THE EFFECTS OF MOTHERS' AND FATHERS' PARENTING STRESS ON CHILDREN'S DEVELOPMENTAL OUTCOMES AT 36 MONTHS IN A LOW INCOME SAMPLE

By

Tamesha N. Harewood

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Human Development and Family Studies

2010

ABSTRACT

THE EFFECTS OF MOTHERS' AND FATHERS' PARENTING STRESS ON CHILDREN'S DEVELOPMENTAL OUTCOMES AT 36 MONTHS IN A LOW INCOME SAMPLE

By

Tamesha N. Harewood

Using data from the National Early Head Start Research and Evaluation Project these 2 studies aimed to (1) independently analyze influences of 24 month maternal stress (Study 1) and 24 month paternal stress (Study 2) on children's developmental outcomes at 36 months; and (2) examine whether child gender moderates the relationship between maternal stress and child outcomes and between paternal stress and child outcomes. Multiple regression analyses for Study 1 revealed significant effects for mothers' parenting stress on all tested outcomes, but only lasting effects were revealed for children's language outcomes (i.e., 24m stress predicted 36m child language outcomes). Although maternal stress predicted children's outcomes, no gender differences were found in children's language and cognitive outcomes related to maternal stress. Findings suggested that girls were more vulnerable to higher maternal stress than were boys. In Study 2, father's parenting stress predicted children's lower cognitive scores at 36 months, but did not seem to impact other developmental domains. Girls, not boys, were found to be more susceptible to higher paternal stress and more adaptive to lower paternal stress in the cognitive domain. These findings present interesting implications for future studies.

ACKNOWLEDGEMENTS

First of all I give thanks to God, my strength and provider, without Him I can do nothing. I would like to acknowledge and thank my committee chairperson, Dr. Holly Brophy-Herb for her support and guidance throughout this process. I would also like to express thanks to my committee members, Dr. Claire Vallotton for her advice and suggestions, and Dr. Robert Griffore, for his willingness to assist and guide. Special thanks to my families (Harewood, Watson, Phillips, Hall, Abbott, and APOC) and friends for their prayers, encouragement, inspiration, tolerance, patience and love. To the Early Head Start Research and Evaluation (EHSRE) Consortium I offer my gratitude for allowing me to analyze their data for this study. Finally, thank you to the faculty and staff of the HDFS department for their assistance along the way.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

Parenting stress is an aversive psychological reaction arising from attempts to adapt to the demands of parenthood (Deater-Deckard, 2004). A corpus of work has been conducted on parenting stress using a number of differing methodologies and samples. Parenting stress has been linked to negative parenting behaviors (Abidin, 1992; Crouch & Behl, 2001; Holden & Banez, 1996; Rodriguez & Green, 1997), poor developmental outcomes for children (Baker et al., 2003; Crnic, & Low, 2002; Gutermuth-Anthony et al., 2005; Slykerman et al., 2005), particularly behavioral problems (Barry et al., 2005; Crnic, Gaze & Hoffman, 2005; Deater-Deckard, Dodge, Bates, & Petit, 1998) which are most often studied, and disrupted and inconsistent parent-child interactions (Deater-Deckard, 2004). Stress has also been found to increase parents' use of criticism, irritability, and punitive actions, which can potentially contribute to a child developing conduct problems (Webster-Stratton, 1990).

Abidin (1990), who developed the Parenting Stress Index, proposed that parenting stress potentially leads to dysfunctional parenting behavior which can promote a negative environment for children's growth and development. On the other hand, other researchers (Crnic, et al, 2005; Crnic & Greenberg, 1990; Gutermuth-Anthony et al., 2005; Huth-Bocks & Hughes, 2008) have argued there is no mediated path of the effects of parenting stress on children's outcomes. Despite this divergence of opinion, there is widespread agreement that children's positive developmental outcomes can be hampered by parenting stress. However, the extent of understanding these negative developmental consequences is limited because of the lack of research that includes fathers (paternal stress), and a lack of research examining outcomes other than behavior problems.

Children living in poverty are at greater risk for having a parent with high stress (McLoyd, 1998), which can contribute to poorer outcomes in language, cognition, and behavior (Crnic and Low, 2005). Research has repeatedly found girls to be more advanced than boys in developmental domains early on in life (Fenson et al, 1994). While girls may be more advanced than boys early in their development, both boys and girls may be vulnerable to the effects of parenting stress (mothers' or/and fathers'). Parenting stress, though, may have different effects on girls' and boys' developmental outcomes. Clearly more research is needed in order to elucidate the effects of the parenting stress of both mothers and fathers on boys' and girls' development across multiple developmental domains.

Statement of the Problem

Existing literature suggests that parenting stress can negatively influence children's development in infancy and later life (Coon, 2007; Nievar & Luster, 2006). Understanding how parenting stress impacts children's development, and how it affects positive developmental outcomes, is critical to promoting optimal development. Despite the wealth of literature examining the relationship between parenting stress and child developmental outcomes, two gaps in the existing literature limit both our empirical understanding of parenting stress as well as our translational efforts to provide effective parental support programs.

First, the vast majority of studies have focused on maternal stress (e.g. Baker et al 2003; Barry et al, 2005; Coon, 2007; Deater-Deckard et al, 1996; Deater-Deckard et al, 1998; Qi & Kaiser, 2003; Slykerman, et al, 2005). Results from studies of maternal stress are often generalized to "parenting stress" when researching the effects of parenting stress on children's outcomes. Alternatively, a smaller number of studies have examined father's parenting stress (e.g. Cabrera & Mitchell, 2009; Baker et al, 2003). Few studies have included both mothers' and

fathers' perceptions of stress in the parenting role as they relate to child outcomes. Studying the independent effects of fathers' and mothers' parenting stress may reveal differential effects on children's outcomes, as they might be uniquely experienced and demonstrated based on parental gender.

Second, a large body of work has been conducted examining how parenting stress affects children's behaviors and other outcomes but few have considered the child's gender as a possible moderator. Literature identifies parenting stress as having negative effects on child outcomes but little has been done to tease apart those effects to determine differences in outcomes for boys and girls. Also, literature including other developmental domains such as language and cognition need to be more extensively analyzed in relation to parenting stress. Further research is therefore needed to support the minimal literature currently existing on fathers' parenting stress and to expound on maternal stress literature on child developmental outcomes including language, cognition and behavior, looking more in depth at how this type of stress affects both girls' and boys' development.

Rationale for Proposed Study

Parenting stress has most often been studied in terms of maternal stress, largely because mothers, historically, were the caregivers and homemakers, typically spending more time in interaction with their children than did fathers (Adamsons & Buehler, 2007; Deater-Deckard, 2004). This dyadic relationship encouraged extensive research and literature on parent-child interactions including the role of parenting stress in predicting the quality of parent-child interactions. More recently, however, society has witnessed a change in the family structure with greater numbers of women in the workforce and more fathers becoming involved in the responsibilities of child caregiving and day-to-day parenting. McBride (1989) aptly points out

that as the most proximal influences of the child during infancy, parents influence the growth and development of the child. Hence as fathers become more involved in their children's day-to-day parenting it is pertinent to include fathers in research focusing on the child's growth and development. Examining the independent effects of mothers' parenting stress and fathers' parenting stress on the developmental outcomes of young children, then, are seminal.

Knowing how maternal and paternal stress influences children's developmental outcomes can be beneficial to providing necessary and appropriate intervention strategies that help reduce the likelihood of poor child developmental outcomes. Reducing the effects of parenting stress on children's outcomes would be better addressed if more distinguished evidence for the effects on boys and girls were available. Trying to intervene in similar ways for boys and girls may not be efficient if the effect of parenting stress does not have the same impact on boys as it does on girls. Therefore, attention is warranted in research examining child gender as a moderator highlighting differential effects of mothers' and fathers' stress on boys' and girls' development. This information can have important implications for particular intervention content and strategies.

Thus the purposes of this study are to (1) independently investigate the influence of maternal stress on children's developmental outcomes at 36 months; (2) independently inspect the influence of paternal stress on children's 36 month developmental outcomes; and (3) to examine whether child gender moderates the relationship between maternal stress and child outcomes and paternal stress on child outcomes. These research foci are organized in two studies: Study 1 addresses questions with regard to maternal stress and child outcomes while Study 2 concerns paternal stress and child outcomes. Collectively, these studies will extend current literature by including a study of fathers' parenting stress directly on children's outcomes

and extend past research by examining the moderating variable of child gender and focusing on children's cognition, language and behavior outcomes at age three years.

Theoretical Framework

Bronfenbrenner's theory serves broadly as the theoretical framework for developing this study by examining the effects of microsystem variables that may influence children's development and growth. At the core of Bronfenbrenner's research was the idea that children's growth and development are rooted in, and influenced by multiple systems that interact to form their environment. Bronfenbrenner considered parents as one of the most proximal influences in a child's life during infancy (1988), having strong influences on the child at this early stage. Bronfenbrenner thus referred to this most immediate system as the child's microsystem. He describes the systems in his bioecological theory noting that the microsystem, which is the inner level, is the composite of relationships among the child, the parents, and the immediate setting/environment in which that child is contained, such as home, school, etc. (Bronfenbrenner, 1977). Because parenting can be stressful it can affect the normal responses given when stress is a non-factor. In accordance with Bronfenbrenner's theory, this stress, if filtered into the environment in which the child is embedded, can and will have an effect on development and growth.

Study 1:

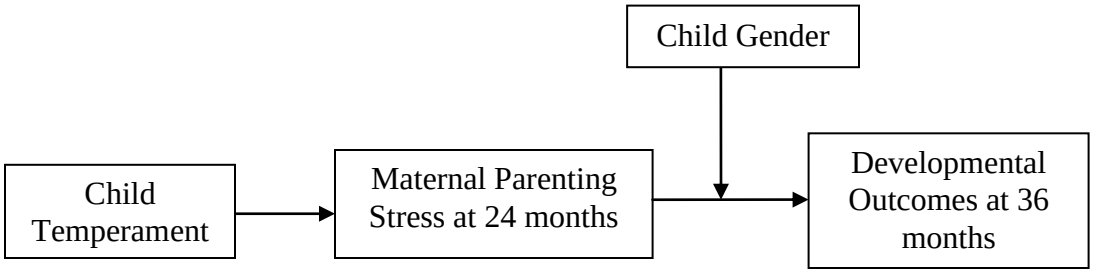

Figure 1: *Conceptual Model*

Study 2:

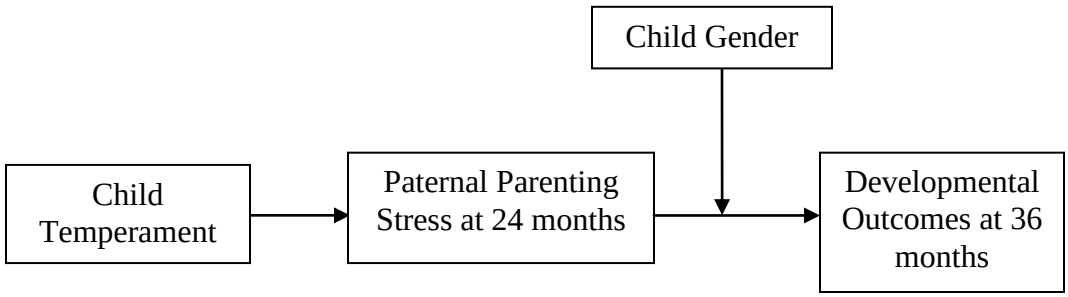

Figure 2: *Conceptual Model*

Study 1 (Figure1) and Study 2 (Figure 2)are secondary analyses utilizing the Early Head Start Research and Evaluation (EHSRE) data from the main study(Love et al., 2005) and data from the Fathers' Involvement with Toddlers Substudy (FITS; Boller et al, 2006) respectively. Parenting stress data were collected in the main study for mothers at 3 time points (when children were 14, 24, and 36 months). Data was collected from fathers at 2 time points, 24 and 36 months; however, only the 24 month father's PSI data was available in the EHSRE public dataset. Study 1 will therefore use the 24 month maternal Parenting Stress Index (PSI) data as the independent variable and 36 month PSI as a control variable. Study 2 will use fathers' 24 month PSI as the independent variable.

For simplicity the independent paths to the three child outcome variables, which are language, cognition and behavior, are not shown in the Study 1 or Study 2 models above. The assumption for this research is that all questions were answered truthfully.

Research questions guiding both Study 1 and Study 2 were: (1) Is there a relationship between parenting stress at 24 months and children's 36 month language, cognition and behavior outcomes? Research indicates that mothers' parenting stress has negative effects on children's development from as early as the prenatal stage (Anhalt Telzrow & Brown, 2007). Thus I hypothesized for Study 1 that higher maternal stress at 24 months would be negatively associated with children's language and cognition and positively associated with negative aspects of child behavior at 36 months. (2) Does child gender moderate the relationships between parenting stress and child language, and/or behavior, and/or cognition outcomes? Prior research has suggested that boys are more vulnerable to mothers' parenting stress (Barry et al, 2005; Coon, 2007). I therefore expected that child gender would moderate the relationship between mothers' parenting stress and child outcomes, with the expectation that the relationship between maternal stress and child outcomes would be stronger for boys.

These hypotheses were reiterated for the effects of fathers' parenting stress at 24 months on children's 36 month developmental outcomes for Study 2. However, for Hypothesis 2, fathers' parenting stress was expected to have a greater negative influence on girls' outcomes. Fathers were found to have greater negativity towards girls, and not boys, during times of economic stress making girls more susceptible to their stress effects (Elder et al, 1985).

Table 1

Conceptual and Operational Definitions for the Study Variables

Variable	Conceptual Definition	Operational Definition
Parenting Stress	Stress related to the role of parenting and the demands of children (Abidin, 1992)	Parenting Stress Index. Measures the level of stress a parent is experiencing based on a series of self reported answers.
Language development	The ability to hear and understand spoken language or hearing vocabulary (Dunn & Dunn, 1997). The ability to produce words and sentences (Fenson et al, 1993)	Peabody picture vocabulary test. Measures children's ability to understand spoken words and identify associated symbols. McArthur Communicative Development Inventories. Measures children's early language skills.
Cognitive development	The level of the child's thoughts, perceptions and understanding of the world (Bayley, 1993).	Bayley Mental Developmental Inventories. Measures children's cognitive skills
Temperament	Emotionality (Buss & Plomin, 1975).	The Emotionality scale of the EASI measures different temperaments.

CHAPTER TWO: LITERATURE REVIEW

Parenting stress

Parenting stress is experienced by all parents; it is an inevitable experience that comes with the parenting experience (Crnic & Greenberg 1990; Deater-Deckard & Scarr, 1996). Parental stress influences parental functioning (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983; Webster-Stratton, 1990) and parent-child relationships (Crnic, et al, 1983). Aspects of positive parenting, such as warmth and support have been linked to better developmental outcomes. However, when parents become overwhelmed with their parenting duties, or perceive their children as adding stress to their responsibilities, such positive parenting may become more difficult to demonstrate (Crnic, et al, 1983). Furthermore, parental stress in the first three years of a child's life can have serious implications for the quality of the parent-child relationship and can affect children's developmental outcomes (Abidin, 1990). Parenting stress undermines the psychological processes of parents, causing them to have skewed perceptions of their children, which can jeopardize the parent-child relationship (Deater-Deckard, 2004). This is evidenced in studies where parenting stress has been shown to be associated with abuse (Kelley, 1998; Nair, et al, 2003), less effective parenting (Crnic, et al., 1983) insecure attachments (Deater-Deckard, 2004) and children's poor developmental outcomes (Crnic, & Low, 2002).

Research has produced evidence indicating that parenting stress, directly and indirectly via the parent-child relationship, has a negative influence on child outcomes. In support of the indirect influences of parenting stress, Abidin (1990) posited that parenting behavior explains the relationship between parenting stress and children's problem behaviors and emotions. Other studies have linked parenting stress to harsher, less responsive, and more authoritarian parenting,

affecting children's prosocial behaviors, academic work, and emotional well being (Crnic & Low, 2002; Deater-Deckard, 2004; Putnick et al, 2008; Vandell, Posner & Lee, 1998) as well as contributing to internalizing and externalizing problems in adolescents (Corona, LefKowitz, Sigman, & Romo, 2005). Studies indicate that stressed parents are often less involved and less to likely interact with their children, and often subject them to more frequent spankings and criticisms (Crnic et al, 1983; Whipple & Webster-Stratton, 1991) contributing to their less than optimal growth and development (Blankenhorn, 1995; Hetherington & Stanley-Hagan, 1997; McCarty, Zimmerman, Digiuseppe & Christakis, 2005).

Conflicting findings related to the meditation of parenting behavior in the parenting stress-child outcome relationship also exist. The modeled paths for the current studies reflect direct influences of mothers' and of fathers' parenting stress on the outcomes of children. Also, lack of literature on direct effects of fathers' stress warrants research. Literature reviewed included both indirect and direct influences of parenting stress due to minimal studies focusing on direct effects.

Effects of Parenting Stress

Maternal stress. While analyzing parenting stress, parenting behaviors, and child problems Huth-Bocks and Hughes (2008) found interrelations among all these variables in a sample of low income mothers and children exposed to intimate partner violence. Results indicated a strong direct relation between parenting stress and child behavioral, and emotional problems even after parenting behaviors were entered into the regression equation (Huth-Bocks & Hughes, 2008). According to Farver and colleagues (2006), parenting stress can affect the perceptions of mothers about their children, by influencing their sensitivity and responsiveness; and possibly influencing the existence of a positive home environment that will be beneficial to

developing their child's school readiness skills. In a study of triplet children, mothers reporting high levels of stress were the least sensitive to their children's needs and had children with the weakest cognitive scores (Feldman, Eidelman, & Rotenberg, 2004). Even during adolescence, parenting stress can negatively affect children's outcomes. A study on adolescents revealed that distressed parents provided less cognitive stimulation in the home, which was associated with limited vocabularies in adolescent children (Nievar & Luster, 2006). Also, it was found that highly stressed mothers are less likely to provide their children with the prosocial skills necessary to develop peer relationships (Bhavnagri, 1999).

Results also showed significant negative associations between maternal stress and children's PPVT scores, as well as their social functioning, in a sample of low-income Latino families (Farver, Xu, Eppe, & Lonigan, 2006). Bivariate correlations conducted between measures of parenting stress (PSI-SF) and children's vocabulary (PPVT & EVT) scores revealed parents reporting higher stress had children with poorer expressive and receptive vocabularies (Noel, Peterson & Jesso, 2008). High maternal parenting stress experienced around the birth of a child has been linked to children's lower intelligence scores (Slykerman et al, 2005) and greater externalizing behavior problems (Baker et al 2003; Deater-Deckard, Dodge, Bates, & Petit, 1998; Deater-Deckard, Pinkerton, & Scarr, 1996; Qi & Kaiser, 2003). Similarly, higher levels of stress were found to be associated with disruptive behavior problems, beyond SES, in a study of 4^{th} and 5^{th} grade boys (Barry et al, 2005), highlighting the importance of parenting stress as an independent environmental factor influencing the child. A more recent study of low income families found a negative relation between mothers who were stressed when their children were 14 months and the children's language development at 24 and 36 months (Coon, 2007). Mothers'

stress was found to have a greater negative effect on boys language development than on girls', suggesting greater vulnerability of boys to maternal stress.

Further support for the negative effects of mothers' stress on children's development was found in studies revealing strong direct relationships between parenting stress and child outcomes. For example, a cross-sectional study of low income preschool children, found a relationship between higher parenting stress and children's lower social competence in the classroom (Gutermuth-Anthony et al, 2005). Teacher reports of children's behavior, as opposed to parent reports, provided evidence, not confounded with the measure of parenting behavior, of the direct relationship between the two variables (Gutermuth-Anthony et al, 2005). Probable reasons for this result were explained to be the experience of poverty, and the home environment being stressed. While Crnic et al (2005), supported the concept of parenting stress threatening the quality of dyadic parent-child interaction, data collected in this longitudinal study only showed support for direct effects of parenting stress on child outcomes.

Overall the evidence for the effects of maternal stress points in the same direction, which is, less favorable outcomes for children. It is therefore important for researchers to entirely explore this topic, especially among vulnerable low income populations, in order to assist in the development of efficient intervention content and strategies to help minimize poor child outcomes

Paternal stress. The abundant literature on parenting stress suggest a plethora of results indicating that parenting stress is linked to negative influences on children's development (Bhavnagri, 1999; Coon 2007; Farver et al., 2006; Slykerman et al, 2005). The exclusion of fathers in parenting stress research subtly suggests that fathers do not necessarily experience parenting stress or that results for the relationship between fathers' stress and child outcomes will

be similar to those of mothers' stress. In fact, many of the studies carried out involving fathers tend to overlook paternal stress related specifically to their parenting role. Rather, these studies focus on marital relationship as an antecedent to paternal stress (Gavin, Black, & Minor, 2002; Haper & Fine, 2006; Stoneman, Brody, & Burke, 1989). One such study revealed that fathers' parenting stress predicted child misbehavior in a middle income sample; results showed the relationship was mediated by discipline and was stronger when fathers were dissatisfied with their marriage (Deater-Deckard & Scarr, 1996). Research has revealed links between the father-child relationship and children's developmental outcomes, such as cognition, and language (Magill-Evans & Harrison, 1999; Magill-Evans & Harrison, 2001). In a study of residential fathers in Finland, higher paternal stress was linked to fathers being less engaged and more unavailable to their children (Halme, Tarkaa, Nummi & Astedt-Kurki, 2006). Shannon and colleagues (2002) found fathers' engagement with their children had positive effects on children's cognitive development.

Fathers' positive interactions reflecting warmth, sensitivity, involvement, and less harsh discipline, not characteristic of distressed parents, were associated with better developmental outcomes for children including better grades (Black et al, 1999; Pratt, Green, McVicar, & Bountrogianni, 1992; Strage & Brandt, 1999), fewer behavior problems (Amato & Fowler, 2002; Crockenberg & Litman, 1990), secure attachment and greater social competence (Amato & Rivera, 1999; Biller & Kimpton, 1997; Deater-Deckard, 2004). However, no known studies have investigated the direct influences of fathers' parenting stress on children's developmental outcomes at 36 months. The increased roles of fathers in the parenting and caregiving of their children make it vital to examine these direct effects. Also, the influence

of fathers' stress on children's outcomes may be different for boys and girls and should be considered.

Covariates

Temperament. Deater-Deckard's parent-child-relationship (P-C-R) theory proposes that an increase in the child's emotional and behavioral difficulties is likely to propel an increase in parenting stress levels (2004). This spike in stress can then lead to an increase in the child's emotional and behavioral problems. In a study of 36-60 month old, predominantly Caucasian children, researchers found a positive and reciprocal relation between stress related to challenging behavior and externalizing adjustment (Coplan, Bowker & Cooper, 2003). Abuse literature substantiates these findings indicating that parents perceiving their children as difficult tend to report higher levels of stress and are prone to exercise harsher punishment on them (Whipple & Webster-Stratton, 2001). Chang and colleagues (2004) found positive relations between teenage parents who perceived their children as having difficult temperaments and their levels of stress. However, they found no associations between difficult child temperament and parenting behavior. These authors surmised that this finding might have been as a result of the age of the parents who were still in the egocentric stage of development.

Noticeably, temperament has been consistently associated with children's behavior outcomes, with greater focus given to the construct of difficult temperament when related to parenting stress. For example, children's difficult temperaments were found to be positively associated with higher incidences of parenting stress (Chang et al., 2004; Gelfand, Teti, & Padin Fox, 1992; Whipple & Webster-Stratton, 2001) and negative behavior outcomes (Baker et al, 2003; Coplan, Bowker & Cooper, 2003). Other researchers have also linked temperament to cognitive and language outcomes of children (Miller, 2000; Morales et al., 2000).

Moderator

Child Gender. The effects of parenting stress on children's outcomes may be manifested in different developmental domains and to varying degrees according to child gender. Past research found evidence for gender differences in how children respond to disruptive events in the home (Hoyenga & Hoyenga, 1979). Studies have shown boys to be less tolerant of stress (Davis & Emory, 1995) and vulnerable to its effects from as early as conception (Hansen, Moller & Olsen, 1999) compared to girls. Infant males have been found to be more emotionally reactive to aversive stimuli than females and often demand greater maternal contact (Tronick & Weinberg, 1997). These finding suggest that boys show greater vulnerability to maternal stress than girls. A recent study analyzing the effects of parenting stress on children's cognitive outcomes revealed a minimal but stronger relationship between parenting stress and boys' language outcomes at 24 and 36 months, than girls (Coon, 2007) using the McArthur CDI language measurement. There were no differences in cognitive outcomes for boys and girls. Reasons for the similarities were attributed to the age of the sample used and the children's lack of exposure to the

gender socialization process. Other parenting stress literature found that low income parents coping with high levels of stress were at risk for producing antisocial boys (Patterson et al., 1992) and stress was negatively associated with boys' externalizing behaviors (Barry et al, 2005).

Apart from the previously mentioned studies there is minimal literature focusing on the role of child gender in the relationship between parenting stress and child outcomes. Past studies examining concepts related to parenting stress, and depression - a parental disposition that is closely related to parenting stress, found negative outcomes for both boys and girls, but study

samples did not include boys and girls together. Depression literature was included in this research because there was a lack of parenting stress literature to extract from. Economic stress linked to parental depression adversely affected adolescent boy's self confidence, relations to peers and academic performance (Conger, 1992). Similar findings were found in a replicated study of girls, showing parental depression associated with economic hardship to negatively and directly influence girls' adolescent adjustment (Conger et al., 1993). However, findings revealed a direct association between mothers' depression and girls' outcomes, but found that boys' outcomes were indirectly linked to depression through parenting behaviors.

Other results revealed that when mothers were depressed both boys and girls had greater behavioral and emotional problems (Ramchandani et al., 2005). A stronger association was found between fathers' depression and boys increased problem behaviors than between fathers' depression and girls' outcomes (Ramchandani et al, 2005), suggesting boys vulnerability to both father's and mothers' depression. In a German sample, chronically depressed mothers were shown to have boys with lower cognitive scores than boys of mothers with mild to no depression, or girls. Overall, maternal depression was determined as having only small effects on the cognitive development of children (Kurstjens & Wolke, 2001).

Focusing on fathers, results from the Oakland Growth Study of 1985, indicated that economic stress negatively affected girls self confidence and security, but not boys (Elder et al., 1985). Authors concluded that possible differences resulted because fathers were more negative and unsupportive towards girls, rather than boys, during economic hardship (Elder e al, 1985).

Parenting stress and constructs of parenting stress have been linked to small differences in boys and girls outcomes; however, findings remain mixed about the overall effects. Boys were found to be more vulnerable to mothers' stress/depression in some cases, but in others there were

no gender differences. One study found girls to be susceptible to fathers' stress, but evidence to support this finding was lacking. Clearly more research on the role of gender in the parenting stress-child outcome relationship is necessary. Research in this area will add valuable findings to existing literature.

Summary

Children's early development is rapid and ongoing (Berk, 2008; Huttenlocher et al., 1991), making these early years vital to their social, academic, and emotional development, and making the parental role seminal. Contextual factors such as parenting stress can have damaging effects on already disadvantaged children living in poverty (McLoyd, 1998) and may increase their risk for poor outcomes. A low-income sample was therefore chosen for these studies because parenting stress is expected to be prevalent in such populations. Although there is much evidence supporting the negative effects of maternal stress on children's development little is known about the moderating role of child gender in these relationships; thus warranting further research in this area. Conversely, substantive evidence for the direct effects of paternal stress on children's early developmental outcomes is pending, making research in this area necessary. Also, it is unknown whether children are differentially susceptible to fathers' stress effects, and if so, in which developmental domains. Results from this study will contribute greatly to parenting stress literature and provide insight relevant to intervention design and implementation.

CHAPTER THREE: METHODOLOGY

Design of Early Head Start Research and Evaluation (EHSRE) Project

The EHSRE is a longitudinal evaluation study of Early Head Start (EHS) involving 17 EHS sites across the country that were among the first federally funded EHS programs serving low income parents, children and their families (refer to ACYF, 2002; Love et al., 2005). Families who met income eligibility for EHS were randomly selected for participation in EHS or in a comparison group. EHS services began between mothers' last trimesters of pregnancy and the target children's first birthday and continued until children were three years old. Services were either home-based, center-based, or consisted of a mix of home-and-center-based services. Services were designed to positively impact children's development; promote positive parenting and parent-child relationships and to provide support to families. Participants in the comparison group were not offered the services received by the EHS group but were not restricted from seeking services elsewhere.

Eligibility requirements for families included meeting the income guidelines of the program; be expecting a child or have a child under 12 months of age (during the time period from Sep. 1st 1995 to Sep. 30th 1998); and agreement to random assignment, i.e. the comparison or program group. Also, families were not to receive any similar services for a period of three months or longer. Participants received remuneration and a gift for completion of interviews and assessments.

EHSRE Main Study Procedures

Intake interviews for the EHSRE project included demographic data collection between February 1996 and October 1998. Most applicants were the biological mothers of the target child (99%) and 26% of applicants were pregnant (Berlin, Brady-Smith, & Brooks-Gunn, 2002) at

intake. Assessments were conducted with children, parents, and at child care facilities at three time intervals linked to the age of the target child; at 14, 24, and 36 months. Additionally, families were interviewed about services received at 6, 15, and 26 months after random assignment (ACYF, 2002).

Families (N = 3001) were recruited to the EHSRE project and random assignments were made (EHS participants =1,513; comparison group = 1,488). All data were collected by trained personnel. Response rates dropped from 78.1% to 70.3% between 14 and 36 month parent interviews for the combined sample (i.e. control and program groups).

Fathers' Substudy Procedures

Considering the changing father-child relationship, the Fathers' substudy was designed to investigate the influence of fathering on children's social, cognitive, physical and emotional development (Boller et al, 2006). Researchers requested assistance from participating mothers of the EHSRE main study in indentifying fathers for FITS (Boller et al, 2006). Seventy-six percent of mothers in the main study identified fathers viable for the substudy. Interviews with fathers were conducted using similar questions and observational procedures to those used with mothers in the main study at 12 of the 17 EHS sites when the target child was 24 and 36 months old. Father-child interactions (separate from the data collection with moms) were also videotaped at 7 of the 12 sites. Exit interviews were conducted when the focus child turned 36 months.

Participants for Study 1

Of the full sample 99% of primary caregivers were mothers (*n* = 2,977). One fourth of primary caregivers lived with a spouse; over 50% of caregivers were unemployed and almost half (*n* = 1,367) of the sample 48% completed less than 12 years of schooling. Mothers reported an average age of 22 years. Roughly 57.6% of the sample indicated they had 3 or more

cumulative risk; 5 indicating high risk. The sample included 1446 girls and 1502 boys (mean age = 3.03 months); approximately 50% of the sample received EHS services.

Participants for Study 2

Fathers were recruited via the assistance of mothers from the main study in EHSRE project. In total 803 fathers were interviewed at 24months; 91% (n = 732) fathers completed the PSI when focus child was 24 months. Fathers' reported a mean age of 26.8 (SD = 7.7) at the time of the child's birth. Over 75% of fathers were the biological fathers of children in the study, 70.6% (n = 566) of fathers completed 12 years or less of school.

Measures across both studies

Parenting stress. The Parenting Stress Index-Short Form (PSI-SF, Abidin, 1990) is a parent self-report questionnaire consisting of 36 items developed to identify dysfunctions in the parent-child relationship. It is comprised of three subscales: Parent-Child Dysfunctional Interactions (PCDI), Parent distress (PD) and Difficult Child (DC). Each scale consists of 12 questions mostly requiring answers on a scale of 1 (Strongly Agree) to 5 (Strongly Disagree), and a midpoint of 3 (Not Sure). For the EHSRE project

parenting stress was measured using only the PCDI and the PD scales, resulting in the use of 24 items yielding possible scores from 24 - 120. Scores on this measure were gathered at the14, 24, and 36 months time points for primary caregivers (99% mothers), but only collected at 24 months for fathers. The measure had high internal consistency within the EHSRE project (Cronbach's alpha was .80 for Parent-Child Dysfunctional Interaction, and .87 for Parental Distress subscales) (Kisker, et al, 2003).

Child Measures

Cognitive development. The Mental Development Index (MDI; BSID-II, Bayley, 1993) assesses the language, cognitive and personal-social functioning of infants ages 1 through 31/2 years. The test is administered by a trained examiner. Scores below 84 represent a delay in language development and scores over 116 represent an advance in language development. Scores from 84-116 correspond with normal development. The internal consistency (Cronbach's alpha) of the MDI across all age groups was .88 and .91 for ages 24-42 months. The test-retest reliability was also .91 (Kisker, et al 2003). When the MDI was correlated with the McCarthy Scales of Children Abilities and the Wechsler Preschool and Primary Scale of Intelligence-Revised, concurrent validities were .79 and .73 respectively (Kisker, et al, 2003).

Language development. The Peabody Picture Vocabulary Test, Third Edition (PPVT- III, Dunn & Dunn, 1997) is an orally administered test that measures the receptive vocabulary achievement and screens for verbal ability. When administered, the examiner shows the subject four numbered pictures and states a word. The subject then selects the picture that the stated word best describes by pointing to the picture or saying the number that corresponds with the picture. The examiner ends the test when the child's "basal"– one or no errors in an item set– and "ceiling"– eight or more errors in an items set- sets are determined. The EHSRE project Cronbach's alpha showed .93 for both forms and test-retest correlation coefficients for ages 21/2 to 5 years were .92 for both forms. Comparative tests were conducted to test the concurrent validity of the PPVT III. Correlation coefficients with the Wechsler Intelligence Scale for Children—Third Edition verbal ranged from .82 to .92; with the Kaufman Adolescent and Adult Intelligence Test .76 to .91; and with the Oral and Written Language Scales listening comprehension .63 to .83 (Kisker, et al, 2003).

Since PPVT is only measured at 36 months, the McArthur Communicative Development Inventory (CDI, Fenson et al., 1993) Vocabulary Production Subscale will be used as the control for 24 month language. The McArthur CDI assesses children's language skills between ages 8 and 30 months via parent report. The short form of the CDI words/sentences section uses a 100-word checklist to assess the vocabulary production of children 16-30 months old. The Cronbach's alpha for Word/Sentences Vocabulary Production was .99. Concurrent validity was .97 (Kisker et al, 2003).

Internalizing and externalizing behaviors (child behavior problems). The early childhood version of the Achenbach's Checklist for Child Behavior (CBCL; Achenbach & Rescorla, 2000), appropriate for children aged 1–51/2, is a 99-item parent-report scale on which informants rate the frequency of various problem behaviors in their children. Used in the EHSRE project, the CBC Aggressive scale (CBCA) measures the frequency of 19 child behavior problems that tend to mutually occur and represent aggressive behavior. Answers selected range from "0" being "not true" to "2" being "very/often true", giving a total score of 38 if answers on all question are very/often true. EHSRE project Cronbach's alpha for the CBCL scales .89 and .92 for the two broader groupings (internalizing and externalizing) and .95 for the total score. Correlation coefficients ranged from .48 to .70 between the CBCL problem syndromes and the Toddler Behavior Screening Inventory and the Infant-Toddler Social and Emotional Assessment (Kisker, 2003).

Covariates

Temperament. Child temperament was measured using the Emotionality, Activity, Sociability, Impulsivity (EASI; Buss & Plomin, 1975) temperament survey. EASI is a parental report instrument which assesses four categories of temperament. The emotionality scale, which

was used as the measure of temperament in this research, measures traits of fear, anger and general distress. Scales on each item range from 1 (not very typical of your child) to 5 (very typical of your child) with an average of 5 items for the subscale. Questions asked on the assessment are answered on a 5-point likert scale.

Cumulative risk. The cumulative risk variable reflects five dichotomously scored indicators of risk, representing the absence/presence of each of the following risk factors: low parental education, adolescent parenthood, unemployment, single parenthood, and welfare status at baseline. Past research suggests that cumulative risk can have a great influence on outcomes (Sameroff & Fiese, 2000). For example, the parenting stress and child outcome relationship (Whiteside-Mansell, Pope & Bradley, 1996; Jackson, 2003), and was particularly shown to affect outcomes in the EHSRE dataset (e.g. Raikes, Pan, Luze, Tamis-LeMonda, Brooks-Gunn et al., 2006). As noted, the risk variables which make up the cumulative risk variable were binary coded to represent absence or presence of risks and then summed to give a maximum score of 5 and minimum of 0. A score of 5 indicated high cumulative risk and a score of 0 indicated no cumulative risk.

Analysis Plan: Study 1

This study used quantitative analysis in SPSS to analyze data. Hierarchical multiple regressions were conducted to analyze the predictive effect of mothers' stress on children's outcome measures - language: PPVT III, cognition: Bayley MDI, and behavior: CBCL independently.

To address Hypothesis 1 in Study 1 the dependent variables included the Bayley MDI score at 36months, the PPVT score at 36 months and the Achenbach CBCA score at 36 months. Each of these variables was tested separately and followed similar models. In the first step of

each model, the cumulative risk variable (MR_5) was entered followed by temperament variable (EASI: EEMO) in step 2. Standardized scores for 24 month outcome variables (Bayley MDI, McArthur's Vocabulary Production, and CBCA respectively) were then entered into the regression model to control for their effects at step 3 and to test for longitudinal links, rather than concurrent links, between parenting stress and child outcomes. Because the PPVT is only measured at 36 months, the McArthur CDI vocabulary production was used as the control for 24 month language. This measure was used because it is more predictive of children's expressive vocabulary at 24 months and thus be a stronger variable to precede the PPVT than a receptive assessment.

Maternal 36m PSI was entered in step 4 to control for the effects of concurrent stress on children's 36-month outcomes Added next, in step 5, was the independent variable- mothers' PSI at 24 months. A total score for the PSI was calculated by adding the standardized scores of the two PSI subscales (PD & PCDI). After this variable was added the regression was performed and the results analyzed. A significant and inverse contribution from the 24 month PSI score to the 36 month child cognitive, and language outcomes, and a significant contribution to the 36 month behavior outcomes, would mean hypothesis 1 was supported.

At step 6 of the each model a dummy variable for child gender was entered (girl = 0; boy = 1) so a possible moderating effect could be tested in step 7.

Step 7 of each model was used for Hypothesis 2, which predicted that child gender would moderate the relationship between maternal stress and child outcomes at 36 months. Scores for the mothers' 24 month PSI were standardized and multiplied by gender to create an interaction variable to test the effect of mothers' parenting stress on boys and girls cognition, language and behavior outcomes at 36 months. Hypothesis 2 would be supported if the PSI x gender variable

made a significant contribution to any of the dependent variables (cognition, language or behavior) independently and if follow-up tests of main effects showed that boys were more negatively affected by mothers' stress than were girls.

Study 2 Hypotheses 1 and 2

Similar models to those used in Study 1 were constructed for each outcome tested in Study 2. All mother variables were replaced with father variables, except for cumulative risk; no father cumulative risk variable was computed due to insufficient data. Hypothesis 1 for Study 1 was supported if fathers' PSI at 24 months made significant and inverse contributions to children's cognitive and language outcomes, and a significant contribution to behavior problems at 36 months. As was done in Study 1, the model was tested again and extended to include child gender and the interaction of gender x fathers' 24-month PSI for hypothesis 2, replacing all maternal variables with paternal variables. Hypothesis 2 was supported if the gender x PSI variable significantly contributed to the dependent variables (cognition, language, and behavior) and follow-up tests of main effects revealed that girls were more negatively affected than were boys.

Missing Data

Due to some constraints with the public dataset for the EHSRE project, missing data imputation was not possible. Cases were, therefore, eliminated via a listwise deletion method, reducing samples based on whether participants answered questions on all variables included in each model. Sample sizes for cognition outcomes were reduced from a valid 1658, when all other variables were added to the models, to 1180, 1133, and 1110 in Models 1A, 1B, and 1C, respectively. For language outcomes, sample sizes was reduced from a valid 1424 to 1071cases; and from 2031 to 1515 cases for behavior outcomes in Study 1. For Study 2 sample sizes for

models 1, 2 and 3 were reduced from a valid 731 (completed data on 24-month PSI) to 465 (cognition), 463 (language) and 587 (behavior) respectively.

CHAPTER FOUR: RESULTS

This chapter presents results related to research questions and hypotheses developed in chapter 1. Hierarchical regression analyses were used to analyze the independent effects of mothers' and fathers' stress at 24 month (child age) on children's outcomes at 36 months old; hypothesis 1 for both studies. Further regression analyses were conducted to determine if the parenting stress and child outcome relationships were moderated by child gender; hypothesis 2 for both studies. Variables included in both studies are displayed below.

Preliminary Analyses

Descriptive statistics (mean, standard deviation, and range) of measures used in Study 1 and Study 2 are presented in Table 2 to show the scale of measures included in each study. Mothers' 24 month PSI and fathers' 24 month PSI were both included in one table (Table 2) to avoid duplication of all other measures used in both studies, and for simplicity.

Table 2

Means, Standard Deviations and Range of Study Measures

Measures	*N*	*M*	*SD*	*Range (Min-Max)*
Temperament	2,334	2.96	.95	4 (1-5)
36m Cognition	1,658	90.63	12.63	85 (49-134)
36m Language	1,424	83.01	15.56	85 (40-125)
36m Behavior	2,031	11.08	6.47	37 (0-37)
24m Cognition	1,780	89.08	13.68	85 (49-134)
24m Language	2,068	54.77	22.96	100 (0-100)
24m Behavior Problems	2,102	12.62	6.76	36 (0-36)
Mothers' 24m PSI	2,125	42.63	13.29	87 (24-111)
Mothers' 36m PSI	1998	43.15	13.94	89 (24-113)
Fathers' 24m PSI	731	37.70	10.96	74 (23-97)

Bivariate correlations were performed to analyze relationships among independent, dependent, and control variables shown in Table 3 and Table 4 for Study 1 and Study 2 respectively. Pearson's correlations were used for all correlations. For Study 1 and Study 2 maternal risk was significantly correlated with all 3 outcomes (behavior, cognition, and language), at 24 months (r = .10, -.19 & -.06, $p < .01$ respectively) and significantly and negatively associated with cognitive and language outcomes at 36 months (r = -.16 & -.21, $p <$ .01, respectively), but not behavior (r = .04, $p > .05^{ns}$) at 36 months. Correlations between prior and current outcome variables at 24 and 36 months were high to moderately correlated (r = .53,

.57, and .31, $p < .01$) for behavior, cognition, and language respectively. Mothers' PSI and all outcome variables were low to moderately correlated. Fathers' 24m PSI was moderately and significantly correlated with all outcome variables.

Table 3

Intercorrelations among Study 1 variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Matrisk	--									
2. 36m Behavior	.04	--								
3. 36m Cognition	-.16**	-.08**	--							
4. 36m Language	-.21**	-.11**	.57**	--						
5. Mothers' 24m PSI	.12**	.33**	-.17**	-.20**	--					
6. Mothers' 36m PSI	.11**	.42**	-.15**	-.18**	.62**	--				
6. Temperament	.10**	.22**	-.09**	-.11**	.23**	.23**	--			
7. 24m Behavior Problems	.10**	.53**	-.12**	-.14**	.40**	.32**	.27**	--		
8. 24m Cognition	-.19**	-.06**	.57**	.51**	-.18**	-.15**	-..09**	-.13**	--	
9. 24m Language	-.06**	-.09**	.38**	.31**	-.19**	-.17**	-.10**	-.12**	.44**	--
N	2954	2017	1646	1418	2111	1985	2317	2088	1768	2055

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4

Intercorrelations among Study 2 variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Matrisk	--								
2. 36m Behavior	.04	--							
3. 36m Cognition	-.16**	-.08**	--						
4. 36m Language	-.21**	-.11**	.57**	--					
5. Fathers' 24m PSI	.15**	.08	-.16**	-.15**	--				
6. Temperament	.10**	.22**	-.09**	-.11**	.08*	--			
7. 24m Behavior Problems	.10**	.53**	-.12**	-.14**	.07	.27**	--		
8. 24m Cognition	-.19**	-.06**	.57**	.51**	-.10*	-.09**	-.13**	--	
9. 24m Language	-.06**	-.09**	.38**	.31**	-.12**	-.10**	-.12**	.44**	--
N	2954	2017	1646	1418	725	2317	2088	1768	2055

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Hypotheses for Study 1: Mothers' Study.

The hypothesized results of Study 1 and Study 2 will be separately presented below. All 3 child outcomes of cognition, language, and behavior will be addressed. Significant results revealed in hierarchical multiple regressions are shown in Tables 5- 10 below.

Hypothesis 1. Hypothesis 1 for study 1 postulated that higher maternal stress at 24 months would have a negative effect on children's cognition, language and behavior outcomes at 36 months. Regression models for each of the outcomes tested included 36-month outcome scores as the dependent variable, 24-month PSI as independent variables, and maternal risk, temperament, prior outcome scores (24-month), and 36-month PSI as

covariates. Results for the regression models testing PSI and cognition revealed significant effects for 24-month maternal stress (Model 1A, Table 5) on children's 36-month cognitive scores; 36-month PSI was not controlled for in this model. Model 1A was statistically significant F (4, 1175) = 162.16, p <.001, and accounted for 35% of the variance in children's cognitive performances. This model was retested replacing mothers' 24-month PSI with 36-month PSI (Model 1B), which was also statistically significant F (4, 1128) = 155.66, p < .001, and accounted for 35% of the variance in children's cognitive performances. Both Mothers' 24 and 36-month maternal stress significantly predicted children's 36-month cognitive scores (see Model 1A and 1B, Table 5). However, when the model was tested controlling for prior stress, neither 24-month, nor 36-month PSI showed significance (Model 1C, Table 5). Prior cognition scores appeared to be greatly influencing later cognition scores in all 3 models.

Table 5.
Regression Analyses: Mothers' 24m & 36m PSI Predicting Cognition at 36m

	Variable	Model 1A[1]	Model 1B[2]	Model 1C[3]
Step 1	Maternal risk	-.19***	-.20***	-.20***
		(.30)	(.30)	(.30)
Step 2	Maternal risk	-.19***	-.20***	-.20***
		(.30)	(.30)	(.30)
	Temperament	-.06*	-.05	-.06
		(.38)	(.38)	(.39)
Step 3	Maternal risk	-.09***	-.10***	-.10***
		(.25)	(.25)	(.25)
	Temperament	.00	.01	.00
		(.31)	(.32)	(.32)
	24m Cognition	.57***	.57***	.57***
		(.30)	(.31)	(.31)
Step 4	Maternal risk	-.08***	-.09***	-.09***
		(.25)	(.25)	(.25)
	Temperament	.02	.02	.02
		(32)	(.32)	(.33)
	24m Cognition	.56***	.56***	.56***
		(.31)	(.31)	(.31)
	24m PSI	-.07**		-.05
		(.31)		(.39)
	36m PSI	-	-.06**	-.04
		-	(.31)	(.39)

Note: n=1180[1], 1133[2], 1110[3]
* $p < .05$, ** $p < .01$, *** $p < .001$

The second regression model (Table 6) of Study 1 included 36 month language scores as the dependent variable, and, as was previously mentioned, all independent variables and covariates were the same in all models with the exception of prior outcome scores. In this model the 24-month McArthur Vocabulary Production score was used as the prior language score. The model was statistically significant, F (5, 1065) = 40.40, p <.001 and accounted for 16% of the

variance in children's language outcomes at 36 months. Prior language scores at 24m (β =.28, t = 9.66, p <.001), maternal risk (β = -.18, t = -6.42, p <.001), and 24m PSI (β = -.08, t = -2.12, p <.05) were significant predictors of language at 36 months. Maternal risk was a negative predictor of language at 36 months and 36-month PSI was not a significant predictor of children's 36-month language outcomes (β = -.04, p >.10^{ns}). Mothers' 24m PSI remained significant for its effect on children's 36-month language performance even after controlling for 36-month, suggesting lasting effects of earlier stress on children's later language outcomes.

Table 6
Regression Analysis: Mothers' 24m PSI Predicting Language at 36 months

Variable	Beta	Std error	B	Adj R^2
Step 1				.05
Maternal risk	-2.99	.39	-.23***	
Step 2				.06
Maternal risk	-2.86	.39	-.22***	
Temperament	-1.36	.51	-.08**	
Step 3				.15
Maternal risk	-2.56	.37	-.20***	
Temperament	-.81	.48	-.05	
24m Language	5.01	.47	.30***	
Step 4				.15
Maternal risk	-2.46	.37	-.19***	
Temperament	-.54	.49	-.03	
24m Language	4.77	.48	.29***	
36m PSI	-1.46	.49	-.09**	
Step 5				.16
Maternal risk	-2.39	.37	-.18***	
Temperament	-.41	.49	-.02	
24m Language	4.63	.48	.28***	
36m PSI	-.69	.61	-.04	
24m PSI	-1.26	.60	-.08*	

Note: n=1071
* p < .05, ** p < .01, *** p < .001

Regression analyses for the third outcome in hypothesis 1 included the dependent variable of behavior at 36 months (Table 7); independent variables and covariates were the same as previous models, with the exception of prior outcome scores. Scores for behavior problems at 24 months were used as the prior outcome score for this model. The model was statistically significant F (5, 1508) = 161.98, $p < .001$, and accounted for 35% of the variance. Prior behavior scores ($\beta = .43$, $p < .001$), and 36m PSI ($\beta = .29$, $p < .001$), but not 24m PSI, were significant predictors of behavior and were both moderately contributing to children's 36-month behavior problem scores. Maternal risk was not significant for this model. Temperament was initially significant but did not maintain its significance once 36m PSI was entered into the regression ($\beta = .04$, $p > .05^{ns}$). This model suggested that children's behaviors were influenced by concurrent stress rather than prior stress.

Table 7.
Regression Analysis: Mothers' 36m PSI Predicting Behavior at 36 months

Variable	Beta	Std error	B	Adj R^2
Step 1				.00
Maternal risk	.18	.14	.03	
Step 2				.04
Maternal risk	.06	.14	.01	
Temperament	1.44	.17	.21***	
Step 3				.28
Maternal risk	-.07	.12	-.01	
Temperament	.52	.16	.08***	
24m Behavior	3.29	.15	.51***	
Step 4				.30
Maternal risk	-.15	.12	-.03	
Temperament	.40	.16	.06**	
24m Behavior	2.94	.16	.45***	
24m PSI	.94	.15	.15***	

Table 7 (cont'd)

Step 5				.35
Maternal risk	-.18	.11	-.03	
Temperament	.28	.15	.04	
24m Behavior	2.79	.15	.43***	
24m PSI	-.11	.18	-.02	
36m PSI	1.88	.17	.29***	
Step 6				.35
Maternal risk	-.18	.11	-.03	
Temperament	.27	.15	.04	
24m Behavior	2.78	.15	.43***	
24m PSI	-.13	.18	-.02	
36m PSI	1.87	.17	.29***	
Child Gender	.67	.27	.05**	
Step 7				.35
Maternal risk	-.18	.11	-.03	
Temperament	.27	.15	.04	
24m Behavior	2.78	.15	.43***	
24m PSI	-.11	.18	-.02	
36m PSI	2.22	.23	.34***	
Child Gender	.64	.27	.05*	
36m PSI x Child Gender	-.62	.28	-.07*	

Note: n=1,515

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

Summary of Results for Hypothesis of Study 1: Mothers' Study

Hypothesis 1. The models in Table 5 through Table 7 test hypothesis 1 for Study 1. Results show mothers' 24 and 36 month parenting stress predict children's cognitive performances; mothers' 24 month parenting stress predict children's 36 months language outcomes; and mothers' 36 month (but not 24 month) parenting stress predict children's 36 month behavior outcomes. Based on these results Study 1 Hypothesis 1 was partially supported.

Hypothesis 2. Hypothesis 2 stated that maternal stress at 24 months will have a greater negative effect on boys' outcomes at 36 months. Models tested for hypothesis 2 included 24m PSI on language and cognitive outcomes, and 36m PSI on behavior outcomes. The models for interaction effects of gender and mothers' PSI effects on children's cognitive outcomes at 36 months were not significant (β = -.02/-.01, $p > .10^{ns}$). The language model, even though it was statistically significant (F = 7, 1063, p < 001, adjusted R^2 = .16), did not show any significant effects for the moderation of child gender on the relationship between 24m PSI and children's language outcomes (β = -.02, $p > .10^{ns}$). Child gender nonetheless, did have a significant effect on the maternal stress-child problem behavior relationship (Table 7). Results showed that mothers' 36-month parenting stress predicted behavior problems for both boys and girls (β = .07, p <.05), but the effect was more pronounced for girls (β = .33, p <.001) than boys (β = .26, p <.001). This effect was found for concurrent and not prior maternal stress effects as was hypothesized. Follow-up regressions (Table 8) showed greater vulnerability of girls to mothers' higher parenting stress, than boys (graphically displayed in Figure 1.2). These results were contrary to study expectations therefore, hypothesis 2 was not supported.

Table 8.

Follow-up regression Analysis for Children's 36-month Behavior Outcomes and Mothers' Total PSI at 36 months by Gender

Gender		Variable	B	Std Error	Beta	T
Girls (N=746)	Step 1	Maternal risk	.44	.19	.09*	2.33
	Step 2	Maternal risk	.33	.19	.06	1.77
		Temperament	1.55	.24	.23***	6.37
	Step 3	Maternal Risk	.11	.16	.02	.70
		Temperament	.72	.22	.11***	3.24
		24m Behavior	3.10	.21	.48***	14.50
	Step 4	Maternal risk	.06	.16	.01	.37
		Temperament	.62	.22	.09**	2.78
		24m Behavior	2.82	.22	.43***	12.59
		24m Mother PSI	.92	.23	.13***	3.93
	Step 5	Maternal risk	.03	.15	.01	.16
		Temperament	.48	.21	.07*	2.30
		24m Behavior	2.61	.21	.40***	12.28
		24m Mother PSI	-.29	.26	-.04	-1.13
		36m Mother PSI	2.31	.25	.34***	9.30
Boys (N=769)	Step 1	Maternal risk	-.09	.20	-.02	-.47
	Step 2	Maternal risk	-.20	.19	-.04	-1.03
		Temperament	1.29	.24	.19***	5.28
	Step 3	Maternal Risk	-.25	.17	-.05	-1.50
		Temperament	.31	.22	-.05	1.44
		24m Behavior	3.39	.20	.53***	16.64
	Step 4	Maternal risk	-.34	.17	-.06*	-2.07
		Temperament	.19	.22	.03	.89
		24m Behavior	3.00	.22	.47***	13.66
		24m Mother PSI	.95	.21	.16***	4.56
	Step 5	Maternal risk	-.36	.16	-.07*	-2.26
		Temperament	.09	.21	.01	.42
		24m Behavior	2.89	.22	.45***	13.47
		24m Mother PSI	.04	.25	.01	.14
		36m Mother PSI	1.53	.24	.25***	6.29

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

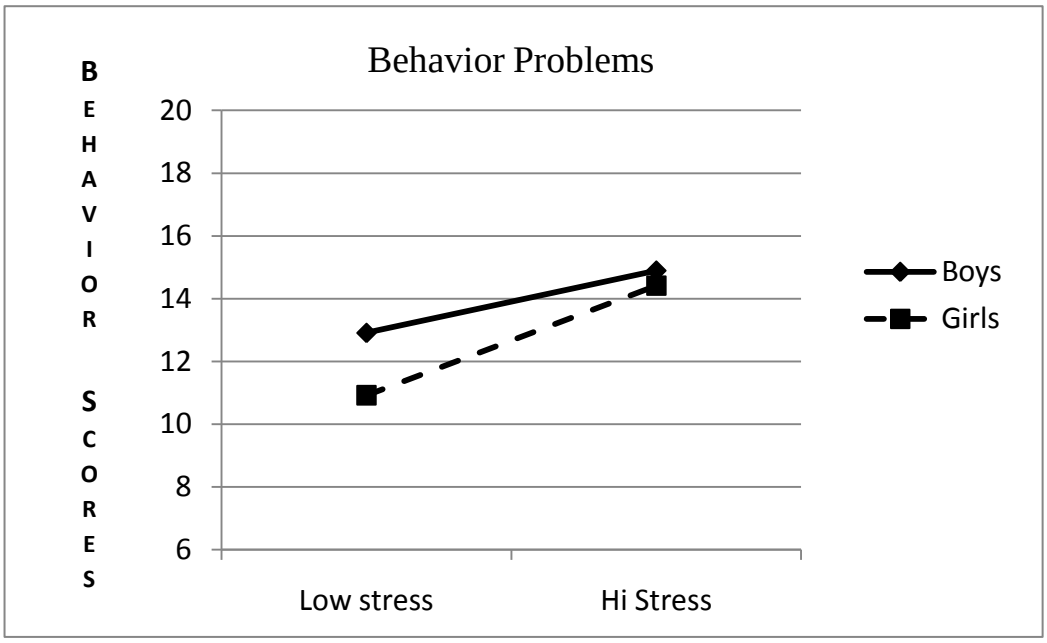

Figure 3: *Mothers' 36m parenting stress predicting boys and girls problem behavior scores at 36 months*

Hypotheses for Study 2: Fathers' Study

Hypothesis 1. Hypothesis 1 for Study 2 posited that higher paternal stress at 24 months will have a negative effect on children's cognition, language, and behavior scores regardless of child gender. Hierarchical multiple regression analyses were conducted for hypothesis 1 to analyze the effect of the independent variable, maternal stress on dependent variables, children's cognitive, language, and behavior outcomes.

The first regression model for Study 2 (see Table 9) included children's 36 month cognition scores as the dependent variable, and maternal risk, temperament, and prior cognition at 24 months, as covariate, and 24-month PSI as the independent variable. The model was statistically significant F (4, 464) = 65.83, p <.001, and accounted for 36% of children's cognitive performance at 36 months. Maternal risk (β = -.09, p < .05) and prior cognition scores (β = .57, p < .001) were both significant predictors of 36 month cognition outcomes, and temperament was not significant. After accounting for control variables, fathers' 24-month parenting stress (PSI)

significantly predicted children cognitive performance (β = -.09, $p < .05$) at 36 months (see Table 9).

Table 9.
Regression Analysis: Fathers' 24m PSI Predicting Cognition at 36months

Variable	Beta	Std error	*B*	Adj R^2
Step 1				.05
Maternal risk	-2.36	.47	-.23***	
Step 2				.05
Maternal risk	-2.31	.47	.22***	
Temperament	-.93	.63	-.07	
Step 3				.35
Maternal risk	-1.06	.40	-.10**	
Temperament	.19	.53	.01	
24m Cognition	7.31	.50	.57***	
Step 4				.36
Maternal risk	-.94	.40	-.09*	
Temperament	.26	.53	.02	
24m Cognition	7.30	.50	.57***	
24m PSI	-1.10	.49	-.09*	
Step 5				.36
Maternal risk	-.94	.40	-.09*	
Temperament	.26	.53	.02	
24m Cognition	7.30	.50	.57***	
24m PSI	-1.10	.49	-.09*	
Child Gender	-.02	.97	-.00	
Step 6				.37
Maternal risk	-.94	.40	-.09*	
Temperament	.27	.52	.02	
24m Cognition	7.34	.50	.57***	
24m PSI	-1.92	.62	-.15**	
Child Gender	.15	.96	.01	
PSI x Child Gender	2.17	1.0	.10*	

Note: n=465
* $p < .05$, ** $p < .01$, *** $p < .001$

Each of the other two models for Study 2 hypothesis 1 included independent variables of maternal risk, and prior outcome variables at 24 months, and covariate, temperament. Both models for language F (4, 458) = 27.27, $p < .001$, adjusted R^2 = .20; and behavior F (4, 582) = 54.36, $p < .001$, adjusted R^2 = .27, at 36 months were statistically significant. Nonetheless, 24-month paternal stress did not predict children's language performances (β = -.05, $p > .10^{ns}$), and problem behavior scores (β = .05, $p > .10^{ns}$). Thus, hypothesis 1 for Study 2 was only partially supported.

Hypothesis 2. Hypothesis 2 stated that paternal stress at 24 months would have a greater negative influence on girls' outcomes at 36 months, than on boys. Analysis of child gender moderating the relationship between fathers' parenting stress and child cognitive outcomes at 36 months (Table 9) was significant effect (β = .10, $p < .05$); the effect of parenting stress on cognitive development was more pronounced for girls than for boys (Table 10). No significance was found for the moderation of child gender on the relationship between parenting stress at 24 months and children's language outcomes (β = -.06, $p > .10^{ns}$); or behavioral outcomes (β = .01, $p > .10^{ns}$); at 36 months of age. Thus hypothesis 2 was only partially supported. Figure 1.3 graphically displays the effects of paternal stress on boys and girls cognition scores at 36 months.

Table 10.
Follow-up Regression Analysis for Children's Cognition Outcomes at 36 months and Fathers' Total PSI at 24 months by Gender

Gender		Variable	B	Std Error	Beta	T
Girls (N=239)	Step 1	Maternal risk	-1.67	.71	-.15*	-2.35
	Step 2	Maternal risk	-1.67	.72	-.15*	-2.33
		Temperament	-.42	.98	-.03	-.44
	Step 3	Maternal Risk	-.49	.57	-.04	-.85
		Temperament	.30	.77	.02	.39
		24m Cognition	8.03	.67	.62***	12.03
	Step 4	Maternal risk	-.21	.56	-.02	-.35
		Temperament	.50	.76	.03	.65
		24m Cognition	8.03	.65	.62***	12.26
		24m Father PSI	-2.05	.63	-.17***	-3.52
Boys (N=226)	Step 1	Maternal risk	-2.93	.61	-.31***	-4.83
	Step 2	Maternal risk	-2.85	.61	.30***	-4.69
		Temperament	-1.28	.80	-.10	-1.60
	Step 3	Maternal Risk	-1.71	.55	-.18**	-3.10
		Temperament	.03	.72	-.00	-.04
		24m Cognition	6.26	.77	.48	8.18
	Step 4	Maternal risk	-1.74	.56	-.18	-3.10
		Temperament	-.04	.72	-.00	-.05
		24m Cognition	6.28	.77	.49***	8.16
		24m Father PSI	.32	.78	.02	.27

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

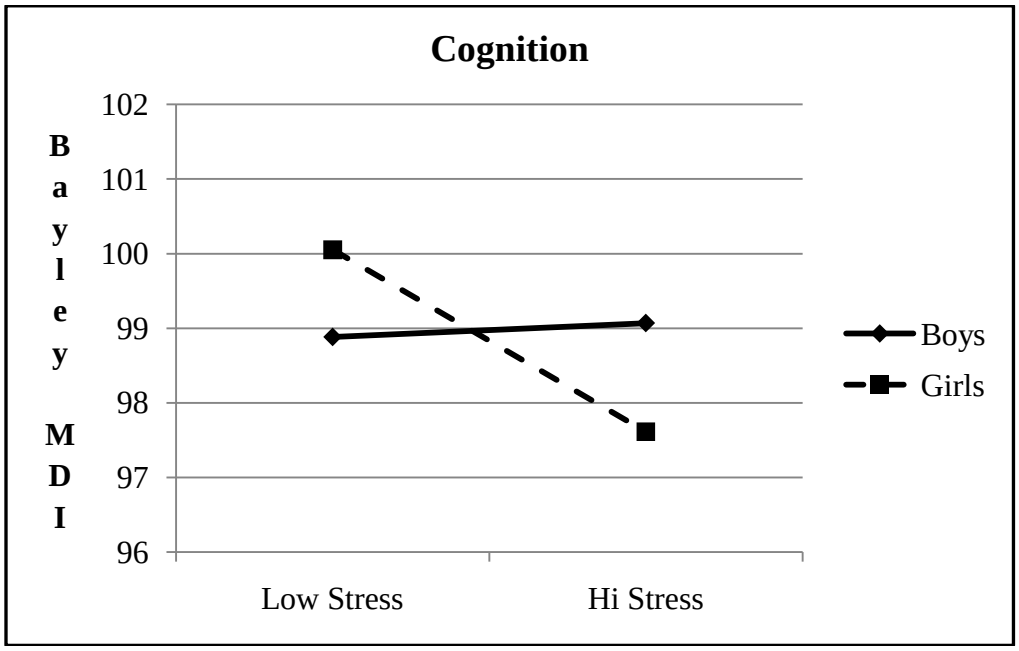

Figure 4: *Fathers' 24 month parenting stress predicting boys' and girls' cognitive performances at 36 months*

CHAPTER FIVE: DISCUSSION

Parents are said to experience stress at some point in their lives while carrying out their parenting duties (Crnic & Low, 2002; Deater-Deckard, 2004). Previous research examining parenting stress has extensively investigated the effects of maternal stress on children's outcomes, looking more in depth at behavior. Thus far, little research had been conducted focusing on the direct effects of fathers' stress on children's development and there had been a paucity of literature to reference regarding the moderation of child gender. Results from Study 1 were consistent with previous studies indicating a link between maternal stress and child outcomes. Results for Study 2 revealed interesting findings for future studies on paternal stress. In the following sections an expanded review of the findings will be presented as well as strengths and limitations of the two study designs, and implications for future research, respectively.

Study 1

Hypothesis 1 examined the relationship between mothers' parenting stress at 24 months and children's outcomes at 36 months. Results from the current study were consistent with previous research, (e.g. Anhalt, Telzrow, & Brown, 2007; Baker et al., 2003; Barry et al., 2005; Coon, 2007; Farver et al., 2006; Magill-Evans & Harrison, 2001) in that the current study found higher maternal stress predicted children's lower cognitive and language scores and increased behavior problem scores. Mothers' 24m and 36m PSI independently predicted children's 36 m cognitive outcomes, but when simultaneously added to the model the effect was not significant; possibly due to over-controlling. This was a unique finding related only to cognitive outcomes. Although not measured for this study, it is possible that parent-child interactions are different when mothers are stressed and the environments in which these children develop are less

cognitively stimulating (Nievar & Luster, 2006). Research has shown that when mothers are stressed they tend to respond less to their children's cues and the quality of the mother-child relationship may be impaired (Crnic et al., 1983), which possess characteristics that are necessary for fostering children's cognitions. For example, there may be fewer opportunities for reading, explaining, discussing, and conversing.

From these findings it seems that 36-month concurrent stress is more predictive of children's behavior problem outcomes than earlier stress. A possible reason for this may be the perceptions mothers hold of their children's behavior when they report higher levels of stress. Mothers may be more sensitive to children's behaviors when they feel like the demands of parenthood are overwhelming causing them stress. Mothers may become more irritable, critical, and punitive (Webster-Stratton, 1990) when stressed, which may direct their focus to the most obvious child outcome – behavior. Many of the earlier studies conducted show that mothers' reporting high levels of stress often reported having children with increased behavior problems (Barry et al., 2005; Deater-Deckard & scar, 1996; Patterson et al., 1992), which may suggest that mothers focused more on their children's problem behaviors when stress levels increased and not necessarily that children's behaviors had changed. Caution should be exercised in stating that parenting stress predicts increased child behavior problems, as both of these measures are parent reported and may be subjected to the perceptions of parents.

Mothers' prior stress (at 24 months) was predictive of children's language outcomes at 36 months. The predictive effect of mothers' prior stress on children's later language outcomes may indicate that the parent-child relationship at 24 months is Bates, particularly important or that children's development at this age is particularly vulnerable. It is likely that stressed mothers are not engaging in the interactions or providing the type of stimulation that would contribute to the

rapidly developing language skills of children at age 2. Thus, children may miss out on that developmental "window of opportunity" to build up their foundational language skills, which may be then be linked to their later underdevelopment in their language skills. Research has shown that around the age of 2 years there is rapid acceleration in children's language (Huttenlocher et al., 1991), linked to later language skills (Pan, Singer, Rowe & Snow, 2005), making this a critical developmental stage for children's language outcomes. Future research should follow-up on parenting stress effects and the impacts it has on later language outcomes. Also, research should follow-up on which outcomes parenting stress have a more lasting effect on, and why.

Results from Study 1 revealed that children's language and cognition scores were lower when maternal risks increased, supporting previous research indicating that children from disadvantaged backgrounds are at greater risk for poor language and cognitive development (McLoyd, 1998; Noel, Peterson & Jesso, 2008; Sameroff & Fiese, 2000). As was expected, difficult temperament was positively associated with children's behavior problems; however, it was not a significant predictor of children's behavior problems once mothers' parenting stress was accounted for. This finding suggests that the effects of temperament may be mediated by parenting stress, which then affects children's behaviors, thus validating prior research indicating a reciprocal relationship among parenting stress, temperament, and child behavioral problems (Coplan, Bowker & Cooper, 2003; Deater-Deckard, 2004). Interestingly, temperament was significantly associated with children's lower language scores, suggesting that the children with difficult temperaments are likely to have lower language scores. Again, after accounting for parenting stress, the effect was no longer significant. One possible reason for this outcome may be that when children display more difficult temperaments, parents feel more stressed in their

parenting role and may not be providing the necessary opportunities for children's language skills. Research shows that temperament may influence the relationship between parenting stress and child cognitive skills (Gutman et al., 2005; Nievar & Luster, 2006) and language abilities (Noel, et al 2008). In fact, researchers have indicated that parenting stress influenced by temperamentally difficult children may have implications for the kind of stimulation parents provide and thus may hinder children's developing skills (Calkins, Hungerford & Dedmon, 2004).

Hypothesis 2, which predicted that the relationship between mothers' 24-month parenting stress and children's outcomes would be more pronounced for boys than girls, was not supported. This hypothesis was developed based on past studies highlighting maternal depression, which is co-morbid with parenting stress, predicted boys developmental problems, such as disruptive behaviors (Magill-Evans & Harrison, 2001; Barry et al., 2005), and poor language outcomes related directly to stress (Coon, 2007). Analyses of the relationship between 24m PSI and children's behavior did not show any significance, but a significant positive relation was revealed for concurrent stress effect on children's 36 month behavior. Results showed differences in the effects of mothers' stress on girls' and boys' problem behaviors; however, girls appeared to be more vulnerable to mothers' higher concurrent stress. Although previous findings had indicated that boys would be more vulnerable in stressed environments (Davis & Emory, 1995; Hansen, Moller & Olsen, 1999) these results were not replicated in this study. Findings showed that boys had greater behavior problem scores than girl when mothers had low stress but lower scores when mothers had high stress. It is often expected that boys will display "bad/highly energetic" behavior, which may be considered as boys being boys. Therefore, when mothers are stressed they might not view boys' behavior as different but their

perceptions of girls' behavior may change based on their stress level. Caution should be taken in explicitly stating that mothers' higher stress predicts greater behavior problems for girls as both of these were parent-reported measures. The lack of findings with regard to gender as a moderator may be partially explained by the fact that while comparison group families did not have access to EHS, they were free to access other community support programs. The degree to which comparison group families received support was not well documented. Conceivably, all families, for whom mothers were almost exclusively caregivers, received some level of community support. This support could have provided some buffer from parenting stress and provided some level of protection for boys against the effects of parenting stress. Future studies should consider the role of EHS services between parenting stress and child outcomes to determine if these relationships are the same in and out of EHS.

Study 2

The results for hypothesis 1 only partially supported the prediction that fathers' parenting stress would have a negative effect on the outcomes of children. Significant and negative influences of fathers' stress on children's cognitive development were evident but no other measured outcomes for the current study showed significance. Previous research of fathers, although limited, suggested that fathers' stress would affect their children's well-being, academic outcomes, and behaviors (Deater-Deckard & Scarr, 1996). However, results from Study 2 only replicated fathers' higher parenting stress predicted children's lower cognitive scores; interestingly, neither children's language nor behavior were impacted for this study. Fathers with greater stress have been found to engage less or be more unavailable to their children (Halme, Tarkaa, Nummi & Astedt-Kurki, 2006; Fagan, Bernd, & Whiteman, 2007), which is linked to negative effects on children's cognitive outcomes (Shannon et al., 2002). It may be that these

fathers' converse less or are less concerned with interacting with their children when they are stressed. This has been found to be particularly true when fathers were less satisfied with their marriages (Deater-Deckard & Scarr, 1996; Gavin et al., 2002; Haper & Fine, 2006). Follow-up studies should be conducted examining the mediational mechanism through which fathers' parenting stress affects children's outcomes using a couple or dyadic approach.

Findings for hypothesis 2 revealed child gender moderates the relation between fathers' stress and children's cognitive outcomes. Results indicated lower cognitive scores for girls of fathers with higher stress and little to no changes in outcomes of boys regardless of fathers' stress level. This finding was consistent with outcomes from the Oakland growth study which suggested greater developmental risk for girls rather than boys resulting from fathers' stress (Elder et al, 1985). In the Elder et al., (1985) study, fathers' were more negative toward girls when experiencing economic stress but had no change in behavior toward boys.

Sometimes mothers serve as gatekeepers of their children, which may influence fathers' involvement with their children or cause conflict between parents. Fathers' parenting stress may be related to their lack of confidence, or restrictions in their parenting role, linked to mothers' playing the role of gatekeeper. This may have a greater impact on girls than on boys, since girls become more involved in parents' conflicting relationships, which could minimize the opportunities to develop their cognitive skills (Cox, Paley, & Harter, 2001). Additionally, this parental conflict in the home may impair opposite-sex relationships such as father-daughter, mother-son relationships (Cox, Paley, & Harter, 2001), which may account for fathers' stress having a greater negative influence on girls' cognitive performances. Future research should consider examining paternal involvement as a salient factor in fathers' parenting stress. Alternatively, future research should examine mothers' gate-keeping (which may be

counterproductive to their own well being) and how it may contribute to fathers' stress, and children's development.

This study was conducted as a foundational study for examining the effects of mothers' and fathers' parenting stress on children's 36-month outcomes. Delving more deeply into the theoretical framework of Bronfrenbrenner would require a couple or dyadic approach be used. The theoretical framework nonetheless, was appropriately selected considering single parent possibilities, and the fact that separately mothers and fathers could have independent impacts on children's growth and development. It is recommended that future studies consider more couple-meditational models to incorporate the full intentions of Bronfrenbrenner's theory.

Strengths and limitations of both studies

Several strengths were evident in this study. First, due to the income eligibility requirements of the EHSRE projects, all families had an income at, or below the Federal poverty line. This requirement provided a fairly synonymous sample for use in both studies, which limited the variability of incomes and reduced the likelihood of confounding effects from socio-economic status.

Second, the use of the National EHSRE data provided a large sample size of families and children from varying regions and EHS programs across the United States, in both urban and rural areas. Both studies used the same sample of children from the National EHSRE project. It also allowed for a longitudinal design, as data used for the current study was gathered at 2 time points (24, and 36 months). A third strength was that all measures used in these studies had very good psychometric properties. Measurement instruments (PSI, MDI, Achenbach CBCA, PPVT, and McArthur CDI) were all reliable and valid.

Lastly, examination of the effects of mothers' and fathers' parenting stress on children's outcomes significantly contributes to the existing body of research on parenting stress, especially related to language and cognition. Furthermore, it adds to the paucity of research on fathers' parenting stress and allows for a comparison of results. Additionally, this study extends current literature by presenting results related to how parenting stress might differentially affect boys' and girls' outcomes.

Limitations

Although there were many strengths to both studies, some limitations existed. Firstly, insufficient data were collected to allow for similar computation of a paternal risk variable, thus the results of Study 2 may be slightly skewed since the maternal risk variable was used in both studies. Secondly, parents were assumed to have had continuous (or non-continuous) parenting stress, i.e. what parents reported during data collection was thought to be the constant state of those parents and not just their state of mind for that one day/week. This could be misrepresentative of these parents. Thirdly, there were problems with missing data. Fewer children were analyzed for each model because some families/children were missing data on all of the variables included in the models. Also missing data imputations were not possible due to constraints of the public EHSRE dataset. These problems with missing data could affect the generalizability of results to a low income population, especially if participants who were not included, due to missing data, differed on some quality that made them distinct from the rest of the sample.

Fourthly, neither of these studies explored outcomes of children from other SES such as middle income and high income families. These studies can therefore only be generalized to a

low income population. Examination of a more economically diverse population would have made the results more applicable to a wider population.

Implications for future research

Follow-up studies should examine these results in other low-income populations to test for generalizabilty. Future research should examine a comparative study between maternal and paternal stress, controlling for the effects of mothers stress while analyzing fathers' stress and vice versa. Also, future research should examine the effects of mothers' stress in a two parent home to determine whether maternal stress will have a different effect on children's outcome when the father is not stressed (will fathers presence/involvement in the home buffer the effects of mothers' parenting stress on children's outcomes?). A more longitudinal study should be conducted to investigate the effects of parents' early parenting stress effects on children's later development. Although the psychometric properties of the PSI have been validated for use with a male sample, a measure developed specifically to assess fathers' parenting stress should be created. Finally, there may be other relationships that may be influencing the fathers' stress effect on girls which this study was unable to measure. More in-depth research on paternal involvement and potential links to children's development should be explored.

Conclusion

A child's early environment is an important factor in later development. According to McLoyd (1998), children in low income families are often disadvantaged and at risk for slower development compared to their peers in other SES groups. Findings from Study 1 suggest that boys and girls from low income families are similarly susceptible to mothers' parenting stress, in their language and cognitive development, but girls' behaviors may be more vulnerable to higher maternal stress. Study 2 on the other hand, suggests greater vulnerability for girls' cognitive

development when paternal stress is higher. These studies extend current literature and can be used to construct future studies that will contribute to helping with children's positive development especially in at-risk populations, and specific to gender. Understanding parenting stress and its impacts on children's developmental outcomes is vital to constructing appropriate intervention strategies and may offer insight into the developmental trajectories of children in these environments. Parenting programs and EHS/preschool programs may be beneficial sources for providing support to buffer/reduce the effects of parenting stress.

REFERENCES

REFERENCES

Abidin, R. (1990). Introduction to the special issue: The stresses of parenting. *Journal of Clinical Child Psychology, 19,* 298-301

Abidin, R. (1990). *Parenting Stress Index Short Form: Test Manual.* Charlottesville VA: Pediatric Psychology Press.

Abidin, R. (1992). The determinants of parenting behavior. *Journal of Clinical Child Psychology, 21,* 407 – 412.

Achenbach, Thomas M. and Leslie A. Rescorla. (2000). Manual for the ASEBA Preschool Forms and Profiles. Burlington, VT: University of Vermont Department of Psychiatry.

Adamsons, K., Beuhler, C. (2007). Mothering versus fathering versus parenting: Measurement equivalence in parenting measures. *Parenting: Science and Practice, 7,* 271-303

Administration on Children Youth and Families. (2002). *Making a difference in the lives of infants and toddlers and their families: The Impacts of Early Head Start, Volume I: Final Technical Report*. Washington DC: Department of Health and Human Services

Amato, P. R., & Fowler, F. (2002). Parenting Practices, Child Adjustment, and Family Diversity. *Journal of Marriage and the Family, 64,* 703-716.

Amato, P. R., & Rivera, F. (1999). Paternal Involvement and Children's Behavior Problems. *Journal of Marriage and Family, 61,* 375-384.

Anhalt, K., Telzrow, C. F., & Brown, C. L**.** (2007). Maternal stress and emotional status during the perinatal period and childhood adjustment. *School Psychology Quarterly, 22,* 74-90

Baker, B. L., McIntyre, L. L., Blacher, J., Crnic, K., Edelbrock, C., & Low, C. (2003). Pre-school children with and without developmental delay: Behavior problems and parenting stress over time. *Journal of Intellectual Disability Research, 47,* 217-230.

Barry, T. D., Dunlap, S. T., Cotten, S. J., Lochman, J. E., & Wells, K. C. (2005). The influence of maternal stress and distress on disruptive behavior problems in boys. *Journal of the American Academy of Child and Adolescent Psychiatry, 44,* 265-273

Bayley, Nancy. (1993) Bayley Scales of Infant Development, Second Edition: Manual. New York: The Psychological Corporation, Harcourt Brace & Company.

Bhavnagri, N. (1999). Low income African American mothers' parenting stress and instructional strategies to promote peer relationships in preschool children. Early Education and Development, *10,* 551-71.

Biller, H.B., & Kimpton, J.L. (1997). The father and the school-aged child. In M.E. Lamb (Ed.), *The role of the father in child development* (3rd ed., pp. 143-161). New York: Wiley.

Blankenhorn, D. (1995). *Fatherless America: Confronting our most urgent social problem.* New York: Basic Book.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32,* 513-531.

Bronfenbrenner, U. (1988). Interacting systems in human development. Research paradigms: Present and future. In Bolger, N., Caspi, A., Downey, G., & Moorehouse, M. *Persons in context: Developmental processes.* New York: Cambridge University Press.

Buss, A. H., & Plomin, R. (1975). *A temperament theory of personality development.* New York: Wiley.

Calkins, S. D., Hungerford, A. & Dedmon, S. E. (2004). Mothers' interactions with temperamentally frustrated infants. *Infant Mental Health Journal, 25,* 219–39.

Cabrera, N. J., & Mitchell, S. J. (2009). An exploratory study of fathers' parenting stress and toddlers' social development in low-income African American families. *Fathering*. 7, 201–225. doi:10.3149/fth.0703.201.

Chang, Y., Fine, M. A., Ipsa, J., Thornburg, K. R., Sharp, E., & Wolfenstein, M. (2004). Understanding parenting stress among young, low-income, African-American, first-time mothers. *Early Education and Development, 15,* 265-282.

Conger, R. D., Conger, K. J., Elder, G. H, Lorenz Jr., F. O., Simmons, R. L., & Whitbeck, L. B. (1993). Family economic stress and adjustment of early adolescent girls. *Developmental Psychology, 29,* 206-219.

Conger, R. D., Conger, K. J., Elder, G. H, Lorenz Jr., F. O., Simmons, R. L., & Whitbeck, L. B. (1992). A family process model of economic hardship and adjustment of early adolescent boys. *Child Development, 63,* 526-541.

Coon, T. (2007). *The effect of parenting stress on children's cognitive development: Examining the variables of sex and race/ethnic origin.* (Unpublished master's thesis). University of Missouri-Columbia, Missouri.

Coplan, R. J. Bowker, A., Cooper, S. M. (2003). Parenting daily hassles, child temperament, and social adjustment in preschool. Early Childhood and Research Quarterly, *18,* 376-395.

Corona, R., LefKowitz, E. S., Sigman, M., & Romo, L. F. (2005). Latino adolsecents' adjustment, maternal depressive symptoms, and the mother-adolescent relationship. *Family Relations, 54,* 386-399.

Cox, M., Paley, B., & Harter, K. Interparental conflict and parent-child relationships in Grych Howard J., & Fincham, F. D. (2001). Interparental conflict and child development: theory, research, and applications. Cambridge University Press. New York: NY.

Crnic, K. A., & Low, C. (2002). Everyday stresses and parenting. In M. H. Bornstein (Ed.), *Handbook in Parenting. Practical issues in parenting* (*Vol. 5*, pp. 243-267) Mahwaw, NJ: Erlbaum.

Crnic, K. A., Gaze, C., & Hoffman, C. (2005). Cumulative parenting stress across the preschool period: Relations to maternal parenting and child behavior at age 5. *Infant and Child Development, 14,* 117-132.

Crnic, K., Greenberg, M., Ragozin, A., Robinson, N., & Basham, R. (1983). Effects of Stress and Social Support on Mothers and Premature and Full-Term Infants. Child Development, *54,* 209-217.

Crnic, K.A., & Greenberg, M.T. (1990). Minor parenting stresses with young children. *Child Development, 61,* 1628-1637.

Crockenberg, S., & Litman, C. (1990). Autonomy as competence in 2-year-olds: Maternal correlates of child defiance, compliance, and self-assertion. *Developmental Psychology, 26,* 961-971.

Crouch, J., & Behl, L. (2001). Relationships among parental beliefs in corporal punishment, reported stress, and physical child abuse potential. *Child Abuse and the Society of Pediatric Nurses, 3,* 103-110.

Davis, M., & Emory, E. (1995) Stress differences in neonatal stress reactivity. Child Development, *66,* 14-67.

Deater-Deckard, K. (2004). *Parenting Stress.* New Haven: Yale University Press.

Deater-Deckard, K., & Scarr, S. (1996). Parenting stress among dual-earner mothers and fathers: Are there gender differences? *Journal of Family Psychology, 10,* 45-59.

Deater-Deckard, K., Dodge, K. A., Bates, J. E., & Petit, G. S. (1998). Multi risks factors in the development of externalizing behavior problems: Group and individual differences. *Development and Psychopathology, 10,* 469-493.

Dunn, L. M. & Dunn, L. M. (1997). *Examiner's Manual for the Peabody Picture Vocabulary Test—Third Edition*. Circle Pines, MN: American Guidance Service, Inc.

Fagan, J., Bernd, E., & Whiteman, V. (2007). Adolescent fathers' parenting stress, social support, and involvement with infants. *Journal of Research on Adolescence, 17,* 1–22.

Farver, J. A., Xu, Y., Eppe, S., & Lonigan, C. J. (2006). Home environments and young Latino children's school readiness. *Early Childhood Research Quarterly, 21*, 196-212.

Feldman, R., Eidelman, A. I., & Rotenberg, N. (2004). Parenting stress, infant emotion regulation, maternal sensitivity, and the cognitive development of triplets: A Model for Parent and Child Influences in a Unique Ecology. *Child Development, 75*, 1774-1791.

Fenson, L., Dale, P.S., Reznick, J.S., Thal, D., Bates, E., Hartung, J.P., Pethick, S., & Reilly, J.S. (1993). *The MacArthur Communicative Development Inventories: User's Guide and Technical Manual*. Baltimore: Paul H. Brokes Publishing Co.

Gavin, L. E., Black, M. M., & Minor, S. (2002). Young, disadvantaged fathers' involvement with their infants: An ecological perspective. *Journal of Adolescent Health, 31*, 266–276.

Gelfand, D. M., Teti, D. M., & Fox, C. E. (1992). Sources of parenting stress for depressed and non-depressed mothers of infants. *Journal of Clinical Child Psychology, 21*, 262–272.

Gutermuth-Anthony, L., Anthony, B. J., Glanville, D. N., Naiman, D. Q., Waanders, C., & Shaffer, S. (2005). The relationships between parenting stress, parenting behavior, and preschoolers social competence and behavior problems in the classroom. *Infant and Child Development*, *14*, 133-154.

Halme, N., Tarkka, M. J., Nummi, T., & Åstedt-Kurki, P. (2006). The effect of parenting stress on fathers' availability and engagement. *Child Care in Practice, 12*, 13–26.

Harper, S. E., & Fine, M. A. (2006). The effects of involved nonresidential fathers' distress, parenting behaviors, interparental conflict, and the quality of father-child relationships on children's well-being. *Fathering, 4*, 286–311.

Hetherington, E. M., & Stanley-Hagan, M. M. (1997). *The effects of divorce on fathers and their children.* In M.E. Lamb (Ed.), The role of the father in child development (3rd ed., pp. 191-211). New York: Wiley.

Hoyenga, K. B., & Hoyenga, K. T. (1979). *The question of sex differences: Psychological, cultural, and biological issues*. Boston: Little, Brown.

Holden, E., & Banez, G. (1996). Child abuse potential and parenting stress within maltreating families. *Journal of Family Violence, 11*, 1-12.

Huth-Bocks, A. C., & Hughes, H.M. (2008). Parenting stress, parenting behavior, and children's adjustment in families experiencing intimate partner violence. *Journal of Family Violence, 23*, 243-251.

Jackson, A. P. (2003). The effects of family and neighborhood characteristics on the behavioral and cognitive development of poor black children: A longitudinal study. *American Journal of Community Psychology, 32*, 175-186.

Kelley, S. (1998). Stress and coping behaviors of substance-abusing mothers. *Journal of Education and Development, 10,* 551-571.

Kisker, E. E., Boller, K., Nagatoshi, C., Sciarrino, C., Jethani, V., Zavatsky, T., Ford, M., Love, J. M., & the Mathematica Research Team. (2003). *Resources for measuring services and outcomes in Head Start Programs serving infant and toddlers.* Washington DC: Department of Health and Human Services.

Kurstjens S, Wolke D. (2001). Effects of maternal depression on cognitive development of children over the first seven years of life. *Journal of Child Psychology and Psychiatry, 42,* 623 – 36.

Magill-Evans, J., & Harrison, M. (2001). Parent-child interactions, parenting stress, and developmental outcomes at 4 years. *Children's Health Care, 30,* 135-150.

McBride, B. A. (1989). Stress and fathers' parental competence: Implications for family life and parent educators. *Family Relations 38,* 385-389.

McCarty, C., Zimmerman, F., Digiuseppe, D., & Christakis, D. (2005). Parental Emotional Support and Subsequent internalizing and externalizing problems among children. *Developmental and Behavioral Pediatrics, 26,* 267-275.

McLoyd, V. (1998) Socioeconomic disadvantage and child development. *American Psychologist, 53,* 185-204.

Miller, M. H. (2000). *The relationship of temperament at school entry, cognitive ability, gender, SES and at-risk status to later school achievement*. (Unpublished doctoral dissertation). Indiana University of Pennsylvania, Pennsylvania

Morales, M., Mundy, P., Delgado, C. E. F., Yale, M., Neal, R. & Schwartz, H. K. (2000). Gaze following, temperament, and language development in 6-month-olds: A replication and extension. *Infant Behavior & Development 23,* 231–36.

Nair, P., Schuler, M., Black, M., Kettinger, L., & Harrington, D. (2003). Cumulative environmental risk in substance abusing women: early intervention, parenting stress, child abuse potential and child development. *Child Abuse and Neglect, 27,* 997-1017.

Nievar, M. A., & Luster, T. (2006). Developmental processes in African-American families: An application of McLoyd's theoretical model. *Journal of Marriage and Family, 68,* 320-331.

NICHD Early Child Care Research Network. (2005). Duration and developmental timing of poverty and children's cognitive and social development from birth through third grade. *Child Development, 76,* 795-810.

Noel, M., Peterson, C., Jesso, B. (2008). The relationship of parenting stress and child temperament to language development among economically disadvantage preschoolers. *Journal of Child Language, 35,* 823-843. doi: 10.1017/S0305000908008805

Pan, B. A., Rowe, M. L., Singer, J. D. Snow, C. E. 2005. Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76,* 763-782.

Patterson, G. R., Reid, J. B., Dishion, T. J. (1992). *Antisocial boys*. Eugene, OR: Castalia.

Pratt, M. W., Green, D., MacVicar, J., & Bountrogianni, M. (1992). The mathematical parent: Parental scaffolding, parent style, and learning outcomes in long- division mathematics homework. *Journal of Applied Developmental Psychology, 13,* 17-34.

Putnick, D., Bornstein, M., Hendricks, C., Painter, K. M., & Suwalsky, J. T. D., Collins, A. W. (2008). Parenting stress, perceived parenting behaviors, and adolescent self-concept in European American families. *Journal of Family Psychology, 22,* 752-762. doi: 10.1037/a0013177

Qi, C. H., Kaiser, A. P. (2003). Behavior problems of preschool children from low-income families: review of the literature. *Top Early Childhood Special Education, 23,* 188–216.

Raikes, H., Pan, B.A., Luze, G., Tamis-LeMonda, C., Brooks-Gunn, J., Constantine, J., Tarullo, L. B., Raikes, H. A., & Rodriguez, E. T. (2006). Mother-child book reading in low-income families: Correlates and outcomes during the first three years of life. *Child Development, 77,* 924–953.

Rodriguez, C. M., & Green, A. J. (1997). Parenting stress and anger expression as predictors of child abuse potential. *Child Abuse & Neglect, 21,* 367 – 377.

Shannon, J. D., Tamis-LeMonda, C. S., London, K., & Cabrera, N. (2002). Beyond rough and tumble: Low-income fathers' interactions and children's cognitive development at 24 months. *Parenting: Science and Practice, 2,* 77-104.

Sharp, D., Hay, D., Pawlby, S., Schmucker, G., Allen, H., & Kumar, R. (1995). The impact of postnatal depression on boys' intellectual development. *Journal of Child Psychology and Psychiatry, 36,* 1315-1336.

Slykerman, R. F., Thompson, J. M. D., Pryor, J. E., Becroft, D. M. O., Robinson, E., Clark, P. M., Wild, C. J., & Mitchell, E. A. (2005). Maternal stress, social support and preschool children's intelligence. *Early Human Development, 81,* 815-821.

Strage, A., & Brandt, T. S. (1999). Authoritative parenting and college students' academic adjustment and success. *Journal of Educational Psychology, 91,* 146- 156.

Stoneman, Z., Brody, G., Burke, M. (1989). Marital quality, depression, and inconsistent parenting: Relationship with observed mother-child conflict. *American Journal of*

Orthopsychiatry, 59, 105-117.

Tronick, E. Z., Weinberg, M. K. (1997). Depressed mothers and infants: Failure to form dyadic states of consciousness. In L. Murray & P. Cooper (Eds.). *Postpartum Depression and Child Development* (Vol. 1, pp. 54–81). New York: Guilford Press.

Vandell, D., Posner, J., & Shumow, L. (1998). Harsh, firm, and permissive parenting in low-income families: Relations to children's academic achievement and behavioral adjustment. *Journal of Family Issues, 19*, 483-507.

Webster-Stratton, C. (1990). Stress: A potential disruptor of parent perceptions and family interactions. *Journal of Clinical Child and Adolescent Psychology, 19,* 302-312.

Whipple, E., Webster-Stratton, C. (1991). The role of parental stress in physically abusive families. *Child Abuse and Neglect, 15*, 279-291.

Whiteside-Mansell, L., Pope, S. K., & Bradley, R. H. (1996). Patterns of parenting behavior in young mothers. *Family Relations, 45*, 273-281.