1-1-2012

Influences Of Early Child Characteristics And Health On Later Parent And Parent-Child Relationship Factors

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INFLUENCES OF EARLY CHILD CHARACTERISTICS AND HEALTH ON LATER PARENT AND PARENT-CHILD RELATIONSHIP FACTORS

by

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DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2012

MAJOR: PSYCHOLOGY (Clinical)

Approved by:

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Advisor Date

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DEDICATION

For my immediate and extended family, whose belief in me and support over the past several years made this possible. To Ted, our parents and siblings, Oliver and Sophie, thank you for your love, support and patience. To my husband, thank you for your hard work, encouragement and perseverance.

For Oliver, who bravely and joyfully faces each challenging day, and for Sophie, who demonstrates unending patience, acceptance and love – you are my sources of inspiration.

ACKNOWLEDGMENTS

I would like to express my gratitude to my research advisor, Dr. Ty Partridge, for his expertise, guidance and support throughout this project and my entire graduate career. I would also like to thank my clinical advisor and committee member, Dr. Annmarie Cano, as well as my committee member and unofficial mentor Dr. Rita Casey, for their support and encouragement during this project and throughout my time in graduate school. I would like to thank my dissertation committee, Drs. Ty Partridge, Annmarie Cano, Rita Casey, and Mark Larson, for their input and helping to shape this project as well as my development as a psychologist. I would like to thank the researchers and families who participated in the NICHD SECC and Dr. Partridge for facilitating my training in the use of this dataset. I appreciate the guidance of the faculty and staff at Wayne State University and at my clinical placements over the past several years. I am extremely grateful for my parents' immense support and belief in me throughout my life. I could not have finished this project without the extensive support and encouragement from my husband and patience of my children. I am grateful to my parents, sister, mother-in-law, brother-in-law, cousin and aunts for their assistance during this lengthy process. I appreciate the support and encouragement provided by my friends and classmates. Finally, I have to acknowledge Sophie's stuffed friends Owl and Piggy, whom she lovingly propped up next to my laptop holding my "chapter book" about structural equation modeling for Mplus to help me with my dissertation during many late nights.

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CHAPTER 1

INTRODUCTION

The expansive and significant influences of parent characteristics and parenting on child development and the parent-child relationship are well-documented. Much less is understood about the inverse effect, the ways in which child characteristics influence parents and parenting. Recent research and theory employ a more bi-directional relationship model in which parents and children influence each other (Lerner, Rothbaum, Boulos, & Castellino, 2002). Researchers are increasingly framing their hypothesis from a standpoint grounded in ecological systems or family systems theory. Bronfenbrenner's ecological systems theory (1977, 1986) suggests that parents and children function within a complex system of reciprocal intra and extrafamilial influences, all interacting with and influencing each other. Similarly, family systems theory involves interdependent elements within the family system and circular systemic patterns (Minuchen, 1985). A strong theoretical basis exists supporting the influence of young children on their environment, including the parenting they receive (e.g., Belsky, 1984; Bornstein, 2002, Bronfenbrenner, 1986; Karraker & Coleman, 2005; Lerner, 1982; Minuchen, 1985, Putnam, Sanson, & Rothbart, 2002). Emerging empirical evidence also supports a child's influence on his or her parents, for example through behavior and temperament (e.g., Feldman, Greenbaum, Mayes & Erlich, 1997; Fite, Colder, Lochman & Wells, 2006; Marshall & Tracy, 2009). Additional research, however; is warranted to identify the specific ways in which early child characteristics influence parenting.

The aim of this study is to explore further the ways in which early child characteristics influence parents and parenting, as well as contribute to the parent-child relationship. Specifically, using the NICHD Study of Early Child Care and Youth Development (NICHD SECCYD) longitudinal data set, we will evaluate models in which child characteristics directly

and indirectly influence parent characteristics, parenting, and the parent - child relationship. We expect to find direct effects of child health and temperament characteristics on maternal depression, romantic relationships, parental stress, and employment. Additionally, we propose to test two mediator models. First, we will examine a model in which difficult child characteristics such as health and temperament lead to poor parent-child interactions which in turn predict a change over time in maternal depression, stress, employment satisfaction and marital satisfaction. An additional hypothesis is that these child characteristics will also influence parent child interactions, specifically negative and positive regard, maternal sensitivity, and detachment over time through their influence on a child's mother. This doesn't necessarily suggest that the two mediation models are mutually exclusive. In fact, support for both would be consistent with a dynamic transactional model.

Parents, Parenting, and Children

The effects of parent characteristics and parenting on child outcomes and the parent child relationship are well documented. Positive parenting techniques promote healthy child development and can function as protective factors for children facing risks and adversity associated with divorce, premature birth, exposure to multiple stressful life events and low socioeconomic status (e.g. Englund, Luckner, Whaley, & Egeland, 2004; Masten, 2001). Negative parenting styles and techniques are associated with child problems, including emotional and social difficulties; school problems; externalizing and internalizing disorders; and violence (e.g. Alink, Mesman, Van Zeijl, Stolk, Juffer & Koot et. al 2009; Calkins & Johnson, 1998; Grolnick & Ryan, 1989: Steelman, Assel, Swank, Smith & Landry, 2002). Certainly, parenting influences both short-term and enduring components of child development, such as emotional, school and social functioning, attachment, and the parent-child relationship itself (e.g. Barlow, Parsons & Stewart-Brown, 2005; Lengua & Kovacs,

2005). Given the complex context in which each parent's parenting develops and evolves, as well as parenting implications for child development, a comprehensive exploration of the multifaceted relationship between parents and children is warranted.

According to relational developmental systems theory (Overton, 2010), parenting takes place and evolves within a multifaceted context of influences. Parents and parenting efforts are informed and develop within a complex ecology of diverse microsystems (e.g. setting in which person lives, includes immediate and extended family, neighborhood, peers), mesosystems (e.g. associations with other people, interactions between school and home), exosystems (e.g. relationship between immediate context and indirect social setting, such as parent work environment) and macrosystems (e.g. culture) (Bronfenbrenner, 1986; Lerner, 1998; Lerner, Catellino, Terry, Villarruel & McKinney, 1995; Overton, 2010). Ecological systems theory suggests that bidirectional influences exist between and within these nested systems, which interact across the chronosystem (e.g. sociohistorical events and circumstances and life course ecological events). Within this intricate and interactive developmental system, parents navigate and interact with the various environments and systems in diverse ways and attain different knowledge bases and connotations that inform parenting. Consider, for example, maternal return to work after having a child. This decision is influenced by the macrosystem, for example the cultural norms surrounding working mothers and news conveyed about research on advantages or disadvantages of daycare or parental care. Exosystem influences include job flexibility and work culture as well as attitudes about maternal employment in a family's social circles. Mesosystem influences include parent relationship with potential community daycare settings and institutions, such as a church, that may inform return to work decision making. Within the microsystem, availability of family or friends to provide childcare support for working mothers, prevalent

beliefs and practices related to working mothers within a family's neighborhood and peers, and family financial situation may also inform decision to return to work. —Simultaneously, these interactions influence the environment. It follows that parents and children influence each other and their interactions in a reciprocal and complex manner. Their relationship evolves within a complex ecology involving multiple systems and subsystems that all interact with and influence each other over time. A child with a difficult temperament may have greater influence on parent functioning for a mother with a limited support system together with higher expectations of children, for example, than for a mother with a significant network of support as well as flexible ideas about child functioning. Given the established importance of parenting on child outcomes, it is crucial to understand factors that influence parenting. Child contributions are a relatively less understood component of the greater context in which parenting develops and evolves. Returning to the initial example, child factors, according to this theory, should interact with environmental factors to influence maternal decision about return to work as well. For example, a premature infant with a compromised immune system may need to avoid childcare for a prolonged period. Depending on availability of friends or family who could watch the child in their homes (microsystem), the infant's mother may need to delay return to work. Maternal availability and work commitment may influence ability and willingness to stay home at the same time that infant health may influence maternal ability to and acceptance of return to work.

The concept that children play a role in constructing their environment and influencing their own development is not novel (e.g. Lerner, 1982; Lerner & Overton, 2008; Masten & Cicchetti, 2010). Several specific theories address the ways in which child characteristics, such as temperament or health, influence their environment, the parent child relationship, and the parenting that they receive (e.g. Lerner, 1982; Thomas & Chess, 1977; Cicchetti &

Howes, 1991). Lerner (1982) contends that it is not enough to explore the internal and external influences on a person's development. Instead, individuals act on, change, and are influenced by the numerous levels of context in which are entrenched (Baltes, 1979; Lerner, 1982). Within the context of such reciprocal influences, Lerner maintains, children and adolescents can "promote their own development". Through individual temperamental and physical characteristics, children evoke different reactions in people with whom they interact, such as peers, teachers and parents. The different ways in which children meet the demands of their particular environment (for example, expectations of their parents) influences the feedback they receive from others. In turn, this feedback influences further individual development.

Thomas and Chess (1977) suggested that a child's temperament influences his development through its "goodness of fit" with his environment, for example parenting characteristics. Specifically, a good match between a child's temperament and the parenting approach used by his caregivers will facilitate optimal development while disparity negatively influences child outcomes. Children who have difficulty following or adapting to a routine, for example, may present less of a challenge for parents who are more flexible than for those who prefer a strict routine (e.g. Lerner & Galambos, 1992; Thomas & Chess, 1977). Perhaps parent expectations serve to moderate the influences of child temperament or health on the parent child relationship.

Child Contributions to Parenting

One area of research in which child effects have been assessed is child maltreatment. According to the child maltreatment literature, parenting behavior is influenced by child characteristics, parent psychological resources, and sources of stress and support (e.g. Belsky, 1984; Cicchetti & Toth, 2005). Child temperament is perhaps the most studied of

child influences on parenting, and evidence suggests that demanding child temperament in particular can have a negative influence on parenting. Individual differences in child temperament evoke different interactions with a child's immediate (family) and larger environment. Individual children will thus have different susceptibility to contextual difficulties (e.g. Belsky, Bakermans-Kranenburg & Van IJzendoorn, 2007; Fox, Nichols, Henderson, Rubin, Schmidt, Hamer, et al. 2005; Mesman, Stoel, Bakermans-Kranenburg, van IJzendoom, Juffer, Koot & Alink, 2009).

Family systems theory (Minuchin, 1985) suggests that all parts of the family system are interdependent, with circular rather than linear patterns within systems. The systems are constantly evolving and involve complex and patterned interactions and reciprocal influences among subsystems (Cicchetti & Howes, 1991).

In a model derived from transactional development (Sameroff, 1975), family systems and developmental psychopathology theory, Cicchetti and colleagues (e.g. Cicchetti *&* Cohen, 1995; Cicchetti & Howes, 1991) and Sameroff (1975) argue that child characteristics interact with characteristics of their immediate and greater environment to influence their development. For example, children with temperaments characterized by emotion dysregulation may elicit abusive behavior by their parents. Specifically, children born prematurely and with greater emotion dysregulation, whom the parents find more difficult to soothe, may contribute to "system dysfunction" in maltreating families differently than their healthy peers (Cicchetti & Howes, 1991; Cicchettti & Rizley, 1981). Sanson, Hemphill and Smart (2004) explain that, according to the transactional model, children's health status, cognitive abilities and temperament interact with family, parent and greater sociocultural environment to influence developmental trajectories.

While a substantial literature describes the influences of parenting and environmental effects on child development, less is understood about the child's contribution to parenting (e.g. Ambert, 2001; Crouter & Booth, 2003; Fite, Colder, Lochman & Wells, 2006) and parent functioning (e.g. Murray, Stanley, Hooper, King & Fiori-Cowley, 1996).

Child Temperament and Parenting

One potential method of child contribution to parenting efforts is through influences of child temperament. Child temperament, for example, may serve to moderate parenting influences on child behavior (e.g., Bates, Dodge, Pettit & Ridge, 1998; Bradley & Corwyn, 2008; Mesman et al, 2009; Morrell & Murray, 2003) and development (Colder, Lochman, & Wells, 1997; Gallagher, 2002). Borstein (2002) states that infants significantly influence both the way in which parents parent and parents' beliefs about their parenting through the "quality and contingency of their own responsiveness" and their temperament. Either perceived or actual infant temperament and cognitive abilities can influence parents' beliefs about their efficacy. Putnam, Sanson, & Rothbart (2002) point out that a parenting strategy that comforts one baby may lack effectiveness for another baby. Despite using similar parenting approaches, the parents may reach different conclusions about their parenting abilities.

Children with challenging temperaments or who are born prematurely present a more arduous environment for parenting. In such situations, it seems that adequate social and personal resources can decrease inherent risks to parenting, child development, and parent child relationships (Belsky 1984). Parents may withdraw from or engage less with children who are more demanding or possess difficult temperaments (eg. Crockenberg and Acredolo, 1983; Sanson, Hemphill & Smart, 2004). Conversely, by possessing a more difficult temperament, a child may increase the likelihood that his parent will assert power when dealing with him (Rothbart & Bates, 2006). A handful of studies provide evidence that

parenting behaviors are influenced by child externalizing behavior problems (e.g., Anderson, Lytton, & Romney, 1986; Fite, Colder, Lochman, & Wells, 2006). Fite and colleagues (2006) found that boy's externalizing behavior at 4th grade predicted poor parent monitoring grades 5 and 6 as well as inconsistent discipline at grades 4 through 8. Regarding older children, O'Connor and colleagues (1998) found that adoptive parents used more negative parenting strategies with children who had a biological family history of antisocial behavior than with children without such a genetic risk for behavior problems. Kandel and Wu (1995) found that increased early child aggression predicted lower parent monitoring and closeness later in childhood.

Alternately, children with difficult temperaments may elicit parenting that is more positive. Multiple researchers have found that mothers of children with difficult temperament are more connected with their infants than are those with less difficult babies (e.g. Crockenberg & Smith, 1982; Pettit & Bates, 1984). In one study, mothers of young boys with emotion regulation and behavior difficulties showed increase levels of both warmth and dominance (Rubin, Hastings, Chen, Stewart & McNichol, 1998). Parents may employ increasingly positive parenting strategies with children who are more demanding and irritable, depending on child age and parent resources (Sanson, Hemphill & Smart, 2004; Sanson & Rothbart,1995). Sanson and colleagues (2004) suggest that while parents may initially increase positive parenting efforts with more difficult children, it may be difficult to maintain such efforts, particularly if they eventually see their child's difficulties as more intentional and less characteristic. Thus, the influences of child temperament on parenting strategies may change over time as parent perceptions of their children and child characteristics evolve.

Children with less challenging temperaments, on the other hand, may foster positive parenting techniques and development. In one study, less difficult temperament at 12

months of age predicted maternal responsiveness in home observations during the child's second year of age, which was related to positive social interactions at age 2 (Spangler, 1990). Regarding positive child contributions, Kochanska, Barry, Aksan, and Boldt (2008) found positive effects of child responsive stance towards maternal socialization influence and development of children's conscience on the relationship between maternal responsiveness and later child behavior difficulties.

Positive temperament traits may also serve to protect children from environmental stressors. Specifically, children who are more sociable or who have less difficulty adapting may evoke positive relationships with adults who will foster optimal development despite difficult circumstances such as negative parenting (Sanson et al. 2004; Werner & Smith, 1982).

Understanding the ways in which child characteristics influence parenting is particularly important given the ways in which these two factors can interact to influence child outcomes. Specifically, it appears that children with vulnerable temperaments are more likely to suffer long term negative consequences from negative parenting strategies (e.g. Sanson, Hemphill & Smart, 2004) and to benefit from positive parenting efforts or interventions (e.g. Klein Velderman, Bakermans-Kranenburg, Juffer & Van IJzendoorn, 2006).

Additionally, child characteristics may evoke different parenting strategies depending on child, parent or contextual factors. For example, family financial resources or type (e.g. dual or single income, single parent or married couple) or child characteristics (e.g. gender) may influence the ways in which child temperament or health difficulties influence parenting (Braungart-Rieker, Courtney & Garwood, 1999). Braungart-Rieker and colleagues (1999) found that infant boys with high levels of negative emotionality in dual-income families, but not in other family contexts, were increasingly likely to have secure attachments to their

fathers. It is likely that the relationship between child characteristics and parenting efforts is complicated, in any case. Barnett, Clements, Kaplan-Estrin and Fialka (2003) suggested that parents who have not come to terms with their child's chronic medical or mental health condition, or achieved adaptation in their words, find it more difficult to respond to their child with sensitivity.

Child Influences on Maternal Depression

Similar to temperament, there is some literature demonstrating a link between child behavior and maternal depression. Yet while the adverse effects of maternal depression on children and the parent-child relationship are well documented (e.g. Cicchetti, Rogosch, & Toth, 1998; Cummings, Keller & Davies, 2005; Goodman & Gotlib, 1999; Martins & Gaffan, 2000), less is known about the ways in which child characteristics influence maternal depression. This is particularly important given the implications of maternal depression on children and may have implications for prevention and outreach work with parents of children with health or temperamental difficulties.

Specific evidence regarding effects of child characteristics on paternal depression is limited. One study found a link between low child positive emotionality and maternal mood disorder (Durbin, Klein, Hayden, Buckley & Moerk, 2005). However; this association was not present for paternal mood disorder. Another recent longitudinal study failed to find effects of early child temperament on paternal depression and found limited but non-significant effects of female child temperament on maternal depression (Hanington, Ramchandani & Stein, 2010). Miner and Clarke-Stewart (2008) found that rate of early child externalizing behaviors was associated with later maternal depression and sensitivity. It is important to note; however, that this relationship existed for maternal, but not caregiver or teacher, reports of child externalizing behaviors. In a recent study of mothers of children with epilepsy, child

externalizing behaviors and attention deficits, but not autism or adaptive behavioral delays, were associated with increased maternal depression (Wood, Sherman, Hamiwka, Blackman, & Wirrell, 2008). The authors suggest that community support may play a factor in such effects.

The bidirectional and cyclical relationship in which child characteristics and maternal depression influence each other is not entirely understood. Caring for a child with behavioral or emotional difficulties, for example, places specific burdens on parent functioning and may exacerbate or enhance risk of maternal depression. Indeed, mothers of clinic referred children with difficulties report greater rates of depression (Civic & Holt, 2000; Elgar, McGrath, Waschbusch, Stewart & Curtis, 2004).

Empirical evidence supports interactive effects of child characteristics and maternal depression on later child and parent development. Researchers have found that child characteristics such as gender and temperament interact with maternal depression to influence changes in later externalizing behavior in school age and adolescent (Leve, Kim & Pears, 2005) and preschool and school age (Owens & Shaw, 2003) children. Feldman and colleagues (1997) studied 47 mother infant pairs and found that, together with decrease in maternal anxiety, a decrease in infant difficult temperament characteristics from 3 to 9 months of age predicted increased maternal sensitivity during mother and child play interactions. Additionally, increased paternal involvement along with decreased infant difficult temperament was related to reduced maternal intrusive behavior during play interaction.

Child Influences on Maternal Employment

The effects of having a child with temperament or health difficulties on maternal employment are not fully understood. Lerner and Galambos (1992) present potential relationships between difficult child temperament and maternal employment. Children with

more difficult temperaments, for example who are less predictable, with more negative moods and intense responses, challenge the parenting efforts of all mothers. Having a child who presents such demands may be especially stressful for mothers who have to deal with not only home pressures but with those of the employment context as well. A child who does not eat regularly or sleep through the night, for example, may induce different feelings in his mother than would a child who readily falls and remains asleep and eats as expected. A mother who is home may have less difficulty negotiating the parent child relationship than a mother who has to deal with such a difficult child after a full day of work, the authors suggest. Alternately, it is possible that having a child with a difficult temperament may drive encourage a mother to work outside of the home in order to escape (Lerner & Galambos, 1992). In their review, the authors conclude that the majority of data suggests that mothers of children with more difficult temperaments are less likely to seek employment outside of the home. Notably, this remains one of the few papers addressing child influences on maternal decision to return to work.

Galambos and Lerner (1987) found that infant physical problems and difficult temperament predicted maternal employment during the infant and toddler years. Specifically, mothers of children with chronic physical difficulties or more difficult temperament characteristics were less likely to work outside of the home at this time.

Difficulty in finding child care, particularly for children with disabilities, may account for part of the relationship between maternal employment and child difficulties. Sen & Yurtsever (2007) reported that most of the Turkish families of children with disabilities in their study received help from family members rather than community agencies. They reviewed another study in which one fourth to one third of families reported difficulties finding child care for their children with disabilities (Cutler & Gilkerson, 2002, as cited by Sen & Yurtsever, 2007).

In a study of mental health in working mothers of infants, Marshall and Tracy (2009) found that working mothers whose infants had increased health difficulties reported more symptoms of depression than other working mothers. Job quality (through association with work-family conflict) and marital status also predicted maternal depression.

Child Influences on the Parent Marital Relationship

Although a great deal of evidence supports the negative influence of marital conflict on children (e.g. Cummings & Davies, 1994; Grych & Fincham, 1990), less is known about the ways in which child difficulties affect a marriage. Researchers who recently followed families of kindergarteners for three years found that child agentic behavior (attempts to mediate marital conflict) at time 2 predicted lower marital discord at time 3, while child behavior dysregulation at time 2 predicted higher marital discord at time 3 (Schermerhorn, Cummings, DeCarlo & Davies, 2007). The authors suggest that it may be the parent's recognition of the child's attempts to alleviate their discord and thus the child's distress, rather than the child agentic behavior itself, that is linked to later diminished marital conflict. Reviewing literature on child ADHD and marital conflict, Wymbs and Pelham (2010) indicated that parents of children with behavioral disorders such as ADHD, ODD, or CD argue more often about parenting issues and experience greater marital discord, psychopathology and parenting stress (e.g. Johnston & Mash, 2001). In their experimental study of parents of 9 to 12 year old children with and without ADHD, Wymbs and Pelham (2010) had parents interact with confederate children who behaved in either a typical or disruptive manner. Couples then rated their interparental communication before and after the subsequent coparenting discussion. Couples who spent time with the disruptive confederate child displayed less positive and more negative communication with each other than parents who interacted with a typical child. Such effects were even more salient for parents of children with ADHD or

comorbid ADHD and ODD or CD. Another study by Wymbs and colleagues (2008) found that, compared to parents of children without ADHD, parents of children diagnosed with ADHD were more likely to divorce by the time the child was 8 years of age and reported shorter time to divorce. Given the implications for child development of marital conflict and divorce, additional work addressing influences of more general child temperament and health characteristics at an earlier age is warranted.

Family systems and transactional systems theories argue for the importance of addressing child behavior functions for the entire family system, for example addressing sibling-parent and spousal sub-systems (Cicchetti & Howes, 1991; Minuchin, 1985). Caring for a child with a disability places exceptional burdens on parent time and financial resources. Compared to parents of healthy children, parents of children with disabilities, for example, spend additional time helping their children with daily living activities and dealing with behavioral issues and medical crisis (Roberts & Lawton, 2001). The marital relationship may suffer as parents have less time to invest in each other (Sen & Yurtsever, 2007). Turkish mothers in the Sen & Yurtsever study indicated that their family, work and social relationships suffered as a result of having a child with a disability.

It is also possible that having a child with a disability may strengthen certain marital relationships. Mothers of children with disabilities ages five to fifteen in Great Britain were equally likely to report that having a child with such difficulties had made their relationship with their partner stronger as they were to indicate that the situation had weakened it (Emerson, 2003).

The Present Study

While a great deal of theoretical and empirical work addresses the complex relationships between children, parents, and their interactions, additional research is warranted to better

understand the mechanisms that influence the development and effects of parenting within the context of child influences and the parent-child interaction. To study the ways in which children influence their environment, Lerner (1982) suggested using repeated measures of context as well as child behavioral and physical attributes. The current study uses data collected during multiple time points as part of the NICHD SECCYD. Child temperament (behavioral) and health (physical) characteristics are measured at 6 months of age, and maternal characteristics are assessed at multiple time points from child 6 to 36 months of age. In their paper about maternal employment and child temperament, Lerner and Galambos (1992) make several suggestions for future research. Although the authors refer to temperament and maternal employment specifically, many of their suggestions apply to the study of the relationship between more general maternal and child health characteristics and the context in which they interact. They suggest that such research should be longitudinal and include assessment of child temperament and of its influences on the mother, maternal reaction to the child, parenting style, and child outcomes. Additionally, they suggest that future research might explore influences of child temperament and changes on timing of mother's return to work as well as maternal job satisfaction. It follows that such questions could be extended to include influences of child characteristics on maternal depression and satisfaction in the parenting and relationship roles.

Present Study Goals

This study aims to extend the understanding of child effects on parenting and the parent - child relationship. Specifically, we hypothesize that early child characteristics (assessed at 6 and 15 months) that could be considered challenging (health difficulties and difficult temperament) will influence both parent characteristics (stress, depression, attitude about

maternal employment, maternal employment, and relationship satisfaction) as well as parent-child interactions (specifically maternal sensitivity).

In order to evaluate these hypothesized relationships, we examine two mediator models. In the first, initial child temperament and health characteristics influence parent-child interactions, in turn predicting a change over time in maternal depression, stress, marital satisfaction, employment status and role satisfaction. It is expected that challenging early child characteristics will influence parents and parent child interaction.

Next, we examine a model in which early child difficulties influence maternal characteristics over time, which in turn predict parent child interactions. We will compare multiple mediation models for fit. A primary goal is to determine which model or models best describe the complex relationship between child difficulties, maternal outcomes and parent-child relationship characteristics. Specifically, we will explore the following hypotheses:

Hypothesis 1a: Difficult child temperament will predict maternal depression, parenting stress, relationship satisfaction, employment and employment satisfaction. We expect to find that difficult child temperament will predict higher levels of maternal depression and parenting stress and lower levels of marital satisfaction, employment and employment satisfaction.

Hypothesis 1b: Child health difficulties will predict increased levels of maternal depression and parenting stress and lower levels of maternal employment, employment satisfaction and relationship satisfaction. We expect to find that increased child health difficulties will predict increased levels of maternal depression and parenting stress and lower levels of maternal employment, employment satisfaction and relationship satisfaction.

Hypothesis 1c: Difficult child temperament together with child health difficulties will predict increased maternal depression and parenting stress and decreased relationship satisfaction, employment and job satisfaction. In this moderation model, we ask whether children with

health difficulties who also display difficult temperaments will predict maternal and parent-child relationship difficulties and decreased maternal satisfaction above and beyond children who have only health difficulties. We suspect that this will be the case. The longitudinal growth model for hypotheses 1a-c is presented in Figure 1.

Hypothesis 2a-c: Early child health (then temperament, then health and temperament) difficulties will predict 15 month parent-child interactions (decreased maternal sensitivity and positive regard and increased detachment and negative regard; decreased child engagement and positive mood and increased negative mood) which in turn will influence the trajectories of maternal depression, parenting stress, employment, job satisfaction and relationship satisfaction. Here we ask whether mothers of children with difficult temperaments or health problems or disabilities interact with their children differently than mothers of children who are healthy and without challenging temperaments. We expect to find that early child characteristics will predict decreased maternal sensitivity and positive regard, as well as increased detachment and negative regard for the child during later parent child interactions. Additionally, we expect that children with challenging temperament or health characteristics may display decreased engagement and positive mood, as well as increased negative mood during parent child interactions. We expect that these interactions will then influence the trajectories of maternal characteristics. Here we expect that the effects of child characteristics on maternal characteristics over time will be mediated by the parent child relationship. The longitudinal growth model for hypotheses 2a-c is presented in Figure 2.

Hypothesis 3a-c: Early child health and temperament difficulties will predict maternal characteristic trajectories, which will then predict 36 month mother-child interactions. We expect that the relationship between early child difficulties and later parent-child interactions will be mediated by maternal depression, relationship satisfaction, work satisfaction,

employment and parenting stress. The longitudinal growth model for hypotheses 3a-c is presented in Figure 3.

CHAPTER 2

METHOD

Participants

This study involves data collected as part of the NICHD Study of Early Child Care and Youth Development (NICHD SECCYD). This longitudinal study involved data collection at 10 sites throughout the United States: Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. Mothers ages 18 years of age and older were recruited from hospitals in and near the study cites in 1991. During sampling periods, 8,986 women were visited while in the hospital giving birth. Of these women, 5,416 met criteria for eligibility and agreed to participate. A subset of this group was selected to participate based on conditional random sampling in order to achieve ethnic, educational and economic diversity. A total of 1,364 families were enrolled in the study when the infants were 1 month old. Of the mothers participating in the study, 14% were single parents and 11% had not graduated from high school. A total of 24% of the children in the study were from ethnic minority backgrounds (NICHD ECCRN, 1997a; NICHD ECCRN, 1999). See Table 1, page INSERT, for detailed participant information. For each variable, the NICHD SECC team looked at site differences (see NICHD Early Child Care Network (1994) as well as the manuals of operation available on the study website http://public.rti.org/secc/). With regards to variables in the current study, there were significant site differences for mothers' rating of infant general health, total hours that mothers worked per week, and maternal sensitivity.

Procedure

Phase I data of the NICHD SECCYD, used in this study, were collected when the children were 1, 6, 15, 24 and 36 months old. Families were visited at home when the infant was 1

month old. At this time, child and family demographic information was collected and mothers completed numerous questionnaires. Mother-child interactions were assessed at home at 6 and 15 months of age and in the laboratory at 24 and 36 months of age. Throughout Phase I of the study, data was collected and demographic information updated at home, at the laboratory, and through phone and mail contact.

Measures

Demographics. Child health status is operationalized as a number of serious or chronic problems, including ear infections, respiratory and intestinal problems, in which the child was scored as having from no health problems to problems in all categories. Additionally, there is an overall health variable, in which the mother rated the child's health on a scale from poor to excellent. At 24 and 36 months, the mothers were asked whether or not a doctor or other medical professional had ever told them that their child had special needs. At each time point, information was collected regarding maternal employment and student status and the total number of hours a mother spends at work or school. At 1, 6, 15 and 36 months, information was also collected about each mother's satisfaction about her current employment status.

Child Temperament At the 6-month home interview, mothers completed a modified version of the Revised Infant Temperament Questionnaire (Carey and McDevitt, 1978). 56 items from the 5 subscales measured (activity, adaptability, approach, mood and intensity) were averaged to create a global infant temperament score in which higher scores indicate more difficult temperaments. Internal consistency coefficients range from .53 to .71.

Maternal Depression. Symptoms of maternal depression were assessed at 1, 6, 15, 24 and 36 months using the Center for Epidemiological Studies Depression Scale (CES-D). For this study, the survey was titled "My Feelings" and the items were presented in a different

order than in the original version. The CES-D is a 20-item self-report scale that assesses frequency of depression symptoms in the general population (Radloff, 1977). It is not intended for clinical use as a diagnostic tool. Respondents indicate on a scale of 1 (rarely or none of the time (less than 1 day)) to 4 (most or all of the time (5-7 days)) how often in the past week they have felt or behaved a particular way. Scores range from 0 to 60 with higher scores indicating higher levels of depression symptoms. A cutoff score of 16 or above generally indicates significant depressive symptoms. This measure has demonstrated high reliability and validity, with an internal consistency alpha of .85 in the general population, test-retest reliability over four weeks of .67, and satisfactory validity demonstrated by comparison of a depressed to non-patient group (Radloff, 1977).

Maternal Relationship Satisfaction Feelings of intimacy with one's romantic partner were measured at 1, 5, 15, 24 and 36 months. The 6-item emotional intimacy scale from the Love and Relationships Part A: Personal Assessment of Intimacy in Relationships (PAIR) (Schaefer & Olson, 1981) was completed by mothers at all sites. This scale has adequate psychometric properties (Schaefer & Olson, 1981).

Maternal Employment and Role Satisfaction Maternal role satisfaction was assessed by asking mothers about their degree of satisfaction with their current decision to work, attend school, or not work. Responses were rated on a 5-point Likert scale ranging from 1 (very satisfied) to 5 (very dissatisfied). Adequate psychometric properties were reported for the scale by the NICHD ECCRN. Higher scores indicate greater satisfaction with current maternal role.

Parenting Stress Maternal feelings of parenting stress were measured at 1 and 6 months using a modified version of the Parenting Stress Index (Abidin, 1983), titled "Feelings about Parenting". This measure consisted of 30 items: the Attachment, Restrictions of Role, and

Sense of Competence subscales from the original PSI. The PSI appears to have adequate reliability and validity demonstrated for both working and non-working mothers (Abidin, 1983). Maternal reports of stress related to parenting were measured at 15, 24 and 36 months using a survey titled “Parenting Experiences”, an adapted version of the Parent Role Quality Scale (Barnett & Marshall, 1991). Parents indicate, using a 4-point scale, the extent to which each of 10 positive and 10 negative items are a reward or a concern associated with their parenting experiences. NICHD SECCYR authors report adequate reliability for the adapted scales, with internal consistency alphas of .84 for the rewards and .80 for the concerns scales and test-retest over 4 months of .81 and .72 for rewards and concerns, respectively. Satisfactory validity was demonstrated for the original scale (Barnett & Marshall, 1991). A high score indicates high parenting-related stress.

Mother-Child Interaction. Mother and child interaction was observed during the 6 and 15 month home visits using the Home Observation for Measurement of the Environment (HOME) Inventory-Infant/Toddler version (Caldwell & Bradley, 1984). Composite scores reflecting parent lack of negativity and positive parenting are calculated. Adequate psychometric properties are reported for the original measure.

Mother and child semi-structured interaction during play was videotaped for 15 minutes at home during the 6 and 15 month visits and in the lab during the 24 and 36 month visits. For the 6 month interaction, infant activity level, negative mood and positive mood and maternal negative regard for the child, sensitivity and detachment were rated by trained coders at one central location. Adequate reliability and validity have been demonstrated (NICHD ECCRN, 1999). From the 15 and 24 month interactions, child negative mood, positive mood, activity level (24 months only), and engagement with the mother, as well as maternal sensitivity, detachment and negative regard for the child scores were derived. At 36 months, child

negativity, affection towards mother and enthusiasm, as well as maternal sensitivity and hostility items were calculated.

Hypotheses and Data Analysis

This study used latent growth curve modeling to assess differences in rates of change of maternal characteristics as predicted by infant temperament, health, and temperament and health together. Drawing from previous research and theoretical understanding of the dynamic relationship between parents and children, the study also used mediation models involving parent child interactions to assess a series of hypotheses:

Hypothesis 1a: Difficult child temperament will predict higher levels of maternal depression and parenting stress and lower levels of marital satisfaction, employment and employment satisfaction.

Hypothesis 1b: Child health difficulties will predict increased levels of maternal depression and parenting stress and lower levels of maternal employment, employment satisfaction and relationship satisfaction.

Hypothesis 1c: Difficult child temperament together with child health difficulties will predict increased maternal depression and parenting stress and decreased relationship satisfaction, employment and job satisfaction.

Hypotheses 1a-c will each be tested in a series of baseline models. These models will look at child temperament and health separately as well as their interaction predicting maternal outcomes (as growth curves) as well as mother child interactions. Longitudinal growth models will be estimated for each hypothesis using M*plus* 5.1 (Muthén & Muthén, 2008). The cut-offs suggested by Cudeck and Browne (1992) and Hu and Bentler (1999) will be used to examine model fit. Specifically, a CFI >.95 and an RMSEA < .06 indicate a good model fit, while a CFI>.90 and an RMSEA between .80 and .10 indicate acceptable model fit.

Hypothesis 1c is a moderation model in which we will ask: does the interaction between child health and temperament predict maternal characteristics above and beyond either child factor alone? To assess the interaction term, we will conduct a comparative fit analysis (the two original models and the interaction model) using the BIC statistic to compare model fit (Schwarz,1978). Lower BIC indicates better fit. The longitudinal growth model for hypotheses 1a-c is presented in Figure 1.

Hypothesis 2a-c: Early child health and temperament difficulties will predict 15 month parent child interactions, which in turn will influence the trajectories of maternal depression, parenting stress, employment, job satisfaction and relationship satisfaction.

Here we ask: Do initial infant temperament and health characteristics (first separately in 2a and 2b, then together in 2c) predict parent child relationship variables at 15 months, which then predicts initial differences in maternal characteristic and rate of change?

For the relationships between child and maternal characteristics that were significant in the first model, we will examine meditational models through assessment of indirect effects. Again, model fit will be evaluated using Cudeck's and Browne's(1992) and Hu and Bentler's (1999) suggested cut-offs.

To assess for mediation effects, we will first see if infant temperament and health (separately then together) predict 15 month parent-child interactions. Next we will test to see if parent child relationship at 15 months predicts intercept and slopes of maternal characteristics. Finally, we will check whether initial paths between child and maternal characteristics are still significant. Diminished strength would suggest a mediation effect. The longitudinal growth model for hypotheses 2a-c is presented in Figure 2.

Hypothesis 3a-c: Early child health and temperament difficulties will predict maternal characteristic trajectories, which will then predict later (36 month) mother child interactions.

As described above, model fit will be assessed using cut-offs recommended by Hu and Bentler (1999) and Cudeck and Browne (1992). To assess for mediation in this model, we will first assess the relationship between child characteristics and parent-child interaction at 36 months. Next we will assess infant characteristics predicting intercept and slope of maternal characteristics, which then predict parent child interactions at 36 months. We will then determine whether direct path from the infant characteristics to the parent child interaction at 36 months diminishes, which would indicate mediation. The longitudinal growth model for hypotheses 3a-c is presented in Figure 3.

A comparison of the two mediation models (hypotheses 2 and 3) will be conducted using the BIC statistic (Schwarz, 1978). Lower BIC indicates better fit.

CHAPTER 3

RESULTS

Prior to analysis, the data were inspected for missingness, form and distribution. Missing data was addressed using the full information maximum likelihood (FIML) estimation method. Enders and Bandalos (2001) found FIML to be unbiased and more efficient than similar response pattern imputation, listwise deletion and pairwise deletion in a study comparing structural equation model missing data methods. Variables with ratios for skew and kurtosis estimates over their corresponding standard errors which exceeded a value of 1.96 were transformed using natural log transformations. Transformed variables were used in the statistical analyses and are noted where applicable.

Demographics for the study sample are presented in Table 1. Tables 2 and 3 contain descriptive statistics for the baseline model (Hypothesis 1a and 1b) and mediation model variables. Correlations for the baseline model variables are presented in Table 4. These variables have been transformed where noted.

Latent Growth Curve Analyses

Longitudinal growth models were tested for each hypothesis using M*plus* 5.1 (Muthén & Muthén, 2008). Latent growth curve modeling (LGC) involves testing differences in change over time. To measure change in individual growth over time, LGC requires that data is collected for each individual at three or more time points, and the sample size must be at least 200 at each time point (Byrne, 2012; Willett & Sayer, 1994).

Byrne (2012) explains that LGC involves estimating both within person change over time (intraindividual change) with respect to the outcome variables as well as estimating between-person (interindividual) differences in change on the outcome variables. We are estimating between person differences in the intra-individual change. For the current study, LGC

involves simultaneously assessing intraindividual change on the maternal outcomes and looking at between individual differences on these rates of change.

Byrne (2012) explains that LCG model means provide information regarding average slope and intercept values, while variances can indicate individual differences in slope and intercept values. Specification of slope and intercept parameters allows for estimation of between person differences in change. In other words, means represent population average values for slope and intercept, variances represent individual slope and intercept deviations from their population means, and intercept-slope covariances represent population covariance between potential deviations in initial variable status and change rate.

In the current study, we used LGC to assess for differences in trajectories of maternal characteristics across time. We hypothesized that infant health and temperament characteristics at 6 months (predictor variables) would explain both variation in initial status (intercept) and rate of change (slope) of maternal variables at child 6, 15, 24 and 36 months of age. Covariance of residuals for all models was constrained to zero, consistent with standard practice in growth modeling. This indicates that time specific variance at each time point is independent of time specific variance at other time points.

Multiple indices are reviewed to evaluate model fit. The Chi-Square Test of Model Fit provides the chi-square (χ^2) statistic. The hypothesized model χ^2 statistic is compared with that of the baseline model, which includes means (intercepts) in addition to variances of observed variables as parameters. Byrne (2012) explains "To the extent that the χ^2 value of the hypothesized model is less than that of the baseline model, the hypothesized model is considered to exhibit an improvement of fit over the baseline model." It represents the extent to which the proposed structured model better fits the data than the unstructured, baseline

model. While interpreting fit using the χ^2 statistic itself is problematic with large sample sizes, it is used in calculating the CFI, described below (Byrne, 2012).

Incremental and absolute fit indices were used to assess model fit. The Comparative Fit Index (CFI) is an incremental, or comparative, measure of fit. Specifically, it measures proportionate improvement of model fit over the less restricted nested baseline model (Hu & Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA) (Steiger & Lind, 1980) assesses how well the proposed model fits the actual sample data and is sensitive to the number of estimated parameters (Byrne 2012). Byrne (2012) explains that the RMSEA takes into account population estimation measurement error and estimates how well the hypothesized model would fit the actual (unavailable) covariance matrix for the population (Browne & Cudeck, 1993). The cut-offs suggested by Cudeck and Browne (1992) and Hu and Bentler (1999) were used to examine model fit. Specifically, a CFI >.95 and an RMSEA < .06 indicate a good model fit, while a CFI>.90 and an RMSEA between .06 and .80 indicate acceptable model fit.

Several specific hypotheses (1a and 1b) were examined regarding influences of infant characteristics on both the initial levels of and rate of change for maternal characteristics over time.

To test the hypothesis that infant temperament would influence the rate of change in maternal depression, the maternal depression slope factors were regressed on infant temperament intercept at 6 months. Here we asked, “Is there a difference in the rate of change in maternal depression for mothers of infants with more difficult temperaments as opposed to less difficult temperaments? We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 10.919; *d.f.* = 7; *p*=0.142; *CFI* = .998 and *RMSEA*= .021) . Our results indicated that infant temperament at 6 months

does predict maternal depression at 6 months but not the rate of change of maternal depression over time. In other words, initial levels of infant temperament difficulty were significantly related to initial levels of maternal depression, but not the linear slope (maternal depression trajectory). Although infant temperament did not predict changes in maternal depression, mothers' levels of depression symptoms did change at different rates over time (t=2.354) and the women did report significant differences in initial levels of depression (t=15.482). The unstandardized coefficients, standard errors and t-values are presented in Table 5.

To examine the influence of the number of infant health difficulties on maternal depression, the maternal depression slope factors were regressed on infant health summary intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 6.030; *d.f.* = 7; *p*= 0.536; *CFI* = 1.000 and *RMSEA*= 0.00) . The results indicated that number of areas of infant health difficulties at 6 months does predict maternal depression at 6 months but not the rate of change of maternal depression over time. Maternal depression and number of infant health difficulty areas were positively related at 6 months; however, 6 month infant health difficulties did not predict the rate of change in maternal depression. Although not related to number of infant health problems, there were significant differences between mothers in rate of change of depression symptoms over time (t=2.060). Mothers also differed with respect to initial levels of depression (t=15.782). The unstandardized coefficients, standard errors and t-values are presented in Table 5.

To further test the hypothesis that infant health would influence the rate of change in maternal depression, the maternal depression slope factors were regressed on the infant overall health variable intercept at 6 months. We specified a linear growth model, comprised

of intercept and linear slope factors. This model fit the data well (χ^2 = 4.649; *d.f.* = 7; *p*= 0.703; *CFI* = 1.000 and *RMSEA*= 0.00) . As with the other hypothesized predictors of maternal depression, the results indicated that the mother's rating of infant overall health at 6months predicts maternal depression at 6 months. There was a significant negative relationship (t=-5.957) between infant health and maternal depression, indicating increased levels of depression in mothers who rated their infants as having worse overall health. Maternal rating of infant health at 6 months did not predict the rate of change in maternal depression from 6 months through 36 months. There were significant differences between mothers in initial levels of depression (t=15.660) and the rate at which their depression symptoms changed over time (t=2.050). See Table 5 for the unstandardized coefficients, standard errors and t-values.

Neither infant temperament nor infant health predicted rate of change in maternal depression over time. Thus, hypothesis 1c, the moderation model, was not included in the analyses. Notably, for all predictor variables, maternal depression residual variance slope and intercepts were significant. This indicates that the womens' reported depression symptoms did change at different rates over time, and there were significant differences in initial (6 month) symptoms of depression. Trajectories of maternal depression across 6, 15, 24 and 36 months for a random 20 percent of the sample are presented in Figure 4.

To examine the influence of infant temperament on the rate of change in parenting stress from infancy through 36 months, the parenting stress slope factors for 15, 24 and 36 months were regressed on the 6 month temperament factor. The 6 month parenting stress variable was not used in the analyses as it was from the Abidin PSI rather than the Parenting Experiences Survey used at 15, 24 and 36 months. The Abidin PSI had different metrics. We specified a linear growth model, comprised of intercept and linear slope factors. This

model did not fit the data (χ^2 = 314.525; *d.f.* = 5; *p*= 0.000; *CFI* = 0.759 and *RMSEA*= 0.218). Parenting stress does not change significantly across time points, so this model will not work with any of the temperament or health predictors. The means for parenting stress at 15, 24 and 36 months are presented in Table 2. Trajectories of parenting stress across 15, 24 and 36 months for a random 20 percent of the sample are presented in Figure 5. Correlational analyses indicated a small positive correlation between parenting stress at 6 months and infant temperament at 6 months (r = .259, p > .01).

Next, the maternal employment slope factors were regressed onto the infant temperament intercept at 6 months in order to test the hypothesis that infant temperament would influence rate of change of maternal employment levels over time. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 20.395; *d.f.* = 7; *p*=0.005; *CFI* = .993 and *RMSEA*= .038) . There was a significant negative relationship between maternal employment and infant temperament at 6 months; however, infant temperament did not predict rate of change in maternal employment. The more difficult an infant's temperament at 6 months, the less his or her mother worked at 6 months. While 6-month infant temperament did not predict changes in maternal employment across the first 3 years, there were significant differences among mothers with regards to rates of change in maternal employment over time (t=7.528) as well as initial levels of employment (t=17.580). Parameter estimates for model variables are presented in Table 6.

To examine the influence of the number of infant health difficulties on maternal employment, the maternal employment slope factors were regressed on infant health summary intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 22.985; *d.f.* = 7; *p*= 0.0017; *CFI* = 0.992 and *RMSEA*= 0.042) . The results indicated that the number of infant health difficulties

was not related to maternal employment at 6 months or the rate of change in maternal employment over time. The number of infant health problems did not influence the number of hours that a mother works. Although not related to infant health difficulties, there were significant differences between mothers in initial hours worked per week (t=17.683) as well as rate of change in maternal employment from 6 to 36 months (t=7.555). The unstandardized coefficients, standard errors and t-values are presented in Table 6.

To further test the hypothesis that infant health would influence the rate of change in maternal employment, the maternal employment slope factors were regressed on the infant overall health variable intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 30.343; *d.f.* = 7; *p*= 0.0001; *CFI* = 0.988 and *RMSEA*= 0.051) . Mothers' rating of infant health (on a scale from poor to excellent) did not predict initial maternal employment at 6 months. Infant health at 6 months did not predict a change in maternal employment over time. Significant differences existed between mothers with regards to initial levels of employment (t=17.691) and rates of change in employment across time (t=7.576). Parameter estimates for model variables are presented in Table 6. Trajectories of maternal employment across 6, 15, 24 and 36 months for a random 20 percent of the sample are presented in Figure 6.

To test the hypothesis that infant temperament would influence the rate of change in maternal role satisfaction, the maternal role satisfaction slope factors were regressed on infant temperament intercept at 6 months. Here we asked, "Is there a difference in the rate of change in ones role satisfaction for mothers of infants with more difficult temperaments as opposed to less difficult temperaments? We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 8.338; *d.f.* = 7; *p*=0.3038; *CFI* = .998 and *RMSEA*= .012) . Our results indicated that infant temperament at 6 months

was negatively correlated with maternal role satisfaction at 6 months. As infant temperament difficulty increases, maternal role satisfaction decreases. Infant temperament at 6 months did not predict changes in maternal role satisfaction over time. Mothers differed significantly on initial levels of role satisfaction (t=10.882); however, their levels of role satisfaction did not change at significantly different rates over time (t=1.704). Essentially, there were no differences in rate of change in maternal employment across time for temperament to predict. Parameter estimates for maternal role satisfaction model variables are presented in Table 7.

To examine the influence of the number of infant health difficulties on maternal role satisfaction, the maternal role satisfaction slope factors were regressed on infant health summary intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 11.223; *d.f.* = 7; *p*= 0.1292; *CFI* = 0.993 and *RMSEA*= 0.022) . The results indicated that number of areas of infant health difficulties at 6 months predicts maternal role satisfaction at 6 months. Number of infant health problems was negatively correlated with maternal role satisfaction. Role satisfaction decreased as infant health difficulties increased. Infant health did not predict change in maternal role satisfaction over the first 3 years. There were individual differences in initial role satisfaction (t=10.945); however, not in rate of change of role satisfaction across time (t=1.637). The unstandardized coefficients, standard errors and t-values are presented in Table 7.

To examine the hypothesis that infant health would influence the rate of change in maternal role satisfaction over the first 3 years, the maternal role satisfaction slope factors were regressed on the infant overall health variable intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 12.123; *d.f.* = 7; *p*= 0.097; *CFI* = 0.992 and *RMSEA*= 0.024) . Mothers' rating of

infant health was related to initial maternal role satisfaction. There was not a significant relationship between infant health at 6 months and change in maternal role satisfaction from 6 to 36 months. Consistent with the two initial role satisfaction analyses, individual differences existed in initial levels of role satisfaction (t=10.877); however, not in rate of change in role satisfaction over time (t=1.641). The unstandardized coefficients, standard errors and t-values are presented in Table 7. Trajectories of maternal role satisfaction across 6, 15, 24 and 36 months for a random 20 percent of the sample are presented in Figure 7.

To test the hypothesis that infant temperament would influence the rate of change in maternal romantic relationship emotional intimacy, the maternal intimacy slope factors were regressed on infant temperament intercept at 6 months. Here we asked, "Is there a difference in the rate of change in emotional intimacy for mothers of infants with more difficult temperaments as opposed to less difficult temperaments? We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 14.039; *d.f.* = 7; *p*=0.050; *CFI* = .987 and *RMSEA*= .028) . Our results indicated that infant temperament at 6 months did predict maternal romantic relationship emotional intimacy at 6 months. There was a significant negative correlation, indicating that maternal relationship intimacy decreased as infant temperament difficult increased. Infant temperament did not predict changes in maternal relationship intimacy from 6 months to 36 months. Notably, there were individual differences in initial maternal relationship intimacy satisfaction (t=7.804) and the rate at which intimacy changed over time (t=3.206). The unstandardized coefficients, standard errors and t-values are presented in Table 8.

To examine the influence of the number of infant health difficulties on maternal relationship intimacy, the maternal intimacy slope factors were regressed on infant health summary intercept at 6 months. We specified a linear growth model, comprised of intercept

and linear slope factors. This model fit the data well (χ^2 = 14.452; *d.f.* = 7; *p*= 0.0437; *CFI* = 0.986 and *RMSEA*= 0.029) . The results indicated that number of areas of infant health difficulties at 6 months did not predict either maternal intimacy at 6 months or the rate of change in maternal intimacy over time. There was no significant relationship between number of infant health problems and maternal relationship emotional intimacy from 6 to 36 months. Although not related to infant health difficulties, there were significant differences between mothers in initial levels of relationship emotional intimacy (t=7.828) and rate of change in emotional intimacy over time (t=3.082). Parameter estimates for intimacy model variables are presented in Table 8.

To further assess the hypothesis that infant health would influence the rate of change in maternal relationship intimacy, the maternal relationship intimacy slope factors were regressed on the infant overall health variable intercept at 6 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 11.771; *d.f.* = 7; *p*= 0.1083; *CFI* = 0.991 and *RMSEA*= 0.023) . Mothers' rating of infant health was significantly related to maternal romantic relationship emotional intimacy at 6 months. Specifically, mothers who rated their infants as having better health also reported greater emotional intimacy in their romantic relationships. Infant health at 6 months did not predict changes in maternal relationship intimacy over time. As indicated above, there were significant differences between mothers in initial maternal relationship intimacy (t=7.778) and rate of change in intimacy over time (t=3.120). The unstandardized coefficients, standard errors and t-values are presented in Table 8. Trajectories of maternal relationship emotional intimacy across 6, 15, 24 and 36 months for a random 20 percent of the sample are presented in Figure 8.

Infant temperament and health did not predict rate of change over time for any of the maternal characteristics. Hypothesis 1c, a moderation model assessing the influence of infant temperament and health together on rate of change in maternal characteristics over time, was not included in the analyses.

Hypotheses 2a-c and 3a-c involved assessing mediation effects of 15 month and 36 month parent child interactions, respectively, for the hypothesis 1a-c analyses. As stated above, infant temperament and health did not predict rate of change in maternal characteristics over time. The proposed hypotheses 2 and 3 mediation analyses were not warranted. There was nothing to mediate because that relationship did not exist.

Post-hoc analyses were conducted to further evaluation the relationship between early infant temperament and health, parent child interactions at 15 and 36 months, and maternal characteristics over the first 3 years. Descriptive statistics for the interaction variables are presented in Table 2. First, we assessed correlations between infant temperament and health at 6 months and 15 and 36 month parent child interactions. Correlations are presented in Table 4. Infant temperament at 6 months was inversely related to maternal sensitivity during the 15 month interaction ($r = -.135$, $p = .000$) and the 36 month interaction ($r = -.137$, $p = .000$). Mothers of infants with more difficult temperament at 6 months showed slightly less sensitivity with them during 15 and 36 month interactions than did mothers whose infants were rated as less difficult at 6 months. Infant health summary at 6 months was not significantly related to maternal sensitivity during the 15 month or 36 month mother child interactions. There was a small correlation between global rating of infant health at 6 months and the 15 month interaction ($r = .085$, $p = .003$) and the 36 month interaction ($r = .117$, $p = .000$). Mothers of infants with better health at 6 months were more sensitive with them during later mother child interactions. The correlations between infant temperament

and global health rating at 6 months and maternal sensitivity at 15 and 36 months were small. This is consistent with what we saw in the growth curve analyses. There was not much variance in the slopes and the variables did not seem to be very related.

Next, we used latent growth curve modeling to assess the relationship between 15 month parent child interactions and change over time in maternal characteristics at 15, 24 and 36 months. To test the hypothesis that maternal sensitivity during the 15 month mother child interaction would influence the rate of change in maternal depression, the maternal depression slope factors across 15, 24 and 36 months were regressed on maternal sensitivity at 15months. Here we asked, "Is there a difference in the rate of change in depression for mothers who displayed more sensitivity as opposed to less sensitivity? We specified a linear growth model, comprised of intercept and linear slope factors. The model would not run due to lack of sufficient variance in maternal depression across the 3 time points. We removed the slope from the model to assess the intercept. This model fit the datal (χ^2 = 4.440; *d.f.* = 6; *p*=0.6173; *CFI* = 1.000 and *RMSEA*= .000) . Our results indicated that maternal sensitivity at15 months did predict maternal depression at 15 months. Higher maternal sensitivity was associated with lower maternal depression. The level of depression remained consistent across the 15, 24 and 36 month time points. This lack of variance made it impossible to run the growth curve model. There are individual differences in maternal depression (t=19.252) and they are significantly related to maternal sensitivity; however, they do not change over time. The unstandardized coefficients, standard errors and t-values are presented in Table 9.

To evaluate the hypothesis that maternal sensitivity would influence the rate of change in maternal employment, the maternal employment slope factors were regressed on the maternal sensitivity variable intercept at 15 months. We specified a linear growth model,

comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 0.583; *d.f.* = 2; *p*= 0.7470; *CFI* = 1.000 and *RMSEA*= 0.000) . Maternal sensitivity was significantly related to maternal employment at 15 months. Specifically, mothers who displayed greater sensitivity during the 15 month interaction also reported working more hours per week at 15 months. Maternal sensitivity at 15 months predicted changes in maternal employment over time. There was a significant negative relationship, so that decreased maternal sensitivity at 15 months predicted a more rapid increase in maternal employment from 15 to 36 months. The less sensitive the mothers were, they tended to work more hours over time. It follows that there were significant differences between mothers in hours worked per week at 15 months (t=15.279) as well as rate of change in maternal employment from 15 to 36 months (t=4.237). The unstandardized coefficients, standard errors and t-values are presented in Table10.

Prior to examining the relationship between maternal role satisfaction and sensitivity, the maternal role satisfaction variable was dichotomized into a working mothers group and another for at home mothers and recoded in SPSS. To examine the influence of maternal sensitivity on maternal role satisfaction for at home mothers, the maternal role satisfaction slope factors were regressed onto the maternal sensitivity intercept at 15 months. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 2.602; *d.f.* = 2; *p*= 0.2723; *CFI* = 0.998 and *RMSEA*= 0.015) . The results indicated that maternal sensitivity at 15 months predicts maternal role satisfaction for at home mothers at 15 months. Role satisfaction increased as maternal sensitivity increased. Maternal sensitivity during the 15 month interaction did not predict rate of change in maternal role satisfaction for moms who did not work over the first 3 years. This is consistent with the finding that there were not significant differences among at home mothers in rate of change

of role satisfaction from 15 to 36 months (t=1.553). There were, however, significant differences among mothers in levels of role satisfaction at 15 months (t=6.229). The unstandardized coefficients, standard errors and t-values are presented in Table 11.

Next, the maternal role satisfaction, working mothers, slope factors were regressed onto the maternal sensitivity intercept at 15 months in order to test the hypothesis that maternal sensitivity would influence rate of change of maternal role satisfaction levels over time for working mothers. We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data well (χ^2 = 0.563; *d.f.* = 1; *p*=0.4529; *CFI* = 1.000 and *RMSEA*= .000). For working mothers, maternal sensitivity at 15 months was not significantly related to either role satisfaction at 15 months or the rate of change in role satisfaction from 15 to 36 months. Notably, there were not significant differences among working mothers with regards to initial levels of role satisfaction (t=0.567) or rates of change in role satisfaction over time (t=0.185). Essentially, there was no change for maternal sensitivity to predict. Parameter estimates for model variables are presented in Table 11.

To examine the influence of maternal sensitivity on maternal relationship intimacy, the maternal intimacy slope factors were regressed on the maternal sensitivity intercept at 15 months. Here we asked, “Is there a difference in the rate of change in ones romantic relationship emotional intimacy for mothers who display more sensitivity as opposed to less sensitivity during the 15 month parent child interactions? We specified a linear growth model, comprised of intercept and linear slope factors. This model fit the data (χ^2 = 5.996; *d.f.* = 2; *p*=0.0499; *CFI* = .990 and *RMSEA*= .040) . Our results indicated that maternal sensitivity at 15 months was related to maternal relationship emotional intimacy at 15 months. Maternal sensitivity at 15 months did not predict changes in maternal relationship intimacy over time. There were, however, significant differences between mothers with regards to rate of change

in maternal relationship emotional intimacy over time (t=2.705) as well as emotional intimacy at 15 months (t=7.037). The differences in change over time were simply not related to maternal sensitivity at 15 months. Parameter estimates for maternal role satisfaction model variables are presented in Table 12.

CHAPTER 4

DISCUSSION

In this study, we used latent growth curve analysis to test a series of hypotheses regarding the relationship between infant temperament and health and the development of maternal characteristics from 6 to 36 months. In hypothesis 1a, we predicted that difficult child temperament would predict higher levels of maternal depression and parenting stress and lower levels of employment, role satisfaction, and marital satisfaction over time. With hypothesis 1b, we predicted that child health difficulties would predict increased levels of maternal depression and parenting stress and lower levels of maternal employment, role satisfaction and relationship satisfaction. Evaluation of the remaining hypotheses was not relevant due to lack of support for initial hypotheses regarding infant influences on rates of change in maternal characteristics.

Infant Temperament and Health and Maternal Depression

We expected that more difficult infant temperament and poorer infant health at 6 months would be associated with increased maternal depression at 6 months and steeper slopes of maternal depression from infant 6 to 36 months of age. Neither Infant temperament nor infant health predicted changes in maternal depression over time. Infant temperament, overall health rating, and number of health difficulties were related, however, to the initial level of maternal depression. Specifically, the more difficult the infant's temperament was, the higher the mother's depression score. This finding is consistent research by Cutrona and Troutman (1986), who found a strong direct correlation between infant temperament and maternal depression at 3 months of age as well as a relationship between the two mediated by parenting self-efficacy. It is possible that mothers with higher depression scores perceive their infants as more difficult, or having an infant with difficult temperament leads to increased

feelings of depression in mothers. Because the measure of infant temperament was maternal report, the data do not directly assess the nature of the relationship. However; while there is much debate regarding objective v. subjective ratings of child behaviors such as temperament, we would make the case that parental responses to the child are based on the parent's perception of the child's behavior so the subjective ratings are more salient to parent-child relationships. Also, mothers who rated their infants as having worse overall health, as well as those who rated their infants as having more health difficulties, reported higher levels of depression symptoms. Similar to ratings of temperament, depressed mothers may be more likely to recall health difficulties or to rate their infants as less healthy, or even less positively in general. On the other hand, caring for an infant with health difficulties or with difficult temperament may have immediate and negative effects on maternal mood. In the current study; however, these effects were short term. Regardless, maternal depression scores were fairly static from child 6 through 36 months of age, indicating depression is likely persistent. The enduring nature of the depression in these mothers raises the question of whether or not the depressed mothers were already depressed, or if this was truly post-partum depression. We did not have data on previous levels of depression as mothers in this study were recruited around the time of childbirth. Future research should address this question by including measures of depression and other relevant maternal characterstics prior to giving birth.

Infant Temperament and Health and Parenting Stress

It was not possible to evaluate the relationship between early infant temperament and health and parenting stress with the proposed model due to lack of change in parenting stress from 15 to 36 months. Parenting stress scores were quite static throughout these initial years. There was a small positive correlation between parenting stress at 6 months

and infant temperament at 6 months. The lack of support for our proposed model is supported by research by Mulsow, Caldera, Pursley, Reifman, and Huston (2002). This group found that maternal parenting stress across the first 3 years was best predicted by mother's personality. Parenting stress was attenuated by romantic relationship intimacy during infancy and at 3 years and by social support during the child's second year. Child temperament was related to maternal parenting stress at 1 and 36 months. As with other maternal characteristics and maternal well being in general, it appears that components of the mother's larger social and environmental context may have more influence on parenting stress than her child alone.

Infant Temperament and Health and Maternal Employment

With regards to early infant characteristics and maternal employment over the first 3 years, our results indicated that infant temperament does influence the initial decision on whether to return to work; however, it does not predict changes in maternal employment over the child's first 3 years. Mothers of infants with more difficult temperaments worked less than mothers of infants who were rated as less difficult by their mothers. It may be the case that mothers of infants with difficult temperaments decide to stay home, or, alternatively, mothers who stay home may perceive their infants as more difficult. The early mother-child relationship may be more influential with regards to maternal employment, as difficult temperament did not predict changes in maternal employment over time. If a mother returns to work early, for example, it may be difficult to not work later on.

Looking at SPSS descriptive statistics prior to log transformations, it appears that mothers work more as the number of infant health problems increase. This is surprising; however, it may be a health insurance issue as mothers of infants with more health difficulties may require greater financial resources and insurance benefits in order to care for them.

Infant Temperament and Health and Maternal Role Satisfaction

We predicted that more difficult infant temperament and poorer infant health at 6 months would predict lower maternal role satisfaction at 6 months and steeper decline (slope) of maternal role satisfaction from 6 to 36 months. Infant temperament, overall health rating, and number of health difficulties were related to the initial level of maternal role satisfaction. Specifically, mothers who rated their infants as having more difficult temperaments reported less satisfaction with their current work status. Likewise, mothers who reported that their infants were less healthy, and those whose infants had health problems in more areas, reported lower satisfaction with their current role. It is possible that the mothers of these infants had less positive parenting and experiences in general, and lower general satisfaction, due to the pervasive nature of infant health and behavioral difficulties. It could also be the case that mothers who are less happy in their current role perceive their babies characteristics in a less positive manner. The hypothesis that infant health and temperament difficulties would predict rate of change in maternal role satisfaction from 6 to 36 months was not supported. There were no significant differences between mothers in rate of change in maternal role satisfaction over time, so there were no differences to predict.

Infant Temperament and Health and Maternal Romantic Relationship Intimacy

With regards to early infant characteristics and maternal romantic relationship emotional intimacy over the first 3 years, our results indicated that infant temperament does influence initial levels of emotional intimacy; however, it does not predict changes in maternal relationship intimacy over the child's first 3 years. Maternal relationship intimacy decreased as infant temperament difficulty increased. Mothers' rating of infant health, but not number of areas of infant health difficulties, was related to emotional intimacy at 6 months. Mothers who rated their infants as having better health reported more emotional intimacy at 6 months.

Neither measure of infant health predicted rate of change in maternal intimacy from 6 to 36 months.

Although not specific to romantic relationship emotional infancy, Belsky and Rovine (1990) found that multiple parent, environmental and marital characteristics prior to the birth of a first child were most predictive of marital relationship changes from the prenatal period through the child's first 3 years. These factors distinguished between marriages improving and declining in quality across the first 3 years when considered together; however, they did not distinguish the marriages when considered independently. This lends further support to the theory that in future research, child influences should be evaluated together with additional contextual influences. In the Belsky and Rovine (1990) study, infant unpredictability, but not other aspects of infant temperament, was predictive of maternal rating of marital quality.

In summary, infant health and temperament characteristics were related to maternal depression, employment, role satisfaction and romantic relationship emotional intimacy at 6 months. The hypothesis that early infant characteristics would predict rate of change of maternal characteristics over the first 3 years was not supported.

Post Hoc Analyses

Analyses associated with hypotheses 2 and 3 were irrelevant as infant characteristics did not predict differences in rate of change of any of the maternal characteristics. Post hoc analyses were conducted to further explore the relationships between infant characteristics, parent-child interactions and maternal characteristics over time.

As part of hypothesis 2, we predicted that difficult infant temperament and increased infant health difficulties would be associated with decreased maternal sensitivity during later parent-child interactions. Results from correlational analyses provided limited support for this prediction, as there were very small significant relationships between infant temperament and

overall health ratings at 6 months and maternal sensitivity during 15 and 36 month interactions. Mothers who rated their infants as having more difficult temperaments during 6 month interactions demonstrated slightly less sensitivity towards them during 15 and 36 month interactions. This same relationship existed, although with an even smaller effect size, for mothers who rated their infants' health as poorer at 6 months. This is consistent with a study of triplets by Feldman, Eidelman, & Rotenberg (2004) who found that triplets with the most medical difficulties received less maternal sensitivity than their siblings. It is possibly that early infant characteristics set the stage for development of positive and negative ways in which their mothers interact with them. Mothers who view their infants as exhibiting difficult or challenging behaviors or traits may develop particular schemas surrounding their babies that shape the development of future interactions and regard. Future research may investigate potential mediators of these relationships. For example, it may be attributions that mothers make about their infants' temperaments and behaviors, rather than the infant characteristics alone, that contribute most to maternal sensitivity across the first few years. Consistent with findings of minimal effects of infant temperament, the NICHD Early Child Care Research Network (1997b) failed to find a relationship between mother-rated infant temperament difficulty and infant-mother attachment security. Maternal sensitivity and responsiveness, as well as maternal psychological adjustment, did predict attachment security. Infant characteristics alone may be less predictive of maternal outcomes and later parent-child interactions than the ways in which mothers perceive and assign meaning to their infants' characteristics, behaviors and personalities, together with community and extended family support and resources with which mothers negotiate infant temperament and health difficulties. Considering these findings, it may be particularly important to use subjective ratings by mothers in order to predict their later relationships with their children.

We used latent growth curve modeling to further assess the relationship between maternal sensitivity during 15 month parent child interactions and change over time in maternal characteristics from 15 to 36 months. Higher maternal sensitivity at 15 months was associated with decreased maternal depression, increased hours worked, increased role satisfaction for at home mothers, and increased romantic relationship emotional intimacy at 15 months. Maternal sensitivity was not related to role satisfaction for working mothers at 15 months. The relationship between maternal depression and maternal sensitivity is consistent with an expansive body of research on maternal depression and child development (i.e., Cummings & Davies, 1994). Maternal depression and maternal sensitivity are both, influential towards and influenced by, characteristics of the immediate family system and the larger system in which the family functions. For example, Crockenberg & Leerkes (2003) found that infant, mother, and partner characteristics together predicted both maternal sensitivity and post-partum depression. The finding that increased maternal sensitivity was associated with increased hours worked at 15 months was surprising. It may reflect a tendency of working mothers to work extra hard to ensure that time spent together with their child is of high quality. Bianchi (2000) suggested that employed mothers find ways to maximize time spent with their children and use their non-working hours differently than mothers who do not work outside of the home. The results are consistent with a study by Broom (1998) indicating that working mothers displayed greater sensitivity towards their infants at 3 months than did mothers who did not work outside of the home. She also found that marital quality, parental education, and SES predicted parental sensitivity independent of employment status. Gregg, Washbrook, Propper, and Burgess (2005) suggested that maternal home and market abilities may be positively correlated, in which case employed mothers are more skilled both at child rearing and occupational tasks.

With regards to rate of change in maternal characteristics over time, maternal sensitivity during the 15 month mother child interaction predicted slope of only one maternal characteristic: the rate of change in maternal employment from 15 to 36 months. Specifically, decreased maternal sensitivity at 15 months predicted a more rapid increase (steeper slope) in maternal employment from 15 to 36 months. Mothers who were less sensitive increased their work hours at a greater rate than those who displayed more sensitivity during the 15 month interaction. Mothers who display less sensitivity towards their infants may be more likely to increase hours worked from 15 to 36 months due to decreased feelings of closeness in the parent child relationship. It is possible that mothers who are less sensitive also feel less efficacy in their interactions with their children, and in turn embrace working hours. Mothers who are more sensitive may also be more likely to have already returned to or have established a steady working routine by 15 months.

In summary, this study did not find a relationship between infant temperament and health and the rate of change in maternal characteristics from infant 6 to 36 months of age. Infant health and temperament were related to initial levels of maternal depression, employment, role satisfaction and romantic relationship satisfaction. These findings are consistent with recent work suggesting that parent resources and perceptions are more predictive of particular outcomes than child difficulties. For example, Resch, Benz and Elliott (2012) used structural equation modeling to assess a dynamic process model of child disabilities and parent wellbeing. Child functional impairment did not predict parent wellbeing; however, resource access, social and environmental support, and parent problem solving ability did. These associations were mediated by parent appraisal of threat. Household income, number of children and child age were also associated with parent wellbeing. With regards to parent employment specifically, Resch, Benz and Elliott (2012) found a positive correlation between

hours worked per week and social and environmental supports as well as access to information and resources. These findings are consistent with our post-hoc results indicating increased maternal sensitivity associated with increased hours worked at 15 months, which may reflect resources available to mothers rather than sensitivity alone.

Similarly, the NICHD Early Child Care Research Network found that it was the interaction of its hypothesized predictors with other risk factors that predicted child outcomes rather than the expected predictors alone. For example, more time in child care during the first year predicted insecure infant-mother attachment only in interaction with other risk factors, especially low maternal sensitivity (Belsky, 2006; NICHD Early Child Care Research Network, 2001). Lack of support in the current study for the hypotheses involving infant characteristics predicting rates of change in maternal characteristics over the first 3 years does not necessarily indicate that these and other infant characteristics do not influence change in such maternal trajectories. It is possible that these infant characteristics are predictive in combination with other maternal, infant, or broader family or contextual constructs, or that we did not capture the particular aspects of infant functioning that have the most influence on maternal outcomes. Bridgett, Gartstein, Putnam, McKay, Iddins, Robertson and Rittmueller (2009) found that the trajectory of infant regulatory capacity development predicted the development of negative parenting during a child's toddler years. Specifically, negative slope (steeper decrease) of infant regulatory capacity predicted negative parenting during toddlerhood. Future research should incorporate the dynamic nature of both infant (independent and observed at only one time in the current study) and maternal (dependent in the current study) variables when evaluating the dynamic relationship between children and parents. Several of the maternal characteristics in the current study, such as depression and parenting stress, were consistent across the child's first 3 years. Future studies might assess

maternal characteristics prior to childbirth. Changes in maternal characteristics from pre-parenting to parenting status may provide important information about the relationship between child and maternal characteristics.

With regards to limitations, the current study used mothers' reports of infant temperament and health at 6 months to predict parent outcomes. With these measures, we found significant initial relationships; however, infant 6 month characteristics did not influence the rate of change in maternal characteristics from 6 to 36 months. Other than infant health at 6 months, we did not have multiple measures and reporters for each characteristic. Future research should examine infant and maternal characteristics using multiple measures, as well as reporters or evaluators where applicable.

Given the important role that fathers exert in child development and environment, including but not limited to their influence on mothers, additional research is warranted on child influences on fathers. For example, future studies may examine whether fathers are more likely to stay in a marriage or have increased involvement depending on child characteristics, similar to research on child gender influence on fathers remaining in marriage. Recent studies have indicated that paternal post-partum depression is associated with maternal depression (Paulson & Bazemore, 2010) and risk for negative child outcomes (Hanington, Ramchandani& Stein, 2010). Future research may consider differential influences on and effects of maternal and paternal characteristics within the parent-child relationship. Corwyn and Bradley (1999) analyzed data from the NICHD SECC and found different determinants of maternal and paternal responsitivity and acceptance (of parenting role and child characteristics) at child 15 months. In their study, marital quality, but not child temperament or abilities, predicted maternal sensitivity. Child characteristics did not predict

paternal sensitivity either; rather, it was related to marital quality, maternal employment status, and paternal job strain.

Future research should also address the influences of mother's feedback on child developmental outcomes (Lerner, 1992). For example, Miner and Clarke-Stewart (2008) found that parenting mediated the relationship between difficult infant temperament and externalizing behavior at age 9. Specifically, difficult temperament at infancy predicted high levels of externalizing behavior at age 9 only for children whose mothers employed harsh parenting techniques.

Regarding the current study participants, families were excluded from participation if the infants had obvious disabilities at birth or stayed in the hospital for more than 7 days, or if mothers had medical difficulties (NICHD ECCRN, 1997). The exclusion of children with early identifiable difficulties likely attenuated potential findings regarding influences of health difficulties and more challenging temperaments. Future research on child health effects on parenting should include children and parents with early identifiable health difficulties. This will enhance our understanding of the influences of a broader range of infant characteristics on parent outcomes.

Just like parent influences on children, infant and child influences on parents do not occur in isolation. Future research will need to examine potential mediating and moderating effects of extended environmental, social and family influences on the relationship between early infant characteristics and parent outcomes. This will provide increased insight into the complex relationship between child and parent characteristics, interactions and outcomes, as described in ecological systems (Bronfenbrenner, 1977, 1986), family systems (Minuchen, 1985), and relational developmental systems (Overton, 2010) theories.

Research focusing on child influences on parenting has important implications for public policy regarding children and families. For example, early intervention for families of children with medical conditions or behavioral difficulties may enhance parent child interaction and parent and child outcomes. Evidence exists that parenting intervention efforts may be especially effective for families with children who have challenging temperaments (e.g. Klein Velderman, Bakermans-Kranenburg, Juffer & Van IJzendoorn, 2006). Sen & Yurtsever (2007) suggest that families of children with disabilities, coping with stress, time and economic difficulties, do not get the assistance they need from healthcare professionals. Early intervention for children with behavioral difficulties may be especially effective. Work in this area may not only reduce maternal depression and stress associated with caring for difficult children but also enhance parenting skills and in turn reduce risks of future child difficulties (Wood, Sherman, Hamiwka, Blackman, & Wirrell, 2008). Given the influence of parenting on child development, it is essential to consider the factors that shape parenting in the multileveled context in which parenting itself evolves. For infants and children with health or temperament difficulties, and any children at risk, it is important to include broader family and community factors in prevention and intervention efforts.

Also important for clinical practice, results of this study indicate that it is not sufficient to consider individual child or maternal influences on the development of parent characteristics over time. When parents or families present for treatment, it is important to consider not just the current child, individual or family difficulties that have initiated contact with a professional, but rather the changes in child, parent and family characteristics over time as well as client understanding of and thoughts about such trajectories. Given the influence of multilevel systemic influences on child and parent development and functioning, it is important to consider such contextual factors in case formulations and treatment planning.

Table 1

Participant Characteristics

Characteristic	N	Percent of Sample
Total Number of Families	1,364	
Child Gender		
Female	659	48.3
Male	705	51.7
Ethnicity		
Caucasian	1042	76.4
African-American	173	12.7
Hispanic/Latino	83	6.1
Other	66	4.8
Family Status		
Two Parent	1166	85.5
Single Parent	198	14.5
Maternal Education		
Did Not Graduate High School	139	10.2
High School Graduate / GED	288	21.1
Some College	455	33.4
College Graduate	284	20.8
Post-Graduate Education	198	14.5
Site		
U of Arkansas	150	11.0
UC Irvine	132	9.7
U of Kansas	133	9.8
U of New Hampshire	140	10.3
Penn State U	123	9.0
Temple U	136	10.0
U of Virginia	136	10.0
U of Washington	139	10.2
Western Carolina Center	144	10.6
U of Wisconsin	131	9.6

Table 2

Means and Standard Deviations for Baseline Model Variables

Variable	Mean	Standard Deviation
Infant temperament 6 months	3.1783	0.40434
Maternal depression 6 months	8.9746	8.33940
Maternal depression 15 months	9.0455	8.17642
Maternal depression 24 months	9.4026	8.63164
Maternal depression 36 months	9.2193	8.30733
Parenting stress 6 months	50.2293	9.89975
Parenting stress 15 months	34.1198	6.06855
Parenting stress 24 months	34.3252	6.59373
Parenting stress 36 months	34.2732	6.45403
Relationship satisfaction 6 months	3.9508	0.77794
Relationship satisfaction 15 months	3.8879	0.80689
Relationship satisfaction 24 months	3.7586	0.89844
Relationship satisfaction 36 months	3.7576	0.89405
Maternal hours worked 6 months	20.7635	19.14477
Maternal hours worked 15 months	22.0024	19.51745
Maternal hours worked 24 months	22.2065	19.09252
Maternal hours worked 36 months	22.4427	19.17367
Maternal role satisfaction 6m	3.8905	1.12446
Maternal role satisfaction 15m	3.9292	1.08858
Maternal role satisfaction 24m	3.9751	1.08022
Maternal role satisfaction 36m	3.9596	1.07898
Maternal sensitivity 15m	9.3952	1.64637
Maternal sensitivity 36m	17.1860	2.77827

Table 3

Descriptive Statistics for Baseline Model Variables

Variable	N	Percent of Sample
Infant health summary 6 months		
No health problems	251	18.4
Health problems in one area	525	38.5
Health problems in two areas	378	27.7
Health problems in three areas	124	9.1
Infant health rating 6 months		
Poor	17	1.2
Fair	153	11.2
Good	491	36.0
Excellent	618	93.8

Table 4
Pearson Correlation Coefficients Among Baseline Model Variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Temperament	(1)												
2. Health Summary	.082**	(1)											
3. Health Global	-.174**	-.490**	(1)										
4. MDEP 6m†	.252**	.101**	-.148**	(1)									
5. MDEP 15m†	.180**	.094**	-.134**	.578**	(1)								
6. MDEP 24m†	.175**	.099**	-.120**	.573**	.572**	(1)							
7. MDEP 36m†	.199**	.048	-.080**	.537**	.577**	.583**	(1)						
8. PSI 6m†	.259**	.081**	-.089**	.452**	.362**	.328**	.335**	(1)					
9. PS 15m†	.155**	.024	-.090**	.356**	.386**	.308**	.301**	.450**	(1)				
10. PS 24m†	.126**	.046	-.061*	.292**	.319**	.366**	.348**	.381**	.634**	(1)			
11. PS 36m†	.137**	.034	-.059*	.302**	.294**	.311**	.410**	.359**	.568**	.639**	(1)		
12. Work 6m†	-.104**	.039	-.019	-.112**	-.067*	-.039	-.070*	-.140**	-.075**	-.065*	-.064*	(1)	
13. Work 15m†	-.092**	.045	-.032	-.120**	-.111**	-.042	-.078**	-.123**	-.120**	-.083**	-.073*	.614**	(1)
14. Work 24m†	-.118**	.007	.018	-.093**	-.092**	-.048	-.052	-.124**	-.081**	-.111**	-.091**	.532**	.623**
15. Work 36m†	-.087**	.052	-.060*	-.065*	-.050	-.009	-.039	-.086**	-.075**	-.095**	-.087**	.463**	.533**
16. Role Sat 6m	-.085**	-.040	.051	-.271**	-.218**	-.249**	-.252**	-.154**	-.151**	-.101**	-.160**	-.138**	-.086**
17. Role Sat 15m	-.095**	-.055	.101**	-.194**	-.217**	-.187**	-.213**	-.118**	-.126**	-.098**	-.096**	-.070*	-.048
18. Role Sat 24m	-.109**	-.095**	.088**	-.223**	-.233**	-.280**	-.250**	-.153**	-.139**	-.168**	-.157**	-.053	-.040
19. Role Sat 36m	-.121**	-.049	.053	-.213**	-.186**	-.217**	-.225**	-.115**	-.141**	-.135**	-.182**	.022	-.025

20. Intimacy 6m†	-.154**	.018	.102	-.302**	-.344**	-.327**	-.284**	-.293**	-.290**	-.266**	-.294**	.088	.098
21. Intimacy 15m†	-.035	-.100*	.083	-.227**	-.352**	-.377**	-.298**	-.291**	-.255**	-.227**	-.315**	-.017	.062
22. Intimacy 24m†	-.100	.005	.072	-.332**	-.364**	-.418**	-.338**	-.243**	-.245**	-.255**	-.279**	.053	.055
23. Intimacy 36m†	-.050	.008	.016	-.289**	-.273**	-.305**	-.390**	-.253**	-.258**	-.250**	-.289**	.028	.055
24. Sensitivity 15m†	-.135**	-.050	.085**	-.188**	-.203**	-.209**	-.189**	-.093**	-.078**	-.098**	-.046	.089**	.097**
25. Sensitivity 36m†	-.137**	-.051	.117**	-.195**	-.209**	-.234**	-.218**	-.135**	-.062*	-.047	-.054	.061*	.064*

Continued…	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
14. Work 24m†	(1)											
15. Work 36m†	.628**	(1)										
16. Role Sat 6m	-.098**	-.065*	(1)									
17. Role Sat 15m	-.056	-.028	.400**	(1)								
18. Role Sat 24m	-.080**	-.098*	.314**	.339**	(1)							
19. Role Sat 36m	-.047	-.090**	.330**	.290**	.318**	(1)						
20. Intimacy 6m†	.038	.061	.072	.065	.204**	.065	(1)					
21. Intimacy 15m†	-.010	-.062	.188**	.092	.277**	.111*	.515**	(1)				
22. Intimacy 24m†	-.019	-.001	.181**	.131*	.209**	.193**	.570**	.573**	(1)			
23. Intimacy 36m†	.020	-.039	.141**	.063*	.128**	.139**	.519**	.592**	.658**	(1)		
24. Sensitivity 15m†	.052	.012	.141**	.105**	.113**	.128**	.066	.132**	.128*	.100**	(1)	
25. Sensitivity 36m†	.064*	.004	.136**	.091**	.196**	.113**	.214**	.164**	.252**	.074*	.404**	(1)

Note. MDEP = Maternal depression. PSI = Parenting Stress Index. PS = Parenting Stress. † indicates log transformed variable. *$p < .05$, **$p < .01$.

Table 5

Parameter Estimates for Infant Temperament and Health and Maternal Depression

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal depression intercept on infant temperament	0.490	0.055	8.924
Maternal depression slope on infant temperament	-0.002	0.002	-1.073
Maternal depression intercept on infant health summary	0.107	0.025	4.190
Maternal depression slope on infant health summary	-0.001	0.001	-1.325
Maternal depression intercept on infant health	-0.182	0.031	-5.957
Maternal depression slope on infant health	0.002	0.001	1.748

Table 6

Parameter Estimates for Infant Temperament and Health and Maternal Employment

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal employment intercept on infant temperament	-0.440	0.112	-3.920
Maternal employment slope on infant temperament	0.000	0.004	0.120
Maternal employment intercept on infant health summary	0.070	0.051	1.375
Maternal employment slope on infant health summary	0.000	0.002	0.155
Maternal employment intercept on infant health	-0.024	0.062	-0.390
Maternal employment slope on infant health	-0.002	0.002	-0.948

Table 7

Parameter Estimates for Infant Temperament and Health and Maternal Role Satisfaction

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal role satisfaction intercept on infant temperament	-0.234	0.070	-3.345
Maternal role satisfaction slope on infant temperament	-0.003	0.003	-0.941
Maternal role satisfaction intercept on infant health summary	-0.064	0.032	-1.997
Maternal role satisfaction slope on infant health summary	-0.001	0.001	-0.604
Maternal role satisfaction intercept on infant health	0.113	0.038	2.925
Maternal role satisfaction slope on infant health	0.000	0.002	-0.131

Table 8

Parameter Estimates for Infant Temperament and Health and Maternal Relationship Intimacy

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal intimacy intercept on infant temperament	-0.060	0.024	-2.473
Maternal intimacy slope on infant temperament	0.001	0.001	1.048
Maternal intimacy intercept on infant health summary	-0.011	0.011	-1.041
Maternal intimacy slope on infant health summary	0.000	0.000	0.819
Maternal intimacy intercept on infant health	0.031	0.013	2.404
Maternal intimacy slope on infant health	-0.001	0.000	-1.769

Table 9

Parameter Estimates for Maternal Sensitivity and Maternal Depression

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal depression intercept on maternal sensitivity	-0.900	0.106	-8.489

Table 10

Parameter Estimates for Maternal Sensitivity and Maternal Employment

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal employment intercept on maternal sensitivity	0.804	0.233	3.454
Maternal employment slope on maternal sensitivity	-0.031	0.011	-2.794

Table 11

Parameter Estimates for Maternal Sensitivity and Maternal Role Satisfaction

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal role satisfaction, working, intercept on maternal sensitivity	-0.093	0.195	-0.479
Maternal role satisfaction, working slope on maternal sensitivity	0.081	0.190	0.428
Maternal role satisfaction, home, intercept on maternal sensitivity	1.394	0.224	6.229
Maternal role satisfaction,home, slope on maternal sensitivity	0.022	0.014	1.553

Table 12

Parameter Estimates for Maternal Sensitivity and Maternal Relationship Intimacy

Parameter	Unstandardized Coefficient	Standard Error	t-value
Maternal intimacy intercept on maternal sensitivity	0.133	0.057	2.322
Maternal intimacy slope on maternal sensitivity	0.001	0.003	0.324

Figure 1

Longitudinal Growth Curve Model for Hypotheses 1a-c

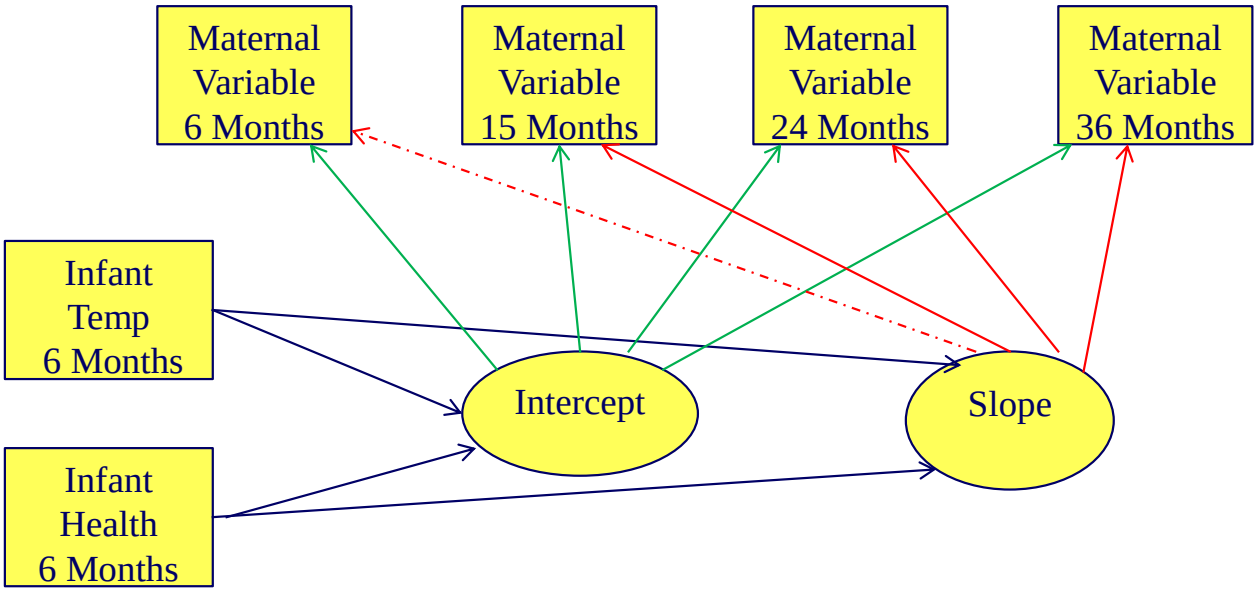


Figure 2

Longitudinal Growth Curve Model for Hypotheses 2a-c

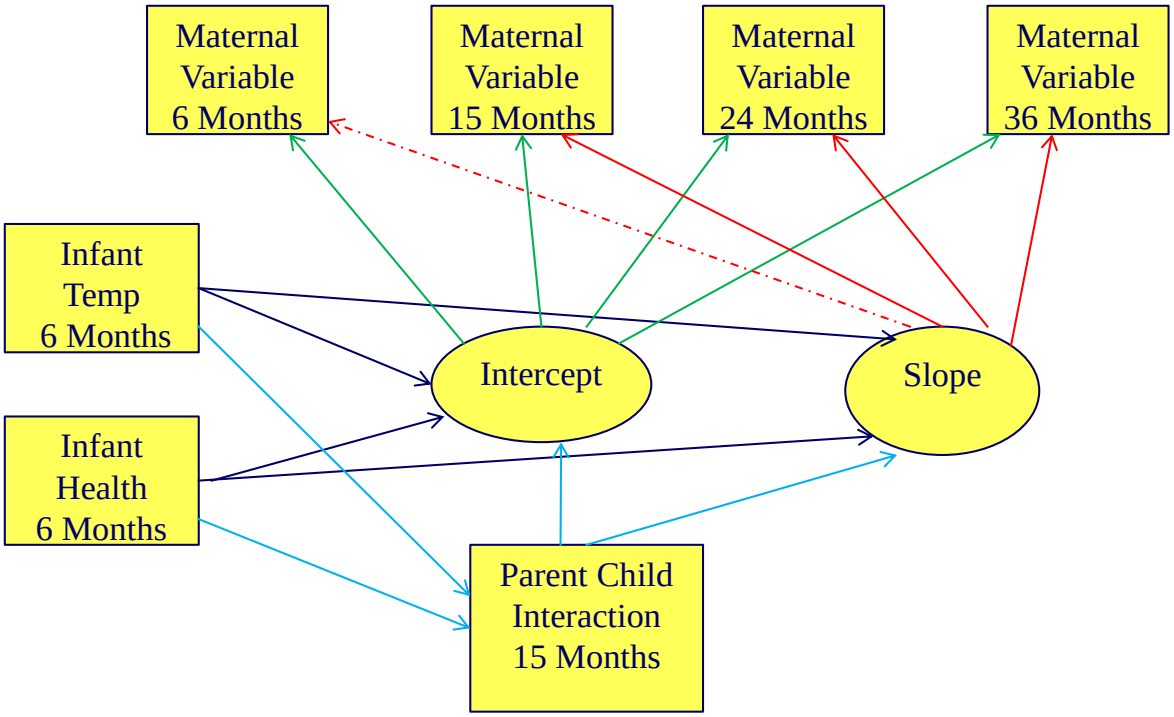


Figure 3

Longitudinal Growth Curve Model for Hypotheses 3a-c

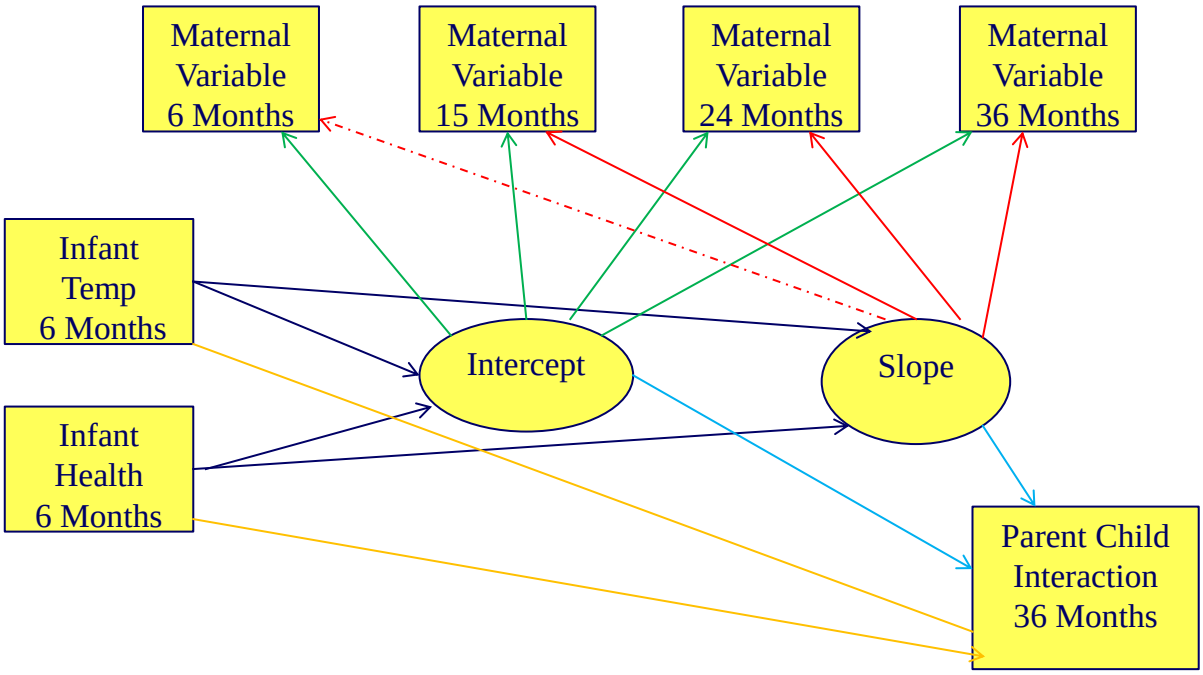


Figure 4

Trajectories of Maternal Depression at 6, 15, 24 and 36 months for 20% Random Sample of Mothers

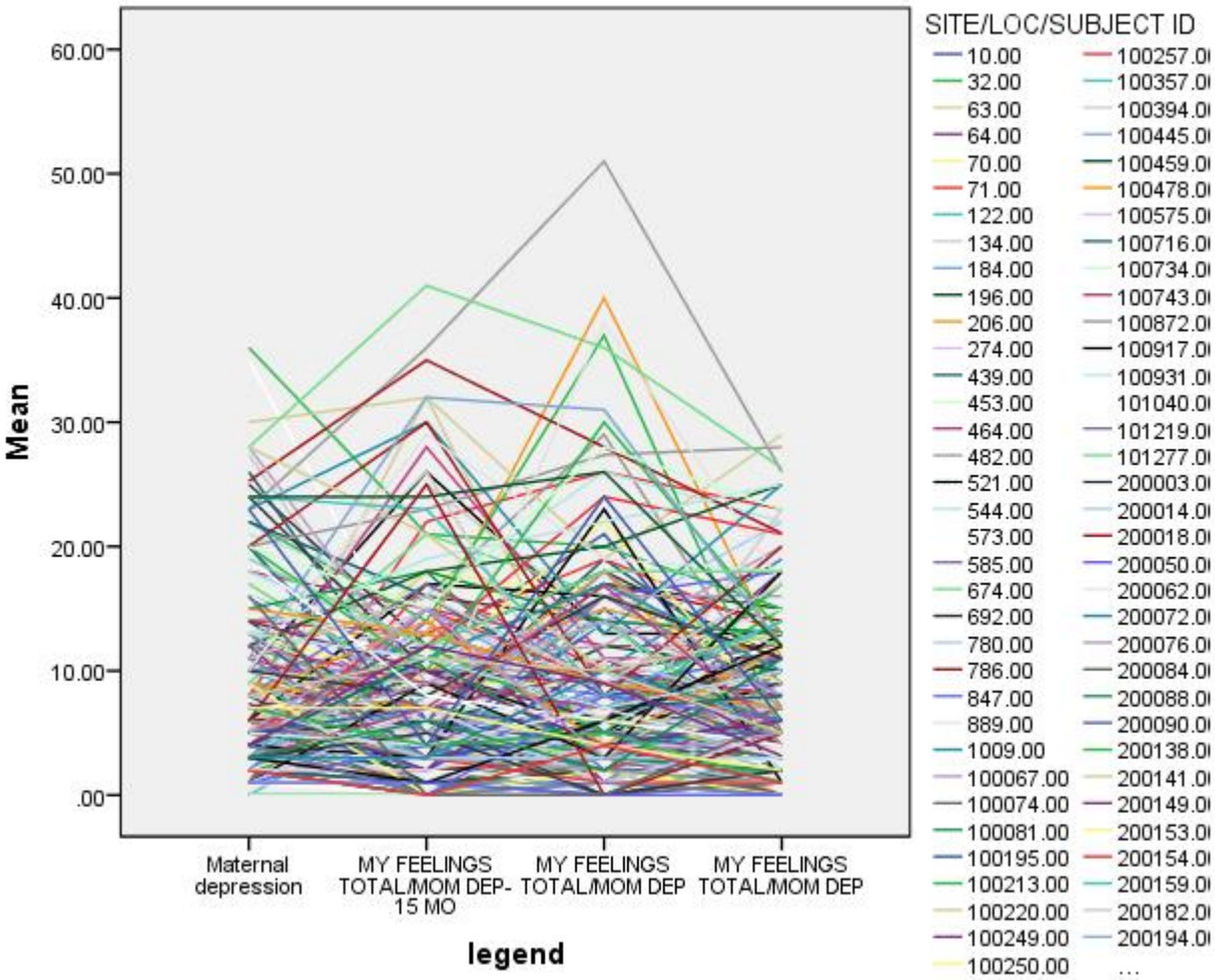


Figure 5

Trajectories of Parenting Stress at 15, 24 and 36 months for 20% Random Sample of Mothers

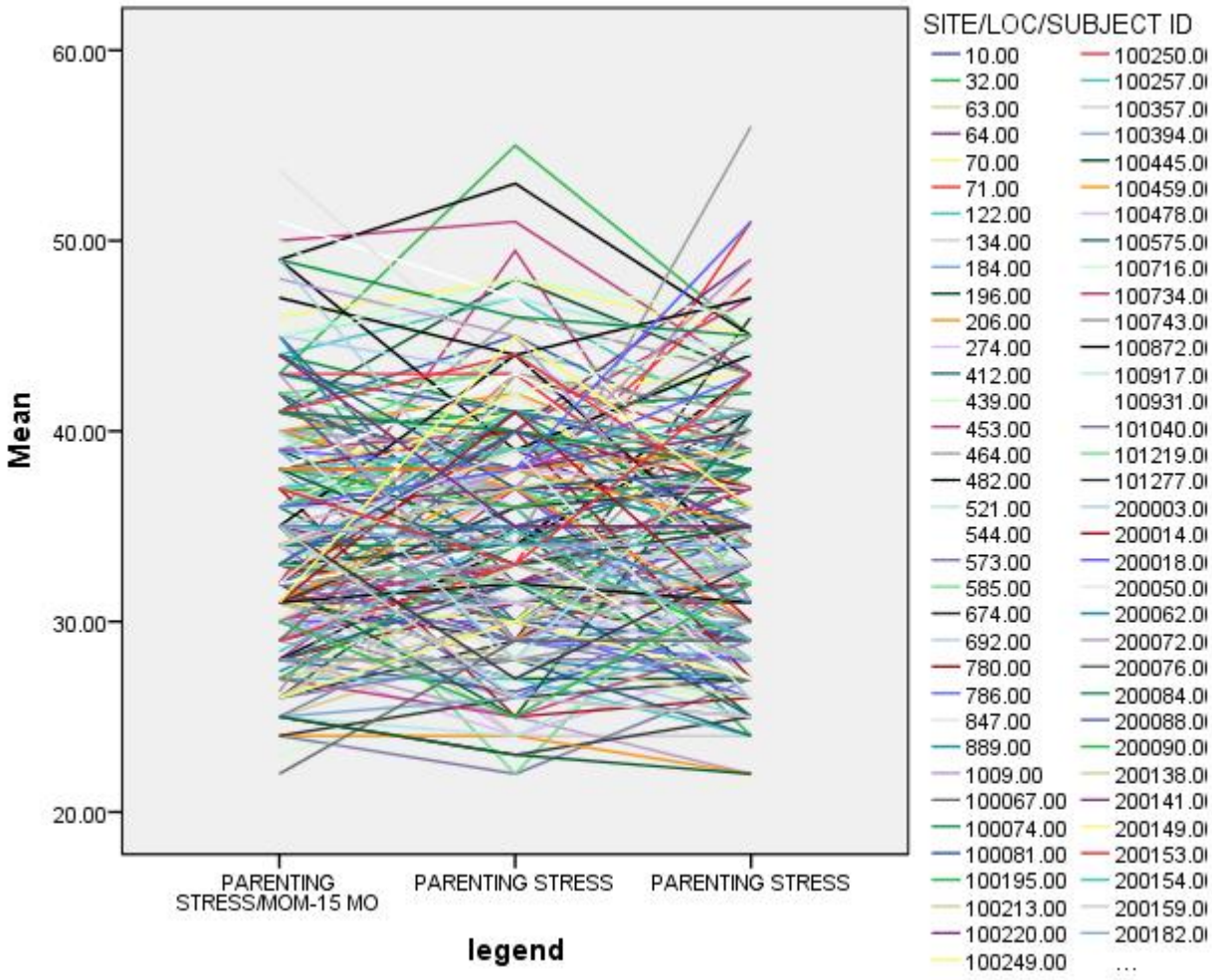


Figure 6

Trajectories of Maternal Employment at 6, 15, 24 and 36 months for 20% Random Sample of Mothers

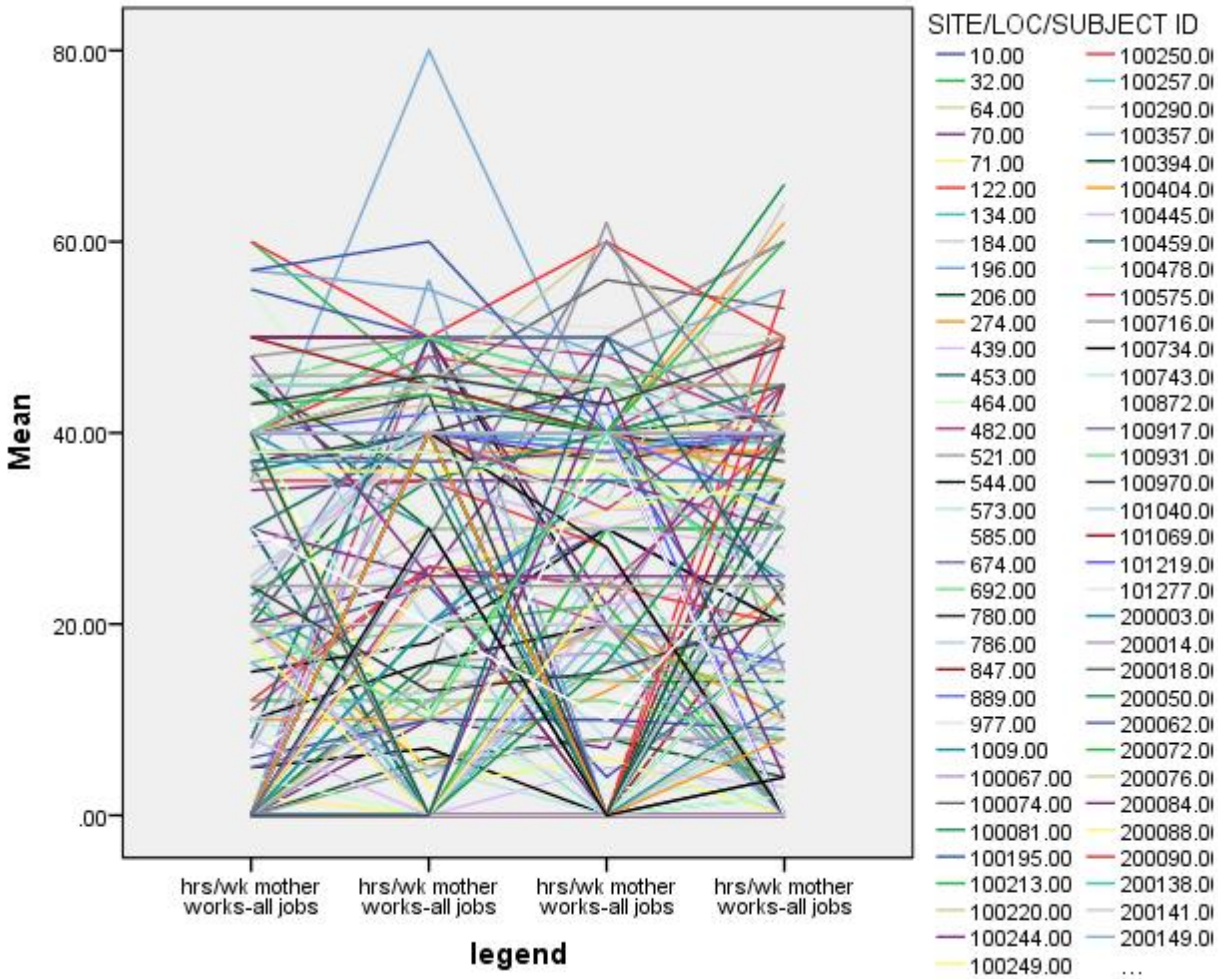


Figure 7

Trajectories of Role Satisfaction at 6, 15, 24 and 36 months for 20% Random Sample of Mothers

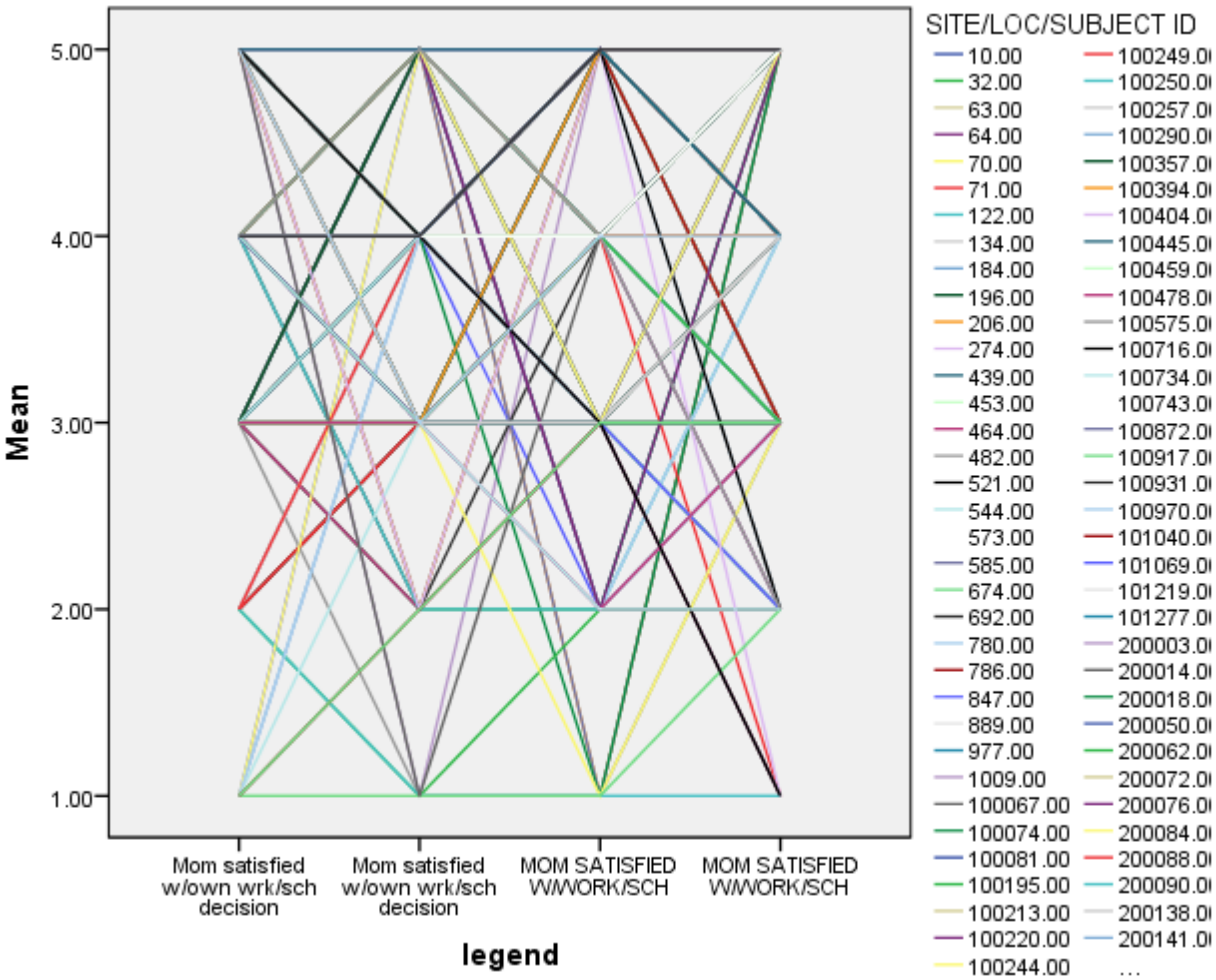
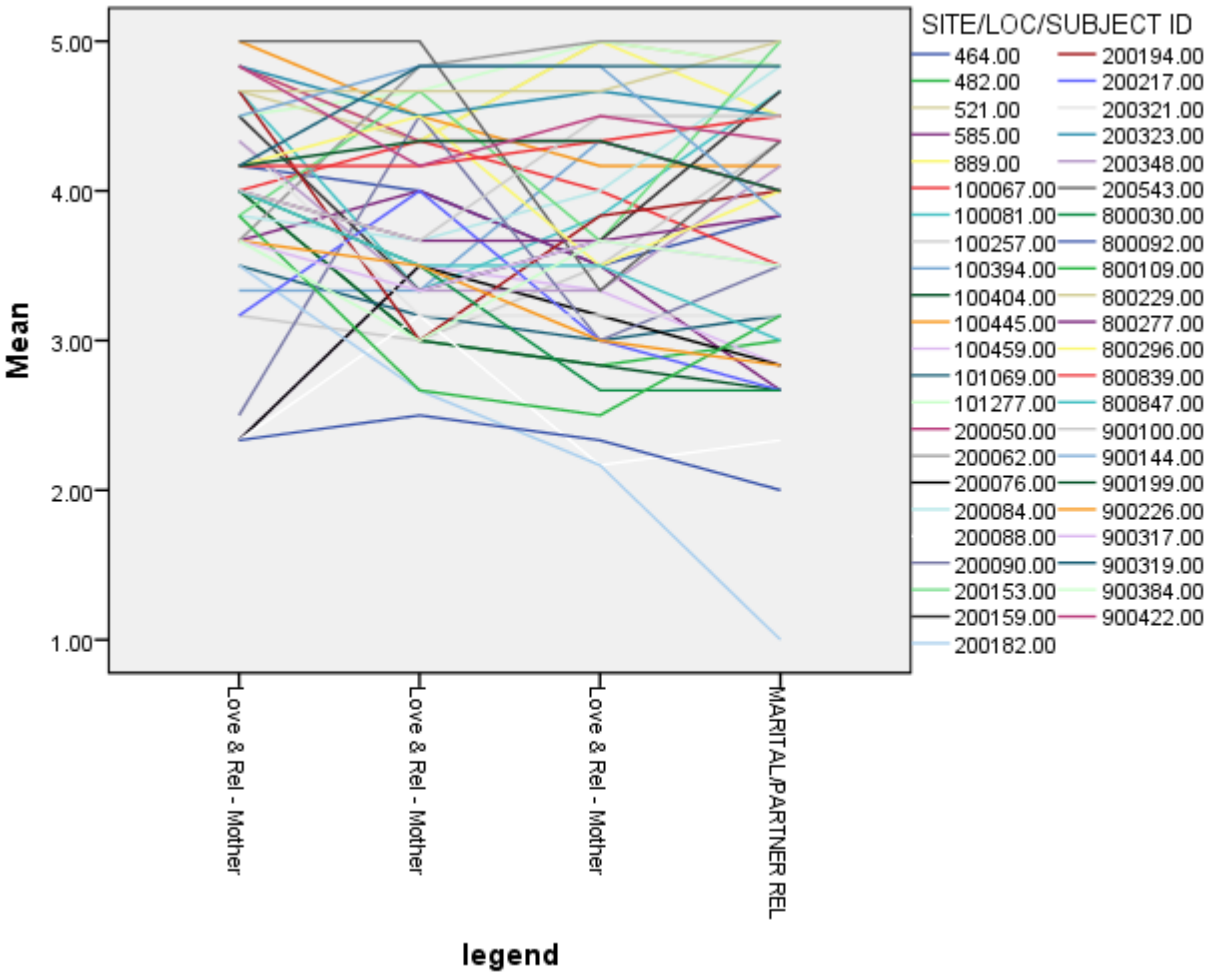


Figure 8

Trajectories of Maternal Relationship Emotional Intimacy at 6, 15, 24 and 36 months for 20% Random Sample of Mothers



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ABSTRACT

INFLUENCES OF EARLY CHILD CHARACTERISTICS AND HEALTH ON LATER PARENT AND PARENT-CHILD RELATIONSHIP FACTORS

by

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December 2012

Advisor: Dr. Ty Partridge

Major: Psychology (Clinical)

Degree: Doctor of Philosophy

The aim of this study was to evaluate ways in which infant temperament and health difficulties influence maternal characteristics over the first three years and the mother child relationship. We used longitudinal data from 1364 families, collected as part of the NICHD Study of Early Child Care and Youth Development (NICHD SECCYD). Longitudinal growth curve models were employed to evaluate influences of infant temperament and health at 6 months on maternal depression, employment, role satisfaction, parenting stress and marital satisfaction when the child was 6, 15, 24 and 36 months of age as well as mother child interactions at 15 months. Measures included the Revised Infant Temperament Questionnaire, the Center for Epidemiological Studies Depression Scale (CES-D), and the Home Observation for Measurement of the Environment (HOME) Inventory-Infant/Toddler version.

Mothers of infants with more difficult temperament and increased health problems at 6 months reported increased symptoms of depression, decreased role satisfaction, and lower marital satisfaction at 6 months. Mothers of infants with more difficult temperaments worked less at 6 months than mothers who rated their infants' temperaments as less difficult;

however, mothers of infants with more health problems worked more hours at 6 months. It may be the case that mothers of infants with more health difficulties need to work more due to health insurance needs and cost of medical treatment. Infant health and temperament did not predict the rate of change in these maternal characteristics from 6 to 36 months. It was not possible to evaluate the relationship between the infant predictors and parenting stress due to lack of change in parenting stress scores from 15 to 36 months.

With regards to mother child interaction, increased 15 month maternal sensitivity predicted decreased maternal depression, increased hours worked, increased role satisfaction for at home mothers, and increased romantic relationship emotional intimacy at 15 months. Maternal sensitivity was not related to role satisfaction for working mothers at 15 months. Decreased maternal sensitivity at 15 months predicted a more rapid increase (steeper slope) in maternal employment from 15 to 36 months. This unexpected finding may indicate maternal resources available and environmental influences associated with maternal employment.

Future research should consider potential moderating and mediating effects of extended family, social and environmental influences on the relationship between infant characteristics and parent characteristics and parenting. Including measures of maternal characteristics prior to childbirth as well will provide additional insight into child influences on mothers.

AUTOBIOGRAPHICAL STATEMENT

Jennifer DeGroot Hanawalt received her Bachelor's of Arts degree in Psychology and Spanish from the University of Notre Dame in 1998. She is pursuing her Ph.D. in clinical psychology with specializations in child clinical and quantitative psychology. During graduate school, she received extensive practicum training working with children, adolescents and adults at the Wayne State University Family Medicine Clinic at Crittenton Hospital, Wayne State University's Psychology Clinic, the Children's Hospital of Michigan Autism Clinic, and the Children's Hospital of Michigan General Pediatrics Clinic Behavioral Health Team. She completed her Master's degree in December 2008. Her Master's Thesis was titled *Parenting Information Seeking and Accuracy and Relation to Maternal Depression.* She recently completed an APA approved internship at the Hawthorn Center in Northville, Michigan.