the sample. Mothers in the second group exhibited moderate levels of sensitivity during mother-child interaction at 54 months ( $M = 16.1$ ) but then displayed consistently lower levels of sensitivity during interactions in 1<sup>st</sup>, 3<sup>rd</sup>, and

5<sup>th</sup> grades ( $M = 14.5$  in 1<sup>st</sup> grade;  $M = 14.1$  in 3<sup>rd</sup> grade,  $M = 14.7$  in 5<sup>th</sup> grade). Based on this decrease in sensitivity, this group will be referred to as the *Moderate-Decreasing* maternal sensitivity trajectory. This group contained 11.4% ( $n = 51$ ) of mothers in the sample. The largest contingent of mothers in the sample (49.2%,  $n = 270$ ) was characterized by moderately stable levels of maternal sensitivity over time, with mean levels ranging from 17.6 to 16.7 during the assessment period, suggesting very little change in observed sensitivity. This group will be labeled the *Moderate-Stable* maternal sensitivity trajectory. The final group of mothers (177 or 36.4 %) showed high and stable levels of maternal sensitivity when observed interacting with their children. Average sensitivity scores for this group ranged from 18.2 to 19.2 during the assessment period; thus, they will be referred to as the *High-Stable* maternal sensitivity trajectory. Posterior probabilities for maternal trajectory membership were comparable to those found for fathers and ranged from 76.3% to 84.5%, indicating a reasonable fit for the data.

In summary, the optimal paternal and maternal sensitivity models contained four trajectories. These models were similar in that both fathers and mothers evidenced high-stable, and moderate-stable levels of sensitivity, with comparable mean sensitivity scores, during separate parent-child interactions with their children from 54 months through 5<sup>th</sup> grade. In addition, both contained a group of mothers and fathers who displayed lower levels of sensitivity with their children at 54 months, but higher levels at 1<sup>st</sup>, 3<sup>rd</sup>, and 5<sup>th</sup> grades. Interestingly, twice as many fathers fell into this trajectory as compared to mothers (34 vs. 15). However, fathers' initial sensitivity scores were not as low as mothers' initial scores (13.0 vs. 10.7). Finally, a group of fathers and mothers were observed to have decreasing levels of sensitivity over time. Mothers' decline in sensitivity over time was more gradual ( $M = 16.1$  vs.  $M = 14.7$ ) as compared to fathers' ( $M = 17.3$  vs.  $M = 11.8$ ). Based on the similarities and differences found in these

models, it is important to further define these groups using demographic and family context variables. These analyses will be described next.

### C. Demographic Correlates of Parental Sensitivity Trajectories

Paternal and maternal sensitivity trajectory groups were compared on continuous demographic variables (maternal and paternal education, and income-to-needs) with one-way analysis of variance. Main effects were examined first followed by paired comparisons. Categorical demographic variables (child gender and child ethnicity) were evaluated using chi-square tests.

Significant main effects across paternal sensitivity trajectories were found for two of the four demographic variables: paternal education at one month,  $F(3, 509) = 14.42, p < .001$ , partial  $\eta^2 = .08$  and child ethnicity,  $\chi^2(3, N = 513) = 20.52, p < .001$ . Income-to-needs at 54 months and child gender did not differ by paternal sensitivity trajectory group. Overall, fathers in the *High-Stable* sensitivity trajectory reported significantly more years of education than fathers in the *Moderate-Stable*, *Moderate-Decreasing*, and *Low-Increasing* sensitivity trajectories. Fathers in the *Moderate-Stable* sensitivity trajectory also had more years of education than fathers from the *Low-Increasing* trajectory. In relation to child ethnicity, children of fathers in the *Low-Increasing* sensitivity trajectory were more likely to be identified as members of minority groups. These results are presented in Table 9.

Table 9. Demographic Variables by Trajectories of Paternal and Maternal Sensitivity

Demo Variable	<u>Paternal Sensitivity Trajectories</u>				<u>Maternal Sensitivity Trajectories</u>			
	Low Increasing ( <i>n</i> = 34)	Moderate Decreasing ( <i>n</i> = 24)	Moderate Stable ( <i>n</i> = 300)	High Stable ( <i>n</i> = 155)	Low Increasing ( <i>n</i> = 15)	Moderate Decreasing ( <i>n</i> = 51)	Moderate Stable ( <i>n</i> = 270)	High Stable ( <i>n</i> = 177)
	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %	( <i>SE</i> ) or %
Paternal Education	13.74 <sup>a</sup> (.43)	14.42 <sup>ab</sup> (.51)	15.10 <sup>b</sup> (.15)	16.31 <sup>c</sup> (.20)	-	-	-	-
Maternal Education	-	-	-	-	13.87 <sup>a</sup> (.55)	13.71 <sup>a</sup> (.30)	14.92 <sup>a</sup> (.13)	16.21 <sup>b</sup> (.16)
Income to Needs	3.47 (.56)	4.43 (.71)	4.29 (.20)	4.54 (.28)	2.89 (.88)	3.35 <sup>a</sup> (.48)	4.01 <sup>a</sup> (.21)	5.19 <sup>b</sup> (.26)
Child Gender % female	41.2	37.5	47.3	56.1	40.0	41.2	48.9	52.5
Child Ethnicity % Caucasian	73.5	91.7	94.0	94.8	66.7	92.2	90.7	98.3

*Note.* Means with different superscripts are significantly different based on Bonferroni post-hoc comparisons at  $p < 0.01$ .

Maternal sensitivity trajectory groups differed significantly on three of the four demographic variables: maternal education at 1month,  $F(3, 509) = 25.60, p < .001$ , partial  $\eta^2 = .13$ ; income-to-needs at 54 months,  $F(3, 509) = 6.83, p < .001$ , partial  $\eta^2 = .04$  and child ethnicity,  $\chi^2(3, N = 513) = 25.07, p < .001$ . Follow-up tests indicated that mothers in the *High-Stable* sensitivity trajectory reported more years of education than did mothers from the other three groups. These same mothers also reported a higher income-to-needs ratio than mothers in the *Moderate-Stable* and *Moderate-Decreasing* sensitivity trajectories. Mothers in the *Low-Increasing* trajectory reported the lowest mean income-to-needs but significant differences between groups were not found, which may have been due to the small sample size of this trajectory group. Finally, a higher percentage of children in the *Low-Increasing* maternal sensitivity trajectory were of minority ethnic status. Demographic results for maternal sensitivity trajectories are also summarized in Table 9.

#### *Data Imputation*

Due to missing data on family context and child outcome variables, data imputation using expectation maximization in SPSS was utilized. This method, which uses a maximum likelihood approach (Dempster, Laird, & Rubin, 1977), imputed missing data on the family context and child outcome variables for the 513 families who were included in the trajectory analyses. Results for the actual and imputed data did not differ on either the family context variables or child outcomes. Therefore the results using the imputed data will be reported.

#### **D. Family Context Variables and Parental Sensitivity Trajectories**

Paternal and maternal sensitivity trajectory groups were compared on family context variables (parental depressive symptoms, relationship intimacy, parental harsh control, and child

temperament) using a series of ANCOVAs, controlling for significant demographic variables. Analyses of the paternal sensitivity trajectories revealed significant differences in paternal harsh control after controlling for paternal education,  $F(3, 509) = 4.15, p < .01$  partial  $\eta^2 = .03$ . Specifically, fathers in the *High-Stable* trajectory group reported using significantly less harsh control than fathers in the *Low-Increasing* and *Moderate-Stable* groups. Paternal reported depressive symptoms, relationship intimacy, and child temperament did not differ by paternal sensitivity trajectory group. Results are presented in Table 10.

Maternal sensitivity trajectory groups differed significantly on depressive symptoms and harsh control before significant covariates were entered into the analyses. More specifically, mothers in the *Moderate-Decreasing* sensitivity trajectory reported significantly more depressive symptoms than mothers in the *High-Stable* sensitivity trajectory, whereas mothers in the *High-Stable* sensitivity trajectory reported using less harsh control as compared to mothers from all the other trajectory groups. These group differences became non-significant, however, after covariates (education and income) were controlled. Although an overall significant main effect was found for mother reports of children's anger/frustration, pairwise comparisons between specific trajectory groups were not significant. Results for family context variables and maternal sensitivity trajectories are found in Table 10.

Table 10. *Family Context Variables by Trajectories of Paternal and Maternal Sensitivity Adjusted for Demographic Covariates*

	<u>Paternal Sensitivity Trajectories</u>								<u>Maternal Sensitivity Trajectories</u>							
	Low Increasing ( <i>n</i> = 34)		Moderate Decreasing ( <i>n</i> = 24)		Moderate Stable ( <i>n</i> = 300)		High Stable ( <i>n</i> = 155)		Low Increasing ( <i>n</i> = 15)		Moderate Decreasing ( <i>n</i> = 51)		Moderate Stable ( <i>n</i> = 270)		High Stable ( <i>n</i> = 177)	
Family Variable	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %
Depressive Symptoms	8.00	(.99)	9.15	(1.18)	7.25	(.33)	6.21	(.47)	8.73	(1.81)	10.57	(.98)	7.91	(.43)	7.23	(.53)
Relationship Intimacy	3.91	(.13)	3.78	(.16)	3.99	(.04)	4.11	(.06)	4.01	(.22)	3.64	(.12)	3.88	(.05)	3.87	(.06)
Parental Harsh Control	22.94 <sup>a</sup>	(.52)	21.75	(.61)	21.63 <sup>a</sup>	(.17)	20.39 <sup>b</sup>	(.24)	22.07	(.79)	21.23	(.43)	20.84	(.19)	19.80	(.23)
Child Temperament	4.82	(.14)	4.92	(.16)	4.68	(.05)	4.72	(.06)	4.39	(.84)	4.86	(.83)	4.78	(.80)	4.61	(.76)

*Note*<sup>1</sup>. Demographic covariates for maternal sensitivity trajectories included maternal education and income-to-needs; Demographic covariates for paternal sensitivity analyses included paternal education.

*Note*<sup>2</sup>. Means with different superscripts are significantly different based on Bonferroni post-hoc comparisons at  $p < 0.01$ .

## **E. Child Outcomes at Sixth Grade as a Function of Parental Sensitivity Trajectory**

### **Membership**

Outcome analyses were conducted in several steps. First, preliminary analyses were performed to examine associations between child gender and sixth grade child outcomes. Next, multivariate analyses of variance (MANOVAs) were conducted to examine child outcomes at sixth grade as a function of paternal and maternal sensitivity trajectory groups. This was followed by analyses of covariance (ANCOVAs) on all significant child outcome variables to determine whether child outcome differences across trajectory groups remained significant after controlling for significant demographic variables. A third set of ANCOVAs controlled for family context variables as well as demographics. Finally, ANCOVAs controlling for child functioning at 54 months and the opposite parent's average sensitivity score were performed on the significant sixth grade child outcomes, with maternal and paternal sensitivity trajectories as the grouping variables.

### *Preliminary Analyses*

Sex differences in child outcomes at sixth grade were examined. No significant main effects of gender were found for teacher reported child outcomes (i.e., SSRS, TRF externalizing and internalizing). However, significant main effects were noted for child reported friendship quality in sixth grade. Specifically, girls rated their friendships with peers as more positive than did boys ( $M = 4.15$  vs.  $4.37$ ,  $t(511) = -4.78$ ,  $p < .001$ ). Based on these results, child gender was entered as a covariate in subsequent analyses involving child reported friendship quality. In addition to main effects, interactions between child gender and maternal and paternal sensitivity

trajectories were examined but were not significant, presumably in part due to the small cell sizes found in some of the trajectory groups (i.e., *Low-Increasing* Maternal Sensitivity Trajectory = 15).

#### *Paternal and Maternal Sensitivity Trajectories and Children's Social Competence*

A MANOVA was conducted to determine if children's social competence at sixth grade differed as a function of paternal and maternal sensitivity trajectory group membership before controlling for covariates. Analyses of paternal sensitivity trajectories revealed significant differences in teachers' reports of children's social skills ( $F(3, 509) = 3.99, p < .01$  partial  $\eta^2 = .02$ ) and externalizing behaviors ( $F(3, 509) = 6.40, p < .001$  partial  $\eta^2 = .04$ ) in sixth grade. Specifically, children whose fathers were in the *High-Stable* and *Moderate-Stable* trajectory groups were rated by their teachers as having significantly better social skills compared to children whose fathers were in the *Moderate-Decreasing* trajectory group. In addition, fathers from the *Low-Increasing* and *Moderate-Decreasing* sensitivity trajectories had children who displayed more externalizing behaviors according to their sixth grade teachers than did children with fathers in the *High-Stable* and *Moderate-Stable* groups. Children's ratings of friendship quality and teacher reports of children's internalizing behaviors in sixth grade did not differ significantly by paternal sensitivity trajectory group. Findings are shown in Table 11.

Similar results were found for maternal sensitivity trajectories with significant differences noted in teachers' reports of children's social skills ( $F(3, 509) = 6.56, p < .001$  partial  $\eta^2 = .04$ ) and externalizing behaviors ( $F(3, 509) = 3.78, p < .01$  partial  $\eta^2 = .02$ ). Pairwise comparisons revealed that children whose mothers were in the *High-Stable* sensitivity trajectory were rated by their teachers as having better social skills as compared to children whose mothers were in either the *Moderate-Decreasing* or *Moderate-Stable* groups. The differences in social skills between

children whose mothers showed *Low-Increasing* sensitivity and those whose mothers were in the *High-Stable* or *Moderate-Stable* group were not significant. Teachers rated children whose mothers were in the *Moderate-Decreasing* sensitivity group as exhibiting significantly more externalizing behaviors than children whose mothers were in the *High-Stable* trajectory. Finally, children's ratings of friendship quality and teachers' ratings of children's internalizing behaviors did not differ significantly by maternal sensitivity trajectory. These results are presented in Table 11.

Table 11. *Sixth Grade Child Outcomes by Trajectories of Paternal and Maternal Sensitivity (not Adjusted for Covariates)*

	<u>Paternal Sensitivity Trajectories</u>				<u>Maternal Sensitivity Trajectories</u>										
	Low Increasing ( <i>n</i> = 34)	Moderate Decreasing ( <i>n</i> = 24)	Moderate Stable ( <i>n</i> = 300)	High Stable ( <i>n</i> = 155)	Low Increasing ( <i>n</i> = 15)	Moderate Decreasing ( <i>n</i> = 51)	Moderate Stable ( <i>n</i> = 270)	High Stable ( <i>n</i> = 177)							
Child Outcomes	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	
Social Skills	103.14 (2.00)		100.42 <sup>a</sup> (2.37)		107.09 <sup>b</sup> (.67)		107.83 <sup>b</sup> (.93)		105.35 (2.98)		103.09 <sup>a</sup> (1.61)		105.57 <sup>a</sup> (.70)		109.69 <sup>b</sup> (.87)
Externalizing Behaviors	51.04 <sup>a</sup> (1.15)		51.66 <sup>a</sup> (1.36)		47.32 <sup>b</sup> (.39)		47.10 <sup>b</sup> (.54)		49.74 (1.74)		49.63 <sup>a</sup> (.94)		47.99 (.41)		46.54 <sup>b</sup> (.51)
Internalizing Behaviors	49.91 (1.36)		49.63 (1.62)		48.77 (.46)		48.41 (.64)		50.60 (2.04)		50.59 (1.11)		49.00 (.48)		47.75 (.59)
Friendship Quality	4.27 (.09)		4.27 (.11)		4.22 (.03)		4.30 (.04)		4.30 (.14)		4.17 (.08)		4.26 (.03)		4.27 (.04)

*Note*<sup>1</sup>. Child outcome measures consist of teacher reported social skills, and externalizing and internalizing behaviors as well as child reported friendship quality.

*Note*<sup>2</sup>. Means with different superscripts are significantly different based on Bonferroni post-hoc comparisons at  $p < 0.05$  or better.

Next, ANCOVAs were conducted to examine whether significant trajectory group differences in child outcomes at sixth grade remained after controlling for significant demographic variables. This was followed by ANCOVAs controlling for significant demographic variables and family context (i.e., depressive symptoms, relationship intimacy, parental harsh control, child temperament). See Table 12 for results. In the analyses comparing paternal sensitivity trajectory groups on teacher reports of children's social skills, only paternal education ( $p < .05$ , partial  $\eta^2 = .01$ ) was significant whereas child ethnicity and income-to-needs at 54 months were not. No family context variables (i.e., paternal reported depressive symptoms, paternal harsh control, relationship intimacy, child temperament) were significant covariates. Differences across paternal sensitivity trajectory groups and teacher reports of children's social skills remained significant after these demographic and family context variables were taken into account ( $F(3, 508) = 3.04$ ,  $p < .05$  partial  $\eta^2 = .018$ ). However, follow-up paired comparisons with Bonferroni corrections no longer detected specific group differences.

Next, teacher reports of children's externalizing behaviors were examined across paternal trajectory groups with the same demographic and family context covariates. Child ethnicity ( $p < .05$ , partial  $\eta^2 = .01$ ) and father reported harsh control ( $p < .05$ , partial  $\eta^2 = .01$ ) were significant, whereas the remainder of the demographic and family context variables were not. Teacher reports of children's externalizing behaviors differed significantly across paternal sensitivity trajectory groups after controlling for child ethnicity and paternal harsh control ( $F(3, 507) = 4.68$ ,  $p < .01$  partial  $\eta^2 = .03$ ). Paired comparisons revealed that children whose fathers were in the *Moderate-Decreasing* sensitivity trajectory were rated as exhibiting more externalizing behaviors when compared to children whose fathers were in either the *Moderate-Stable* or *High-Stable* groups. In earlier multivariate analyses without covariates, group differences were found

between children whose fathers were in the *Low-Increasing* group and those in the *Moderate-Stable* and *High-Stable* groups, with children in the first group rated by their teachers as having more externalizing behaviors. These group differences were no longer significant after controlling for child ethnicity and paternal harsh control suggesting that some of the differences in behavior found for these children can be explained in part by these variables.

Maternal sensitivity trajectories were compared on teacher ratings of children's social skills with demographic (i.e., maternal education, child ethnicity, income-to-needs at 54 months) and family context (i.e., maternal depressive symptoms, relationship intimacy, maternal harsh control, child temperament) covariates. Group differences in children's social skills ratings across maternal sensitivity trajectories remained significant ( $F(3, 509) = 6.57, p < .01$  partial  $\eta^2 = .03$ ), although none of the demographic or family context variables were significant. Pairwise comparisons were similar to results without covariates in the model, namely that children whose mothers were in the *High-Stable* sensitivity trajectory were rated as having better social skills by their teachers than were children whose mothers were in either the *Moderate-Decreasing* or *Moderate-Stable* groups.

Finally, teacher ratings of children's externalizing behaviors were examined as a function of maternal sensitivity trajectories controlling for significant covariates. Child ethnicity was significant ( $p < .05$ , partial  $\eta^2 = .01$ ) but no other demographic or family context variables accounted for a significant proportion of the variance. Differences across maternal sensitivity trajectory groups in teacher reports of children's externalizing behaviors remained significant after controlling for child ethnicity ( $F(3, 508) = 2.93, p < .05$  partial  $\eta^2 = .017$ ). Specifically, children whose mothers were in the *Moderate-Decreasing* group were rated by their teachers as

exhibiting more externalizing behaviors as compared to children whose mothers were in the *High-Stable* trajectory group.

Table 12. Significant Sixth Grade Outcomes by Trajectories of Paternal and Maternal Sensitivity (Adjusted for Demographic and Family Context Covariates)

	<u>Paternal Sensitivity Trajectories</u>								<u>Maternal Sensitivity Trajectories</u>							
	Low Increasing ( <i>n</i> = 34)		Moderate Decreasing ( <i>n</i> = 24)		Moderate Stable ( <i>n</i> = 300)		High Stable ( <i>n</i> = 155)		Low Increasing ( <i>n</i> = 15)		Moderate Decreasing ( <i>n</i> = 51)		Moderate Stable ( <i>n</i> = 270)		High Stable ( <i>n</i> = 177)	
Child Outcomes	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %
Social Skills	103.83	(2.02)	100.82	(2.37)	107.19	(.67)	107.42	(.93)	105.35	(2.98)	103.09 <sup>a</sup>	(1.61)	105.57 <sup>a</sup>	(.70)	109.69 <sup>b</sup>	(.87)
Externalizing Behaviors	50.18	(1.16)	51.54 <sup>a</sup>	(1.35)	47.29 <sup>b</sup>	(.38)	47.37 <sup>b</sup>	(.54)	48.97	(1.75)	49.61 <sup>a</sup>	(.94)	47.93	(.41)	46.70 <sup>b</sup>	(.51)

*Note*<sup>1</sup>. Covariates for paternal sensitivity analyses included paternal education; Covariates for maternal sensitivity trajectories included maternal education and income-to-needs.

*Note*<sup>2</sup>. Means with different superscripts are significantly different based on Bonferroni post-hoc comparisons at  $p < 0.05$ .

## **F. Parental Sensitivity Trajectories and Children's Social Competence Controlling for Children's functioning at 54 months and Opposite Parent's Sensitivity**

In an effort to determine whether any significant differences were accounted for by either stability in child behavior or the other parent's behavior a final set of ANCOVAs was conducted on all significant outcomes controlling for previous child functioning at 54 months and the opposite parent's sensitivity. Composite variables for previous levels of children's social competence and externalizing behavior at 54 months were constructed using maternal and paternal report measures. Specifically, the SSRS Total Standard Score as rated by each parent was averaged to create a composite score representing each child's social skills at 54 months; similarly, the Externalizing scores from the CBCL as rated by mothers and fathers at 54 months were averaged to reflect previous levels of externalizing behaviors. In addition, to determine if differences between paternal sensitivity trajectories and child outcomes remained over and above maternal sensitivity, the average maternal sensitivity score (i.e., mean of all data points available from 54mos through 5<sup>th</sup> grade) was entered as a covariate. Similarly, the average paternal sensitivity score was entered as a covariate for all analyses involving maternal sensitivity trajectories and child outcomes at sixth grade.

Paternal sensitivity trajectory group differences in children's social skills at sixth grade were examined first. Average maternal sensitivity was a significant covariate ( $p < .01$ , partial  $\eta^2 = .01$ ), whereas previous levels of children's social skills at 54 months were non-significant. After controlling for maternal sensitivity, paternal sensitivity trajectory membership no longer predicted differences in children's social skills at sixth grade, indicating that maternal sensitivity

accounted for these differences. Next, children's externalizing behaviors and paternal sensitivity trajectories were explored. Average maternal sensitivity and previous levels of children's externalizing behaviors at 54 months were non-significant and differences between paternal sensitivity trajectories and their children's externalizing behaviors remained significant with all covariates in the model ( $F(3, 505) = 3.44, p < .05$  partial  $\eta^2 = .02$ ). More specifically, fathers with *Moderate-Decreasing* levels of sensitivity had children who displayed more externalizing behaviors according to their sixth grade teachers as compared to children whose fathers were in either the *Moderate-Stable* or *High-Stable* groups, even with earlier child behavior and maternal sensitivity controlled.

Similar analyses were conducted across maternal sensitivity trajectories with children's social skills as the dependent variable. Children's social skills at 54 months were not significant, but average paternal sensitivity was a significant covariate ( $F(3, 507) = 3.54, p < .05$ , partial  $\eta^2 = .02$ ). After controlling for these covariates, significant differences remained between maternal sensitivity trajectories and children's social skills at sixth grade. In particular, children whose mothers were in the *High-Stable* trajectory group were described by their teachers as having more social skills compared to children whose mothers were in the *Moderate-Stable* group. These results differ somewhat from earlier analyses with demographic and family context controls which also found significant differences between children whose mothers were in the *High-Stable* group and those whose mothers were in the *Moderate-Decreasing* group. This suggests that paternal sensitivity scores partially explain the differences found on teacher ratings of children's social skills between these two groups. See Table 13 for these results.

Lastly, maternal sensitivity trajectories and children's externalizing behaviors in sixth grade were examined. Previous levels of externalizing behaviors for the children at 54 months

were non-significant, whereas average paternal sensitivity was significant ( $p < .01$ , partial  $\eta^2 = .01$ ). Furthermore, previously significant differences between maternal trajectory group membership and children's externalizing behaviors in sixth grade were accounted for by average paternal sensitivity and were no longer significant. Results are available in Table 13.

Finally it is important to note that despite several significant findings in these analyses, overall effect sizes tended to be small. Effect sizes or partial eta squared ( $\eta^2$ ) values ranged from .01 to .13, accounting for roughly 1% to 13% of the total variance.

Table 13. Significant Sixth Grade Child Outcomes by Trajectories of Paternal and Maternal Sensitivity (Adjusted for Demographic and Family Context Covariates, Children's Social Competence at 54 months, and Opposite Parent's Mean Sensitivity)

	<u>Paternal Sensitivity Trajectories</u>				<u>Maternal Sensitivity Trajectories</u>											
	Low Increasing ( <i>n</i> = 34)	Moderate Decreasing ( <i>n</i> = 24)	Moderate Stable ( <i>n</i> = 300)	High Stable ( <i>n</i> = 155)	Low Increasing ( <i>n</i> = 15)	Moderate Decreasing ( <i>n</i> = 51)	Moderate Stable ( <i>n</i> = 270)	High Stable ( <i>n</i> = 177)								
Child Outcomes	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %	<i>M</i>	( <i>SE</i> ) or %				
Social Skills	105.13	(2.05)	101.56	(2.39)	107.29	(.67)	106.83	(.93)	106.36	(3.01)	104.20	(1.69)	105.68 <sup>a</sup>	(.70)	109.11 <sup>b</sup>	(.90)
Externalizing Behaviors	49.62	(1.19)	51.20 <sup>a</sup>	(1.36)	47.27 <sup>b</sup>	(.38)	47.58 <sup>b</sup>	(.55)	48.33	(1.75)	48.80	(.97)	47.81	(.41)	47.17	(.52)

*Note.* Means with different superscripts are significantly different based on Bonferroni post-hoc comparisons at  $p < 0.05$ .

### *Concordance between Parents on Trajectory Membership*

A 4x 4 chi square analyses was conducted to determine the percentage of mothers and fathers with the same trajectory group membership (i.e., fathers with high-stable sensitivity and mothers with high-stable sensitivity). Results showed that overall 50% of mothers and fathers belonged to the same sensitivity trajectory group. Furthermore, the majority, roughly 80%, of mothers and fathers belonged to either the high-stable or moderate-stable group if their partner was in either of these two trajectory groups. For detailed analyses see Table 14.

Table 14. *Concordance between Fathers and Mothers on Trajectory Group Membership*

<u>Paternal Sensitivity Trajectories</u>	<u>Maternal Sensitivity Trajectories</u>							
	Low Increasing		Moderate Increasing		Moderate Stable		High Stable	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Low Increasing	03	0.6	08	1.6	21	4.1	02	0.4
Moderate Decreasing	03	0.6	05	1.0	12	2.3	04	0.8
Moderate Stable	08	1.6	35	6.8	166	32.4	91	17.7
High Stable	01	0.2	03	0.6	71	13.8	80	15.6

#### IV. DISCUSSION

The current study had three primary aims. The first was to delineate the developmental trajectories of maternal and paternal sensitivity across early and middle childhood. Consistent with the study hypotheses, most fathers and mothers had high and stable levels of sensitivity during observed parent-child interactions over the seven year study period. However, a small minority of fathers and mothers showed only low to moderate levels of sensitivity which either increased or decreased over time. Next, the study sought to identify potential demographic and family correlates of these trajectories of maternal and paternal sensitivity. Parents classified as having high and stable levels of sensitivity were expected to have more demographic resources, fewer depressive symptoms, more relationship intimacy, and to use less harsh control when disciplining their children than parents classified as having low or mixed (either increasing or decreasing) levels of sensitivity; the children with high-stable levels of parental sensitivity were also expected to be rated as having less difficult temperaments. Results provided partial support for these hypotheses. Fathers and mothers categorized as having high and stable levels of sensitivity were found to have significantly more demographic resources as compared to parents in sensitivity trajectories defined by low and/or moderate levels of sensitivity which increased, decreased, or remained stable over time. In addition, mothers showing consistently high levels of sensitivity reported significantly fewer depressive symptoms, less use of harsh control, and rated their children as having less difficult temperaments than did mothers from low or mixed sensitivity trajectories. Contrary to expectations, however, these same family correlates failed to

differentiate paternal sensitivity trajectories, with the exception of paternal harsh control. Furthermore, higher relationship intimacy was not associated with differences in paternal or maternal sensitivity over time.

The final goal for the present study was to determine whether differences in observed maternal and paternal sensitivity during the period from early to middle childhood differentially predicted children's social competence in sixth grade. Social competence was assessed via teacher ratings of social skills and by children's ratings of their friendship quality. Teacher ratings of internalizing and externalizing behaviors were also used as a measure of behavioral adjustment and an indirect measure of social competence. As expected, children whose parents were in the high and stable sensitivity trajectory groups were rated by their teachers as having significantly better social skills and fewer externalizing problems compared to children whose parents were classified as having persistently low or mixed levels of sensitivity. However, children's ratings of friendship quality and teacher reports of children's internalizing behaviors in sixth grade did not differ significantly as a function of paternal or maternal sensitivity trajectory group.

The remainder of the discussion will consider these results in greater detail and in relation to the existing literature on maternal and paternal parenting and children's social competence and behavioral adjustment. This will be followed by a discussion of the study's strengths and limitations as well as future research directions and overall conclusions.

### **A. Trajectories of Paternal and Maternal Sensitivity**

Four separate trajectory groups of fathers and mothers with distinct patterns of sensitivity characterized by stability and change over the seven year study period were identified. Overall,

the majority of fathers and mothers were characterized by high to moderate levels of sensitivity which remained relatively stable throughout the study period. For fathers, 55.4% of the sample displayed moderate levels of sensitivity which remained relatively unchanged from 54 months to 5<sup>th</sup> grade, while 32.4% included fathers described by high and stable levels of sensitivity which decreased slightly from 54 months to a 5<sup>th</sup> grade. For mothers, 49.2% of the sample exhibited moderately stable levels of sensitivity which declined modestly from 54 months through 5<sup>th</sup> grade, whereas 36.4% of mothers engaged in consistently high levels of sensitivity which also decreased slightly during that same period. In summary, approximately 88% of fathers and 86% of mothers in the sample displayed consistently high to moderate levels of sensitivity during observed parent-child interactions from 54 months through 5<sup>th</sup> grade.

These results are in accordance with the study sample's overall lower demographic risk (e.g., higher education, more income) and high level of family stability (e.g., both parents resided in the home for the duration of the study) both of which have been shown in previous research to be associated with more responsive and authoritative parenting (Bornstein, Hendricks, Haynes, & Painter, 2007; Hetherington & Stanley-Hagan, 2000). The fact that the majority of participating fathers and mothers displayed similarly high levels and patterns of sensitive parenting is fairly consistent with previous research. Lamb (2004) recently reviewed existing research that examined both paternal and maternal sensitivity during infancy and noted that the majority of these studies found few differences between parents. The results of the present study are consistent with this in finding similar patterns of sensitivity over time for both mothers and fathers, albeit later in development.

In addition, a recent study conducted by Hirsh-Pasek and Burchinal (2006) which also utilized SPM analyses to examine maternal sensitivity from 6 months through 54 months using

the NICHD Study of Early Child Care data found the same number of maternal sensitivity trajectory groups (i.e., four) as the current study. Furthermore, the majority of mothers in the Hirsh-Pasek study were characterized by moderate to high levels of sensitivity which remained stable over time, results consistent with the current findings.

Despite these parallels, there are some discrepancies between the current results and studies which have reported differences between paternal and maternal parenting styles during preschool and the early school years. Specifically, fathers have been shown to engage in distinct behaviors not shown by mothers (i.e., rough and tumble play) with their children, and to rate themselves as more authoritarian disciplinarians as compared to mothers (Parke, 2000; Russell et al., 1998). The current study did not uniquely assess father-child interactions but rather measured sensitivity in both parents using a semi-structured task originally developed to assess maternal sensitivity. This may have limited opportunities for rough and tumble play or other distinct father-child behavior. In addition, the majority of fathers in the current study, especially those with high and stable rates of sensitivity, reported limited use of harsh parenting practices, a dimension of parenting that defines authoritarian discipline.

In contrast to the majority of fathers and mothers who displayed consistently high to moderate levels of sensitivity, separate trajectories of low to moderate sensitivity which increased and/or decreased were also identified in both parents. A small group of fathers (6.9%) exhibited low but increasing levels of sensitivity, whereas an even smaller subset of fathers (5.2%) engaged in moderately sensitive parenting at 54 months which steadily decreased to low levels of sensitivity during father-child interactions in 5<sup>th</sup> grade. Mothers showed similar patterns with the fewest women (3%) defined by low and increasing levels of sensitivity during early and middle childhood and a somewhat larger contingent of mothers (11.4%) characterized

by moderate but decreasing levels of sensitivity from 54 months to 5<sup>th</sup> grade. These results are consistent with the hypothesis that some fathers and mothers would exhibit low to moderate levels of sensitivity, although due to limited longitudinal research on parental sensitivity, no specific hypotheses were offered in regard to the overall pattern (i.e., increasing or decreasing) of sensitivity over time among less sensitive parents.

The fact that approximately 12.1% of fathers and 14.4% of mothers from a low-risk (i.e., middle income, some college education) highly stable sample evidenced low or decreasing levels of sensitivity over time is both interesting and somewhat surprising. In order to better understand these differences in sensitivity, several factors should be considered including the developmental stage of the child. During early and middle childhood, children have more opportunities to expand their self-regulation and interpersonal skills through increased contact with other adults and peers. Some parents may feel that they are promoting greater child autonomy, thereby facilitating their children's growth, by being less engaged or sensitive in their parenting during middle childhood. Alternatively, parents may find it difficult to remain sensitive to their children as they reach early puberty, possibly due to increased moodiness and the tendency to spend more time with peers. In addition, demographics and family correlates may help to explain the observed patterns of low or decreasing parental sensitivity found in the current study.

## **B. Demographic and Family Correlates of Parental Sensitivity**

Demographic variables (i.e., parent education, income-to-needs, child ethnicity and gender) were examined as correlates of paternal and maternal sensitivity trajectories to further differentiate these groups and offer possible explanations for different longitudinal patterns of

parental sensitivity. Parents from the different sensitivity trajectories varied somewhat in co-occurring sociodemographic risk, with fathers and mothers from the *High-Stable* trajectory groups having significantly more education than parents from all other groups. Similarly, mothers from the *High-Stable* sensitivity group also reported significantly more household income than mothers from the *Moderate-Stable* or *Moderate-Decreasing* sensitivity groups. These results are consistent with findings from earlier parenting research which has shown that parents with higher SES (i.e., more income and education) tend to engage in more child-centered and responsive parenting (Bornstein, Hendricks, Haynes, & Painter, 2007; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000), qualities analogous to sensitive parenting measured in the current study (i.e., supportive presence, respect for autonomy).

In addition, fathers and mothers from the *Low-Increasing* sensitivity trajectory were significantly more likely to have children identified as members of minority groups as compared to children with parents in the *Moderate-Decreasing*, *Moderate-Stable*, or *High-Stable* trajectory groups. One plausible explanation is the possibility that parental sensitivity in minority families may be comprised of different parenting qualities than those considered in the current study. Several researchers have found that an authoritarian parenting style, parenting characterized by more strict or harsh control, is associated with more positive outcomes for low-income African American children in high risk neighborhoods, despite being associated with poorer child outcomes for European American children (Baumrind, 1973; Dodge, Pettit, & Bates, 2004; Lamborn, Dornbusch, & Steinberg, 1996). These differences may reflect the fact that a more authoritarian parenting style and the use of corporal punishment are considered more normative and effective among low-income African American families than among Caucasian and middle income families. For example, several studies have documented that African American parents

employ spanking as a discipline strategy more frequently than their European American counterparts (Day et al., 1998; Deater-Deckard, Dodge, Bates, & Pettit, 1996; Smith & Brooks-Gunn, 1997), and they tend to endorse spanking as an appropriate display of effective parenting (Deater-Deckard & Dodge, 1997; Deater-Deckard, Lansford, Dodge, Pettit, & Bates, 2003). Specifically, spanking in low-income African American homes may serve as a parental warning to children of the real life dangers they face when they leave their homes. In this same vein, parental sensitivity may be less important in low-income African American families where parents often focus on teaching their children respect for and compliance with rules. These parenting differences underscore the importance of considering the cultural context of families when examining parenting behavior and child outcomes.

In summary, results for associations between demographic variables and paternal and maternal sensitivity trajectories were in the expected direction and consistent with previous parenting research. Specifically, fathers and mothers who displayed consistently high levels of sensitivity during early and middle childhood were found to have more demographic resources as compared to parents characterized by low to moderate levels of sensitivity which increased or decreased over time. Furthermore, families with parents who displayed low but increasing levels of sensitivity had a significantly larger proportion of children identified as minorities.

#### *Family Correlates of Paternal and Maternal Sensitivity*

In addition to sociodemographic indicators, Belsky's ecological process model of parenting (1984) was used as the theoretical rationale for comparisons of contextual sources of stress and support within the family across parental sensitivity trajectories. These included parent discipline strategies (specifically harsh control), parent reported depressive symptoms, relationship intimacy, and child temperament.

Parental discipline strategies varied across trajectories of father and mother sensitivity. Specifically, fathers in the *High-Stable* sensitivity trajectory reported using significantly less harsh control as compared to fathers in the *Low-Increasing* and *Moderate-Stable* sensitivity trajectories. Similarly, mothers characterized by stably high levels of sensitivity utilized less harsh control than mothers described by low and moderate levels of sensitivity, although these differences were accounted for by significant demographic variables (i.e., maternal education, income-to-needs). Thus, parents characterized by consistently high levels of sensitivity reported using harsh control less as part of their disciplinary practices.

These findings are intuitive and consistent with previous research which has found negative associations between these two dimensions of parenting (Bradley & Corwyn, 2007; Miner & Clarke-Stewart, 2008). The fact that the association between observed maternal sensitivity and mother reported use of harsh control was accounted for by socioeconomic variables is also consistent with previous research indicating that fewer socioeconomic resources often co-occur with harsh control or parental hostility (Paulessen-Hoogbeem, 2007). These results also provide additional support for the validity of the identified sensitivity trajectories by offering data on another dimension of parenting (i.e., harsh control) which has been shown to be negatively associated with sensitivity.

Next, parental depressive symptoms were examined, as they have been shown to be related to parenting quality in both mothers and fathers (Campbell et al., 2007, Kane & Garber, 2004; NICHD ECCRN, 1999). Mothers showing moderate and decreasing levels of sensitivity reported significantly more depressive symptoms as compared to mothers with stably high levels of sensitivity. It should be noted, however, that although mothers with moderate decreasing levels of sensitivity reported more depressive symptoms, their overall mean score ( $M = 10.6$ ) was

well below the suggested clinically significant cutoff score of 16 on the CES-D, indicating moderate rather than high levels of depressive symptoms. Ultimately, however, the differences in depressive symptoms between mothers with consistently high levels of sensitivity and those with moderate decreasing sensitivity were accounted for by significant demographic covariates (i.e., maternal education and income-to-needs). In other words, increased sociodemographic risk (relative to the other mothers in the sample) was associated with more maternal reported symptoms of depression, which in turn were related to maternal sensitivity over time. These data are consistent with previous research which has shown that maternal depressive symptoms often exist in the context of socioeconomic and other family stressors and that sociodemographic risk often accounts for links between maternal depressive symptoms and less sensitive parenting (Campbell et al., 2007; McLoyd, 1998).

In contrast to the findings for mothers, fathers showing different trajectories of sensitivity did not vary systematically in their reports of depressive symptoms. Overall fathers reported fewer depressive symptoms than mothers. The relatively low level of depressive symptoms reported by the fathers in this sample may reflect their relatively better economic resources and high level of family stability as well as their high levels of relationship intimacy. Less family stability and increased marital conflict have been associated with paternal depressive symptoms in at least one community sample (Cummings, Keller, & Davies, 2005). Furthermore, the fact that epidemiological research has shown that twice as many women meet criteria for a diagnosis of depression or have subclinical depressive symptoms as compared to men (Kessler & Zhao, 1999; Robins & Reiger, 1991) suggests that it is harder to find men with substantial depressive symptoms in a primarily middle-class community sample. Finally, it is also possible that men

are less willing than women to endorse symptoms of depression given cultural norms which may make it more difficult for men to acknowledge their sad mood.

Relationship intimacy was also examined as a possible correlate of paternal and maternal sensitivity. A substantial body of research has found a clear association between marital relationship quality and parenting, such that parents in more harmonious and satisfying marriages tend to engage in more involved and sensitive parenting, whereas parents in discordant or conflicted marriages utilize more negative parenting practices (Goldberg & Easterbrooks, 1984; NICHD ECCRN, 2000; Cox, Paley, & Harter, 2001). In contrast to these results, in the current study no significant differences in parent reported relationship intimacy were found across paternal and maternal sensitivity trajectories. This may be due to sample bias, given the higher socioeconomic resources and family stability (i.e., married and/or cohabiting during entire 7 year study period) of the current sample. In addition, relationship intimacy was measured using the Love and Relationship subscale of the PAIR, which consisted of only of 6 items. This may have limited the variability of responses and resulted in a ceiling effect on this measure. Furthermore, the brevity of this scale may have made it difficult to detect subtle differences in the emotional climate of the partnership. Finally, it is possible that a questionnaire focused on relationship conflict rather than harmony would have shown an association with parenting, given that correlations between these two constructs have been found frequently in previous research and entire theories of child functioning based on the indirect effects of the marital relationship have been proposed (Davies, & Cummings, 1994; Erel & Burman, 1995; Sturge-Apple, Davies, & Cummings, 2006).

After investigating several family context variables, child contributions to the parent-child relationship were also considered by examining possible associations between paternal and

maternal sensitivity trajectories and child temperament. Previous research which has looked at parenting and child temperament has found that children with difficult temperaments (i.e., more irritability, anger, and frustration) are observed to have less positive father-child interactions (Grych & Clark, 1999) and less responsive parenting by mothers (Crockenberg, 1986; Crockenberg & Leerkes, 2003). Interestingly, however, researchers have shown that this association may be moderated by several variables including socioeconomic status, ethnicity, and measurement strategy (Owens, Shaw, & Vondra, 1998, Putnam et al., 2002). Difficult child temperament in the current study was assessed via maternal reports of child anger and frustration to everyday situations at 54 months of age. An overall main effect for maternal sensitivity trajectory and child temperament was found. Post-hoc comparisons, however, revealed no significant group differences. Likewise no significant trajectory group differences were noted for paternal sensitivity and child temperament. These results are consistent with past data and a recent meta-analysis conducted by Paulussen-Hoogeboom and colleagues (2007), which reported that the correlation between negative child temperament and less supportive (e.g., less sensitive) parenting was found for lower SES families but reversed for higher SES families. In other words, parents with more educational and economic resources were found to provide more supportive parenting to children with more negative emotionality. One possible explanation for this association is the notion that parents from higher SES families may have more support or protective factors which act as a buffer and help to solidify their parenting self-efficacy. They also may see their role as helping their children to cope with frustration and other negative emotions. The parents in this study, given their higher SES status, may have responded to their children's anger and frustration with continued sensitivity, which may account for the lack of significant trajectory group differences on this variable. Alternatively, very few mothers

described their children as showing significant levels of anger and frustration at 54 months, which again brings up a possible issue of sample bias. The fact that child temperament and sensitivity trajectories were unrelated, therefore, may be due to the fact that children in this sample displayed little to no anger and frustration according to maternal reports.

In summary, most of the family context variables examined differentiated the maternal sensitivity trajectories, although these differences were ultimately accounted for by sociodemographic covariates. In contrast to mothers, only parental discipline differed across the paternal sensitivity trajectories, and these differences remained even after controlling for demographics. Overall, these results are consistent with previous parenting research conducted on a high functioning, middle-class sample.

### **C. Paternal and Maternal Sensitivity as Predictors of Children's Social Competence**

Paternal and maternal sensitivity over time were also examined as potential predictors of children's social competence (i.e., social skills and friendship quality) and behavioral adjustment (i.e., internalizing and externalizing behaviors) in middle school. In an effort to eliminate possible third variables that may explain associations between parental sensitivity and child outcomes, significant demographic and family context variables as well as children's social competence and behavioral adjustment at 54 months were entered as covariates. Finally, the opposite parent's mean sensitivity score was controlled to determine if father and mother sensitivity made unique contributions to social competence. Overall, results showed that children's social skills and externalizing behaviors varied as a function of both paternal and maternal sensitivity trajectories, whereas children's internalizing behaviors and friendship quality did not.

Specifically, children whose fathers displayed consistently high or moderate levels of sensitivity during parent-child interactions from 54 months through 5<sup>th</sup> grade had better social skills in middle school according to their 6<sup>th</sup> grade teachers compared to children whose fathers exhibited moderate and decreasing levels of sensitivity. Furthermore, children who experienced stably high levels of paternal sensitivity were rated by their teachers as having fewer externalizing behaviors as compared to children whose fathers showed low-increasing or moderate-decreasing levels of sensitivity. These results changed somewhat after controlling for significant demographic and family context variables. The overall association between paternal sensitivity and children's social skills remained significant. Specific group differences, however, were no longer detected. For externalizing behaviors, significant differences between children with fathers in the high-stable or moderate-stable sensitivity groups and the low-increasing sensitivity trajectory were no also longer significant, suggesting that child ethnicity and paternal use of harsh control accounted for the relationship between paternal sensitivity and child externalizing behavior.

In general, maternal sensitivity over time predicted similar outcomes. Specifically, children whose mothers showed high and stable levels of sensitivity were rated by their teachers as having better social skills than children whose mothers had moderate-stable and moderate-decreasing levels of sensitivity. Similarly, children with mothers who displayed stably high levels of sensitivity also exhibited fewer externalizing behaviors according to 6<sup>th</sup> grade teacher reports compared to children whose mothers evidenced moderate levels of sensitivity which decreased over time. These results remained unchanged after significant demographic and family context variables and children's social competence at 54 months were entered as covariates

Overall these results are consistent with previous research which has found that both paternal and maternal sensitivity are related to children's social competence and behavioral adjustment (Amato & Rivera, 1999; Hastings et al., 2008; McDowell et al., 2003, McElwain et al., 2007; NICHD ECCRN, 2004). The fact that fathers' sensitivity trajectory was most significantly related to children's later externalizing behaviors is particularly interesting. Other studies have reported similar findings with fathers and children including associations between felt attachment security and lower aggression in middle childhood (Booth-LaForce et al., 2006). In thinking about possible mechanisms to explain this relationship, researchers have hypothesized that father's greater use of play during interactions in early childhood may provide more opportunities for children to be exposed to higher arousal states which afford more occasions to experience a range of emotions, thus supporting the development of better emotion regulation skills. These "play sessions" can also help to teach children how to interact socially, a skill that is utilized regularly in middle childhood as children spend more time in social settings such as school and peer events (i.e., sports, clubs).

Several parenting processes likely facilitate social competence including modeling, attachment processes, and genetics. Fathers who can comfortably display a variety of emotions and utilize good self-regulatory skills can directly model these competencies for their children. In addition, children who experience warm and supportive relationships with their fathers, that include support for autonomy, will likely be more willing to express negative emotion, thereby having the chance to learn how to cope with difficult feelings. Finally, genetic predispositions for increased arousal or inhibition obviously have an impact on a child's self-regulatory abilities which may subsequently affect social competence.

Despite associations between children's externalizing behaviors, social skills, and trajectories of parental sensitivity, no significant trajectory differences were found for internalizing behavior or friendship quality. The lack of associations between trajectories of parental sensitivity and these aspects of social competence may be due in part to measurement issues. First, teachers may be less inclined to notice internalizing behaviors (i.e., depression, anxiety) in their students, especially because their attention is often drawn, by necessity, to those students with externalizing behavior problems. Furthermore, teachers may feel less certain or less comfortable rating children's internalizing behaviors due to the very fact that these describe internal states or moods which are much more subjective than external behaviors. These results, however, are consistent with other studies which have utilized teacher reports of internalizing behaviors (Campbell et al., 2007). The absence of findings on friendship quality may be due to the somewhat restricted range of scores on this measure in the current sample. Most children rated the quality of their friendship with their "best friend" as highly positive. Also, the age of the study children (early adolescence) may limit their ability to differentiate subtle qualities of their friendships given their limited friendship experience, and substantial pubertal changes occurring at this age which lend themselves to a greater focus on self.

Child outcomes were re-analyzed with the opposite parent's mean sensitivity score included as a covariate in an effort to discern if fathers and mothers each made unique contributions to their children's social competence. Several researchers have found differential relationships between paternal and maternal parenting quality and children's social competence (Gottman, Hooven, & Katz, 1997; MacDonald & Parke, 1984). After adding these additional controls, paternal sensitivity over time no longer predicted children's social skills, but trajectory group differences in externalizing behaviors remained significant with all of the covariates in the

model. Even fewer group differences remained when maternal sensitivity trajectories and child outcomes were considered with covariates in the model. Specifically, maternal sensitivity no longer was associated with children's externalizing behaviors and differences between maternal sensitivity trajectories on the measure of children's social skills were limited to children whose mothers were in the high stable sensitivity trajectory and those with mothers in the moderate stable group.

These results are consistent with previous research on paternal sensitivity and children's social competence. In this study, however, both mothers and fathers were shown to make unique contributions to children's social competence, albeit in different aspects of behavior. Specifically, paternal sensitivity was related to children's externalizing behavior over and above maternal sensitivity, whereas maternal sensitivity was related to children's social skills over and above paternal sensitivity. These results underscore the need to control for both maternal and paternal parenting to detect unique parenting contributions to child development. Finally the fact that several of the significant relationships between parental sensitivity and children's social competence and behavioral adjustment were accounted for by the opposite parent's sensitivity, highlights the importance of coparenting processes and speaks to the fact that sensitive parenting takes place within a larger family system.

In summary, fathers' and mothers' parental sensitivity during early and middle childhood each uniquely predict to different aspects of their children's social competence and behavioral adjustment in 6<sup>th</sup> grade. Regardless of maternal sensitivity, fathers with decreasing sensitivity over time were found to have children rated by their teachers as exhibiting significantly more externalizing behaviors as compared to children whose fathers displayed consistently high to moderate levels of sensitivity. Likewise, regardless of paternal sensitivity, mothers with high

levels of sensitivity which remained stable had children who were reported to have better social skills compared to children with mothers who showed consistent but moderate levels of sensitivity over time.

#### **D. Study Strengths and Limitations**

This study has several methodological strengths including the use of a large, multisite, longitudinal data set collected over a long period of the study children's development (i.e., 7 years) from multiple informants (i.e., mothers, fathers, teachers, and children), using multiple assessment methods (i.e., observations, questionnaires). In addition, a semi-parametric mixture modeling technique allowed for the identification of distinct trajectories of paternal and maternal sensitivity, thus helping to delineate the developmental course of parental sensitivity in early and middle childhood. No study to date has examined both paternal and maternal sensitivity longitudinally during these periods of development. This study also offered a more detailed exploration of children's social competence in middle childhood by including both direct (i.e., social skills, friendship quality) assessments of social competence and indirect measures of regulation of behavior (i.e., internalizing and externalizing behavior problems). Finally, relevant demographic and family context variables in addition to previous levels of child functioning and the opposite parent's sensitivity were included as covariates to define the relationship between parental sensitivity and children's social competence further.

Despite these strengths, there are also several limitations to the present study. In an effort to eliminate potential confounds, the current sample was selected based on research participation and family stability, which resulted in a more high functioning group of families, thereby limiting the generalizability of the study findings. Furthermore given the sample's reduced

sociodemographic risk, scores on many of the family covariates had a restricted range, thereby creating a ceiling effect on several measures and limiting the ability to detect subtle group differences. This was not true, however, for sensitivity as smaller subsets of fathers and mothers were identified as showing low and moderate levels of sensitivity which either increased or decreased over time and others showed high and stable levels of sensitivity.

Another limitation stemmed from the use of trajectory analysis, an analytic technique which often results in the identification of small subgroups, thereby reducing the power to detect group differences. This study contained a small group of fathers with moderate-decreasing levels of sensitivity ( $n = 24$ ) and an even smaller group of mothers with low and increasing levels of sensitivity ( $n = 15$ ). Given these small cell sizes, child gender could not be adequately examined as a potential moderator of parental sensitivity and possibly other significant group differences (i.e., paternal depression) went undetected. Despite these restrictions, it should be noted that similarly small trajectory groups have been identified in other studies using semi-parametric mixture modeling (Schonberg & Shaw, 2007; Nagin & Tremblay, 1999). In addition, the proportion of fathers and mothers in the current study with low or moderate levels of sensitivity is consistent with what would be expected from a high-functioning community sample.

There were also several limitations inherent in the study design, measurement selection, and data collection procedures. First, this study did not employ a genetically informed design and, therefore, cannot determine the degree to which genetic contributions help to explain patterns of paternal and maternal sensitivity or how they influence the relationship between parenting and children's functioning. Second, the coding scheme for paternal sensitivity in this study was adapted from the maternal sensitivity measure. While this allows for side by side

comparisons of parenting behavior, it may overlook aspects of sensitivity which may be unique to fathers. For example, several researchers have suggested that fathers may facilitate children's social competence in early childhood through play, instrumental support (i.e., problem solving), and their emphasis on child autonomy and self-reliance (McElwain, Halberstadt, & Volling, 2007; Parke, 2000).

In addition, while the inclusion of parental harsh control offered data on another dimension of parenting shown to be related to both parental sensitivity and child outcomes, assessing lax versus firm discipline practices and parental monitoring would have helped to offer a more complete picture of parenting. Research has shown that the degree to which parental sensitivity is related to children's increased self-control and to fewer externalizing behaviors (behaviors indirectly related to social competence) is often dependent on the addition of other parenting behaviors such as limit setting (Eisenberg & Valiente, 2002). If additional measures of parenting (i.e., problem solving, teaching, monitoring) had been available and included in the current analyses, stronger differences between paternal parenting and children's social skills may have been detected. Overall, effect sizes in the current study tended to be quite small (e.g., .01 - .13) accounting for a very small proportion of the total variance.

Finally, due to constraints on how many visits could be required of participating families, maternal sensitivity was coded from mother-child interactions obtained during a laboratory visit whereas father-child interactions were during a home visit.. Children and fathers may have felt more comfortable in their home environment, thereby affecting their behavior during the interaction. Similarly mothers and children participating in the laboratory visit may have felt more restricted or felt more need to meet researchers' expectations in the lab setting.

## **E. Future Directions and Conclusions**

The present study has extended the current literature on parenting and children's social competence by expanding our understanding of the developmental course of parental sensitivity in American middle class mostly Caucasian families. Future research should seek to examine parental sensitivity longitudinally in minority and high-risk samples (i.e., low SES, divorced and remarried families, single parent households). It is likely that the trajectories of parental sensitivity during early and middle childhood in these populations would look substantially different, with a greater proportion of parents exhibiting low to moderate levels of increasing and decreasing sensitivity due to the increased psychosocial stressors and limited socioeconomic resources. Parental sensitivity in several of these family contexts may also look different due to cultural beliefs as compared to the "classic" definition of sensitivity which is typically defined as warm, supportive, child centered behaviors displayed by the parent. However, the recruitment and participation of fathers in research, especially minority fathers, will likely be challenging. For example, 904 families in the NICHD Study of Early Child Care included a father or father figure in the household making them eligible for the father protocol, but only 513 families included fathers who completed two or more visits making them eligible for the present study. This highlights the fact that even in a primarily white middle class two-parent sample, few fathers chose to participate in research sessions. Investigators may want to consider focus groups with fathers to learn more about their parenting strategies and what might motivate them to increase their participation in child development research.

The next generation of studies employing semi-parametric mixture modeling to examine parenting should also include dual trajectory models to investigate issues of coparenting. Specifically, mothers and fathers within the same household who display similar or divergent

levels of sensitivity or parenting styles should be examined both in relation to family context and child outcomes. Another direction for study designs would be to test for possible mediators of the association between parental sensitivity and children's social competence. Mechanisms which have been recently investigated include child self-control (Bradley & Corwyn, 2007), genetic contributions including gene  $\times$  environment interactions (Mills-Koonce, Propper, Garipey, Blair, Garrett-Peters, & Cox, 2007), child temperament such as reactivity and inhibition (McElwain, Halberstadt, & Volling, 2007), and attachment security (Booth-LaForce, Oh, Kim, Rubin, Rose-Krasnor, & Burgess, 2006). Finally, qualitative studies with fathers, including direct observation of father-child interactions in naturalistic settings would help to foster the development of paternal parenting measures. It is important to be innovative in assessment approaches with fathers in an effort to learn more about their parenting styles and any potentially unique contribution they may make to child development.

### *Conclusions*

This study makes several contributions to the existing literature. First and foremost, it helped to identify and delineate the developmental course of paternal and maternal sensitivity during early and middle childhood. Using a group based modeling technique, the study identified four separate groups of fathers and mothers with similar yet distinct levels of sensitivity. These included parents characterized by high-stable, moderate-stable, moderate-decreasing, and low-increasing levels of sensitivity. Overall, the majority of fathers and mothers in this study displayed high to moderately stable levels of parental sensitivity with their children during parent-child interactions from 54 months to 5<sup>th</sup> grade. Second, results helped to further define the trajectories of parental sensitivity by examining relevant demographic and family context variables. Parents with consistently high displays of sensitivity had significantly more

socioeconomic resources and utilized less harsh control as compared to parents with low to moderate levels of sensitivity which increased or decreased over time. Finally, both paternal and maternal sensitivity over time uniquely predicted different aspects of children's social competence in middle childhood, although coparenting also appeared to play a significant role. It is important to note, however, that despite significant results, effect sizes were small for most analyses, accounting for only 1 to 13% of the variance. This highlights the need for additional rigorous longitudinal research to better understand paternal and maternal parenting quality and its complex association with children's social competence and behavioral adjustment.

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