

The Influence of Parenting Stress and Social Support on Parenting Behavior during a
Preventative Parenting Education Program for Enhancing School Readiness

A DISSERTATION

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA

BY

Kate L. Clayton

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Scott McConnell, Advisor

August, 2015

Acknowledgements

This dissertation is the culmination of many people's hard work and dedication and for that I am sincerely grateful. First, I must thank Scott McConnell for his unwavering guidance, support, and generosity. I will always value the education and opportunities that Scott has provided during my time at the University of Minnesota and I look forward to his continued mentorship.

My deepest appreciation goes to the families who participated in this research. Their commitment to supporting their children's development and education was inspiring.

To my parents, Kim and David Jones, thank you for your love, unwavering confidence in my academic pursuits, and support during my quest for this seemingly endless goal. You both are such an important source of support and inspiration. I am so lucky to have parents as wonderful as you. Also, thank you to my brother Patrick – for being you and for keeping life and life's challenges in perspective.

To my wonderful, loving, supportive, husband Luke. Luke, I'd like to think that I could have gotten to this point without you. However, we both know, that without you, I wouldn't have gotten here with my sanity fully intact. Thank you for listening to me, talking me through my frustrations, comforting me when I've been overwhelmed, and rallying me on when I've wavered. I love you with arrows.

To my son, Wesley. How can such a little guy bring such great change and joy to my world? Well, now I know. Love you, Wes.

To my mother-in-law, Pamela Clayton. Your support made this dissertation logistically possible. Because of you, I was able to complete this project knowing that the

person I was asking for an hour, or many hours of time, was equally as dedicated to Wes's wellbeing and happiness. Deadlines became much less ominous knowing I could rely on you.

I would also like to thank CBB research team, Dr. Lauren Martin, Dr. Tracy Bradfield, Dr. Alisha Wackerle-Holman, and Tisa Thomas. Lauren, Tracy, and Alisha, without your support, I would not have had the opportunity to work as a graduate student on this amazing project and I would not have been given the opportunity to pursue this research. Lauren, your commitment to community-based research has been truly inspiring. To Tisa Thomas, a fellow graduate student, your commitment to helping me get the data I needed and time in helping me collect the data for this project made this project the success that it was. Thank you.

Lastly, thank you to my friends and classmates, Braden Schmitt and Cynthia Conner. Together, through years of classes, practicums, internships, exams, study sessions, job interviews, and now as school psychologists, what great friends you have been and continue to be. Thank you.

Abstract

The purpose of this study was to examine if parents with increased levels of risk (e.g. increased parenting stress and lower perceived social support) and less developed parenting behaviors prior to the intervention would show more change in key parenting behaviors (e.g. parent knowledge and parent-child language interactions) over the course of the intervention. Forty-seven parent-child dyads participated. Participants were recruited through a larger parent study investigating the overall efficacy of the intervention. All participants were English speaking. The majority of families were living below the poverty line. A quasi-experimental, pretest-posttest within-subjects intervention design was employed to evaluate the extent to which elevated parenting stress levels or low levels of social support moderated either a) increases in parenting knowledge or b) increases in CT for parents who participated in the College Bound Babies parenting education program. Dependent variables included change in frequency of parent-child conversational-turns and change in parenting knowledge. Data were collected using the Language ENvironmental Analysis (LENA) system in the participant's natural home environment and parenting knowledge was measured using the Parenting Knowledge and Practices Questionnaire, a self-report measure. Moderator analyses indicated that elevated levels of parenting stress or lower levels of perceived social support did not moderate change in parent-child language interactions or change in parenting knowledge for participants regardless of baseline levels of parenting knowledge or baseline level of parent-child conversational turns. Directions for future research and implications of non-significant findings are discussed.

Table of Contents

Acknowledgements	i
Abstract.....	iii
Table of Contents.....	iv
List of Tables.....	v
List of Figures.....	vi
Introduction.....	1
Literature Review.....	10
Methods.....	51
Results.....	63
Discussion.....	77
References.....	97
Appendix A. Family Demographic Survey.....	122
Appendix B. Parent Knowledge and Practices Questionnaire.....	124
Appendix C. Multidimensional Scale of Perceived Social Support.....	128

List of Tables

Table 1. Demographic Characteristics.....	52
Table 2. Descriptive Statistics and Measures for Question 1 and Question 2.....	64
Table 3. Descriptive Statistics and Measures for Question 3 and Question 4.....	65
Table 4. Correlations for Question 1 and Question 2.....	66
Table 5. Correlations for Question 3 and Question 4.....	66
Table 6. Hierarchical Regression Analysis Predicting Change in Parenting Knowledge With Parenting Stress.....	68
Table 7. Hierarchical Regression Analysis Predicting Change in Parenting Knowledge With Perceived Social Support.....	70
Table 8. Hierarchical Regression Analysis Predicting Change in Parent-Child Language Interactions With Parenting Stress.....	73
Table 9. Hierarchical Regression Analysis Predicting Change in Parent-Child Language Interactions With Perceived Social Support.....	75

List of Figures

Figure 1. Models for Testing Moderating Effects.....	9
Figure 2. Boxplots for Research Question 1.....	69
Figure 3. Boxplots for Research Question 2.....	71
Figure 4. Boxplots for Research Question 3.....	74
Figure 5. Boxplots for Research Question 4.....	76

Chapter I: Introduction

Background

How can we ensure our most disadvantaged children are school ready? In recent years, more and more communities have asked this important question. The emphasis on kindergarten readiness has in large part been driven by increased academic demands placed on children during the kindergarten year (Snow, Burns, & Griffin, 1998), which require children to enter school with a broad range of skills that provide the foundation for learning. School readiness is defined as a multidimensional construct that includes many skills developed, at least in part, in interactions with parents and other family members. These skills include language (Dickinson, McCabe, & Essex, 2006), content knowledge, including early literacy (Tabors, Roach, & Snow, 2005), numeracy (Roberts & Bryant, 2011), and broader competencies like executive function (Welsh, Nix, Blair, Bierman & Nelson, 2010) and social skills for interacting with children and adults (Denham, Brown, & Domitrovich, 2011) that are present at the end of preschool and predict children's later achievement (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008, Duncan et al., 2007; Ladd, Kochenderfer, & Coleman, 1997; Magnuson, Ruhm, & Waldfogel, 2007; Sabol & Pianta, 2012).

Results from empirical studies consistently highlight the association between children's skills in the areas of oral language, early literacy, and social-behavioral skills and later academic achievement (McClelland, Matthews, & Morrison, 2009; Rimm-Kaufman, Curby, Grimm, Nathanson & Brock, 2009; Snow et al., 1998; Whitehurst & Lonigan, 1998). For example, preschool language skills have consistently been shown to contribute both directly and indirectly to third-grade reading skills (NICHD Early Child

Care Research Network, 2005). Agostin and Bain (1997) found that children's verbal skills and visual motor skills at kindergarten entry predict achievement in first grade in both reading and mathematics and in a meta-analytic review, LaParo and Pianta (2000) found moderate effect sizes ($r = .51$) for correlations between preschool academic competencies and children's academic skills in first grade. The link between early social and behavioral problems and academic achievement has also been well established (see Masten, 2005) and estimates for the co-occurrence between externalizing behavior problems and academic underachievement can range from 10% to 50% in school age children (Hinshaw, 1992). Additionally, academic problems in the early school years have significant consequences for later negative outcomes including school dropout (McGee, Margot, Williams, Smart, & Sanson, 2002), which limits educational and employment opportunities (Laird, Lew, Debell, & Chapman, 2006).

Despite ongoing efforts by policy makers and communities to ensure the school readiness of all American children, children living in poor and low-income families often enter kindergarten lagging behind their more affluent peers. According to a recent analysis conducted by the Brookings Institute, only 46% of children from families making less than \$25,000 a year began kindergarten school-ready, compared to 61% of school-ready children from families making between \$25,001 to \$50,000, and the 74% of school-ready children from families making between \$50,001 to \$100,000 (Isaacs & Magnuson, 2012). Further troubling is the finding that disparities in school readiness between low-income families (family income at or below 200 percent of the Federal Poverty Level) and higher income families (family income at or above 200 percent of the FPL) are detectable by as early as 9 months of age, and have been shown to widen by the

time children reach age 2 (Halle et al., 2009). Parent-child interactions in the first years of children's lives have been identified as an important in mediating the disparities of low-income children's cognitive and academic school readiness outcomes (Brooks-Gunn & Markmam, 2005; Hart & Risley, 1995).

Parents influence young children's school readiness in many ways. Parents create the home environment (Irwin, Siddiqi, & Hertzman, 2007), they establish parenting practices (e.g. monitoring and limit setting), model desired or undesired behavior (Bandura, 1986), and establish a foundation for the development of cultural norms and values (Whitback, 1999). Regardless of income, how parents interact with their children has a significant effect on children's development, however, when parents are at greater socioeconomic risk, they are more likely to have difficulties providing enriched learning environments, either due to a lack of time, financial, or social resources, which often impedes children's cognitive and social skill development (Mistry, Benner, Biesanz, Clark, & Howes, 2010).

When examining the variability of parenting behaviors within low-SES populations, differences in parenting behaviors and subsequent child developmental outcomes have largely been distinguished by the experience of contextual, psychological and environmental risk factors (Belsky, 1984; McGroder, 2000; Jeon, Buettner, & Hur, 2014; Kohen, Leventhal, Dahinten, & McIntosh, et al., 2008; Komro, Flay & Biglan, 2011; Leventhal & Brooks-Gunn, 2000). One strategy for ameliorating the disparities in school readiness outcomes for children from families experiencing multiple risks is through parent education programs.

Preventative parent education programs are designed to enhance parenting by providing parents with tangible (e.g. books, materials, other resources) and intangible (e.g. knowledge, social networks) resources before problems emerge. By providing supports that address the specific needs of a population or community, evidence-based parent education programs have been shown to enhance parenting behaviors which influence children's school readiness skills (Webster-Stratton, 1999; Zigler, Pfannenstiel, & Steiz, 2008), such as communication and language interactions (Roberts & Kaiser, 2011) and parental responsiveness and sensitivity (Webster-Stratton, 1999). If applied correctly, interventions can reduce the likelihood of problems emerging among all children, especially marginalized children. However, many of the parent sociodemographic risks found to be negatively associated with young children's readiness outcomes are also the risk factors (e.g. conditions or variables associated with a lower likelihood of positive outcomes) that have been found to predict poorer outcomes for families who participate in parenting interventions (Dore & Lee, 1999). Of the many risk factors experienced by low-SES families, parenting stress and perceived social support have each been shown to influence parenting intervention outcomes.

Studies have shown that elevated parenting stress may either positively or negatively influence parenting intervention outcomes. In several intervention studies, parents with higher parenting stress levels showed greater reductions in harsh parenting behaviors (Baydar, Reid, & Webster-Stratton, 2003), improvements in parent's intentional teaching behaviors of toddlers (Ayoub et al., 2011), and increased quality of parent-child language interactions following intervention compared to parents with lower parenting stress levels (Vallotton et al., 2012). Other studies have shown the opposite to

be true. For example, Smith and colleagues (2005) demonstrated that more stressed parents demonstrated less improvement in their use of emotionally supportive behaviors as well as fewer rich language inputs when interacting with their infants compared to parents with lower levels of stress following a intervention which provided parents with useful parenting information. A third category of parenting intervention moderator studies demonstrates that parenting stress has no discernable effect on parenting outcomes (Lavigne, LeBailly, et al., 2008; McTaggart & Sanders, 2007).

Like parenting stress, social support has also been shown to differentially influence parenting outcomes in parenting focused interventions. Several studies have demonstrated that parents with decreased social support made greater gains in their emotional and verbal responsiveness, avoidance of punishment, and overall internal involvement following intervention when compared to parents with more social support (Baydar et al., 2003; Cole, Kitzman, Olds, & Sidora, 1998; Stolk et al., 2008). Other studies have shown the opposite to be true; with parents reporting decreased social support demonstrating reduced intervention effects (Gardner, Shaw, Dishion, Burton, & Supplee, 2009; Smith, Landry, & Swank, 2005).

These varied findings do not lend themselves to a straightforward interpretation of moderating effects of increased parenting stress or decreased social support on parenting intervention outcomes. Instead, mixed and inconsistent findings lead to more questions regarding the generalizability of parenting interventions aimed at enhancing the parenting behaviors of individuals from high-risk communities, in which families often face multiple risk factors. An example of one such community, which also provides the context for the current study, is the Northside Achievement Zone or NAZ.

NAZ is a 13-block by 18-block geographic zone in North Minneapolis, Minnesota. High levels of poverty, high crime rates, and a racially diverse population characterize the NAZ community. It is also known for its enduring problem of school readiness disparities. To address these disparities, NAZ community members, in partnership with University of Minnesota researchers, developed the College Bound Babies (CBB) parent education program.

CBB is a primary preventative parent education program in which all parents of children living within the NAZ boundaries who have children age three and younger have the opportunity to attend parenting education classes weekly, for twelve weeks. A standardized curriculum is used with the overall purpose of enhancing parenting to improve young children's school readiness. More specifically, the curriculum is targeted at enhancing parent's knowledge of child development, teaching parents positive parenting practices related to early language and literacy development, improving responsiveness in parent-child interactions, and increasing positive discipline practices.

The goal of CBB is to meet the needs, preferences, and priorities of a population of parents whose children are at increased risk for school readiness delays. However, a key issue underlying the potential for CBB is whether the universal primary prevention programs implemented in high risk communities are effective in producing desired outcomes for all families in the community, or whether greater outcomes are achieved by the more advantaged or disadvantaged families (Lundahl, Risser, & Lovejoy, 2006). Therefore, determining if there is a differential impact of the intervention for families experiencing greater risk and for those who enter the intervention with less developed parenting knowledge and skills is an important step in determining the overall

effectiveness of the intervention. Given the potential effect that the parenting intervention may have on key parenting behaviors that have been shown to improve children's school readiness, it is important to evaluate whether community-based primary parenting interventions are beneficial in enhancing the parenting practices of all families.

Purpose of the Study

The purpose of this study is to determine whether two risk factors commonly experienced by high-risk families, each independently moderate intervention outcomes in a community-based primary preventative education program for parents of young children when the baseline levels of parenting behaviors being measured are taken into consideration. Specifically, this study tests the moderating effects of parental stress perceived social support and baseline levels of parenting behavior (i.e. parent knowledge or frequency of parent-child language interactions) on the improvement of parenting knowledge or parent-child language interactions (See Figure 1). To do so, the following research questions are explored:

1) To what extent does parenting stress moderate the association between baseline parenting knowledge and change in parenting knowledge for intervention participants?

2) To what extent does perceived social support moderate the association between baseline parenting knowledge and change in parenting knowledge for intervention participants?

3) To what extent does parenting stress moderate the association between baseline frequency of conversational turns and change in parent-child language interactions for intervention participants?

4) To what extent does perceived social support moderate the association between baseline frequency of conversational turns and change in parent-child language interactions for intervention participants?

Significance of the Study

This study examined the moderating influences of increased parenting stress and decreased social support on the treatment effects of a preventative parenting program for parents living in a high-risk community. The knowledge gained from study helps to guide the science of community-based primary preventative parenting interventions in several ways: (1) the study provides information on the moderating effects of parenting stress and social support in a parenting intervention designed to have universal effects for a high-risk community; (2) the study adds to the previous literature by including baseline levels of parenting behaviors as predictors of intervention outcomes; (3) the study adds to the previous literature by providing a naturalistic measure of parent-child language interactions not widely utilized in the parenting intervention literature, and (4) the study findings will be used to inform future changes to the CBB program to increase its overall effectiveness for NAZ families.

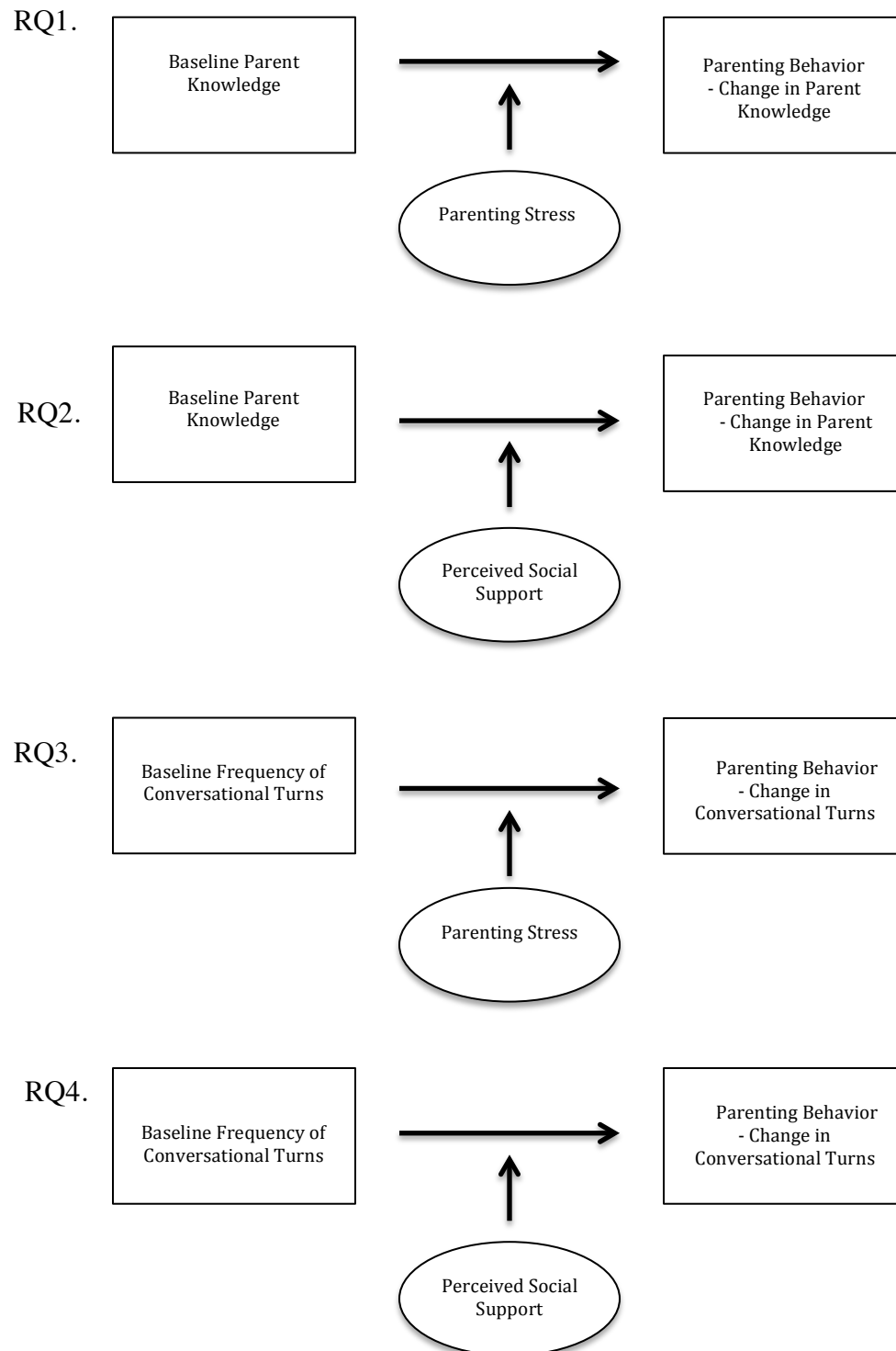


Figure 1. Models for testing the moderating effects of parenting stress and perceived social support on baseline level of parenting behavior and CBB parenting outcomes.

Chapter II

Review of the Literature

This chapter provides a rationale for investigating the moderating effects of parenting stress and social support on parenting behaviors acquired in a preventative parent education program. The literature review begins with an overview of the theoretical underpinnings for the current study. Then, school readiness is defined. A discussion of the parenting behaviors associated with children's school readiness follows. Next, the relevant parenting-focused intervention literature is reviewed. A review of studies investigating moderators of parenting intervention outcomes follows, with an emphasis on two risk factors shown to influence parenting intervention outcomes: parenting stress and perceived social support. Lastly, an overview of the present study and research hypotheses are presented.

Theoretical Background

Snow (2006) posited, "school readiness is best understood as an interaction between the development status and the numerous elements of a child's environment" (p. 30). An ecological systems approach provides a useful starting point for understanding variations in children's school readiness (Pianta, 2002; Snow, 2006). The theory also provides a theoretical basis for understanding the complex, multilevel processes that come into play when intervening to enhance parenting behaviors.

Bronfenbrenner's ecological framework organizes a child's social world into social systems represented by a nested arrangement of concentric structures contained within one another. The proposed system refers to four levels of a child's environment: microsystem, mesosystem, exosystem and macrosystem. The use of levels of systems

organizes influences on development and is a useful way to examine the sources of risk and opportunity on children's development as well as the transactional nature in which parents and children conform to and modify their environments (Garbarino, 1992).

In Bronfenbrenner's model, the microsystemic and the mesosystemic environments are those that have the most direct effects on children's development. Within these contexts, children are exposed to both opportunities for optimal development as well as risks (e.g. poor parenting practices). The accumulation of risk factors (e.g. poverty, parenting stress, limited parental education, single parent status, large family size) and inadequate protective mechanisms for offsetting potentially harmful consequences often lead to negative developmental outcomes for children (Sameroff, Seifer, Barocas, Zax & Greenspan, 1987). For parents, microsystemic influences, like poverty and parenting stress, are reflected in their parenting behaviors, which have particular influence on the processes effecting children's development during the earliest years of life.

An operational research design that promotes the investigation of proximal processes is referred to as the Process-Person-Context-Time Model, or PPCT model for short (Bronfenbrenner, 2005). The PPCT model highlights the crucial role of proximal processes in children's development. These processes are also applicable to adult learning. Bronfenbrenner argued, "Development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of *time*. Such enduring forms of interaction in the immediate

environment are referred to as *proximal processes*” (Bronfenbrenner & Morris, 1998, p. 996, italics in the original). To influence the parenting behaviors of parents and caregivers, these same processes can be applied. Examples of these interactions that support children’s development include parents routinely engaging their child in conversation, reading to their child, and teaching their child new skills. By engaging their child in these interactions, parents shape how their child makes sense of their world and guide them in developing an understanding of their place in that world. In order to influence caregivers’ skills for successfully engaging in these behaviors (i.e. engaging their child in conversation, reading, and play) with their child, caregivers must also be exposed to and participate in progressively complex, reciprocal interactions over extended periods of time. However, Bronfenbrenner argued that proximal processes effecting development vary as a result of the developing person; of the environment or context in which the processes take place; the nature of the developmental outcomes; as well as social stability and social changes occurring over time (Bronfenbrenner & Morris, 1998).

In the current study, the developing *person* element of Bronfenbrenner’s PPCT theory is assessed through the role of the parent. This is because parent behaviors are the outcomes being assessed. In research, risk factors are defined as the measurable characteristics of a group of individuals or a context that makes it possible to predict a negative outcome on a specific criterion (Wright & Masten, 2005). Risk occurs at the individual (e.g. personality traits) and environmental (e.g. community influences) levels. In ecological systems theory, risk factors can be categorized as distal risks (e.g. poverty status) or proximal risks (e.g. emotional well-being) depending on the immediacy of the

risk in relation to a specified developmental outcome. A distal risk factor is one that arises in the environmental context and is not directly associated with an individual's immediate experience but influences their outcomes indirectly through mediating processes of proximal risk factors. In other words, distal factors indirectly affect development through proximal processes (Bendersky & Lewis, 1994). A proximal risk factor is one that a parent or child is directly exposed. For a child, a proximal risk may come in the form of poor parenting behaviors. For a parent, a proximal risk may be the experience of stress related to parenting. Distinguishing between distal and proximal risk is important due to the potential implications for preventative interventions with parents of at-risk children.

Context is the third aspect of the PPCT model. Context refers to the environment in which a developing person spends their time engaging in activities or interactions (i.e. a microsystem or macrosystem). Contexts may impact an individual's development more directly. Contexts may also encompass larger groups of individuals. Bronfenbrenner defined the macrosystem as a context involving any group (e.g. culture, subculture, community, or neighborhood), whose members share similar values, belief systems, "resources, hazards, lifestyles, opportunity structures, life course options, and patterns of social interchange" (1993, p. 25). Furthermore, contexts may have both direct and indirect effects on personal characteristics and the developmental processes taking place. Bronfenbrenner argued that the most important part of studying proximal processes requires collecting data about regularly occurring interactions and activities with important people, symbols, and objects in the developing person's life (Bronfenbrenner & Morris, 2006).

Time is the final component of Bronfenbrenner's PPCT model. Time is an important element in the model because it allows one to consider how proximal processes are influenced by personal characteristics (e.g. risk factors), and context (e.g. an intervention in a high-risk community), on outcomes of interest (e.g. parenting behaviors associated with children's school readiness outcomes).

School Readiness

School readiness is a crucial concern in children's development. In general, the term "school readiness" refers to a young child's ability to successfully respond to the demands of kindergarten or first grade (Carlton & Winsler, 1999). Child-centered definitions of readiness include references to children's cognitive-academic skills (e.g. pre-literacy) and socio-emotional-behavioral skills (e.g. emotion regulation, prosocial behaviors with peers and adults) (Duncan et al., 2007; Ladd et al., 2006). An ecological definition of school readiness places less focus on children's actual abilities at school entry and more emphasis on children's development within the context of interacting systems (Bronfenbrenner, 1977). Therefore, within an ecological perspective school readiness is defined as a multidimensional construct that includes many skills developed, at least in part, in interactions with parents and other family members. These skills include language (Dickinson et al., 2006), content knowledge, including early literacy (Tabors et al., 2005), numeracy (Roberts & Bryant, 2011), and broader competencies like executive function (Welsh et al., 2010) and social skills for interacting with children and adults (Denham et al., 2011) that are present at the end of preschool and predict children's later achievement (Bierman et al., 2008, Duncan et al., 2007; Ladd, Kochenderfer, & Coleman, 1997; Magnuson et al., 2007; Sabol & Pianta, 2012).

Furthermore, within an ecological framework, preparing a child for formal schooling can be best conceptualized in terms of the interactions between people (children, caregivers, teachers), settings (home, daycare, school), and institutions (communities, neighborhoods, governments) (Duncan et al., 2007; NAEYC, 2004). Thus, the focus of readiness from an ecological approach is not solely on promoting the skills and abilities of a child, but also in strengthening the skills of families and communities in supporting children's readiness.

Socio-Economic Status and School Readiness. The differences in academic abilities and social skills among children entering kindergarten are what some researchers refer to as the school readiness gap (Child Trends, 2012). Often, the disparities in children's skills and abilities at school entry are attributed to racial and ethnic characteristics. For example, black, Hispanic, and American Indian students have been consistently shown to start school with significantly lower vocabularies, reading skills, and less developed numeracy skills than their white and Asian counterparts (Duncan & Magnuson, 2005). However, there is a large body of research that shows that the school readiness skills in young children are more aptly linked to family socioeconomic resources rather than race and ethnicity (e.g., Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998).

Parental education, family income and living in a two-parent household, which often serves as a proxy for socio-economic status (SES), are positively associated with school readiness skills (Connell & Prinz, 2002; Janus & Duku, 2007; Umek, Kranjc, Fekonja, & Bajc, 2008). When family SES is factored into equations comparing the school readiness of minority children to White and Asian children, the differences in

abilities normally attributed to race and ethnicity become virtually non-existent (Brooks-Gunn & Markman, 2005). Instead, differences in children's school readiness can be more readily attributed to SES, rather than race, with children from lower-income families entering school less likely to be prepared for the rigors of formal education.

Despite ongoing efforts by policy makers and schools to ensure the school readiness of all American children, children from low-SES families often enter kindergarten lagging behind their more affluent peers academically, socially, and behaviorally. According to a recent analysis conducted by the Brookings Institute, only 46% of children from families making less than \$25,000 annually began kindergarten school-ready, compared to 61% of school-ready children from families making between \$25,001 to \$50,000 (Isaacs & Magnuson, 2012). Economically disadvantaged children are, on average, 27 percent more likely to be underprepared for school at the age of five when compared to children from moderate and high-income families (Isaacs & Magnuson, 2012).

Poor children score lower on cognitive, social-emotional, and behavioral indicators of readiness (Burkham & Lee, 2002; McLoyd, 1998). Evidence from the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), which followed a sample of children from birth through entry into kindergarten, provides rich data on children's school readiness including academic skills, socio-emotional behaviors, and physical health. Findings indicate that by kindergarten entry children whose families incomes were 200% below the poverty level scored lower on math and reading assessments – with 30% of the children scoring very low on reading measures, compared to only 7% of

moderate to high income children (Planty, Hussar, et al., 2009). Still troubling is how early in childhood these disparities can be detected.

Differences in cognitive ability as a function of SES can be seen as early as 9 months of age (Halle et al., 2009). Halle and colleagues (2009) assessed and compared the cognitive skills of nine-month-olds living in poverty and those living above the poverty line, and found small differences in three out of the five skills measured (i.e. exploring purposefully, vocalizing expressively, and early problem-solving). When the children were reassessed at the age of two, children living in poverty fell behind their peers in all five skills. This gap has been found to widen further by the time the children were reassessed at the age of four (Planty, Hussar, et al., 2009). Findings from this same study also demonstrate that children from low-income backgrounds are less likely to receive positive behavior ratings at 9 months, and differences in behavior ratings were shown to be even more discrepant from higher-income peers at 24 months age (Halle et al., 2009). Parenting has been shown to be the most important co-factor in mediating the role of low-SES on children's school readiness (Waldfogel & Washbrook, 2011).

Parenting and the Development of Children's School Readiness

According to ecological theory, parental characteristics, which include the beliefs, expectations, and practices of parents and caregivers, shape children's home learning environments (Desforges & Abouchar, 2003). Many of these characteristics are correlated with children's academic school readiness (Farver, Xu, Eppe, & Lonigan, 2006; Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002). For children from economically disadvantaged backgrounds, who are more likely to start school academically behind their peers, a breakdown in parenting behaviors may impede

children's developing school readiness skills and abilities (Hill, 2001). While many parent characteristics influence children's early development and subsequent readiness, the focus of the current study is on two aspects of parenting known to vary based on SES and neighborhood disadvantage. These include 1) parenting knowledge and 2) responsive language-based interactions between parents and children. Parenting knowledge and responsive language-based interactions have both been identified as strong predictors of later achievement.

Parenting Knowledge. The thoughts, beliefs, and attitudes of parents in regards to parenting and child development are recognized as crucial in mediating the capacity of parents and caregivers to successfully parent their young children (Sameroff & Seifer, 1990). Parental knowledge can be defined as a characteristic of a parent that comprises one's understanding of children's developmental processes, caregiving and child rearing skills, and developmental norms (Dichtelmiller et al., 1992). Recent work has defined parental beliefs as knowledge based, (Sigel & McGillicuddy-DeLisi, 2002). Therefore, in the current study the terms 'belief' and 'knowledge' each refer to parent cognitions about children, children's development, and parenting (Sigel & McGillicuddy-DeLisi, 2002).

When parents have knowledge of children's development and parenting practices, parents are more likely to engage in positive parent child interactions (Damast, Tamis-LeMonda & Bornstein, 1996; Gross et al., 1993). For example, parents of young children who provide clear expectations for behavior, positive reinforcement, and engage their children in an interactive and developmentally appropriate interactions shape an optimal environment for the development of language, cognitive and social emotional skills, which are critical for school readiness (Burchinal et al., 2002). In a study of how

parenting effects children's readiness Burchinal and colleagues (2002) found that parent behaviors and attitudes were two of the best predictors of children's academic achievement. They also showed that parents who were more educated and reported more progressive parenting beliefs had children who demonstrated better academic skills over time.

Early studies investigating the role of parent knowledge of child development and parenting behaviors demonstrated that teenage mothers who had less knowledge of child development interacted more negatively with their children than teenage mothers with more developmental knowledge (Fry, 1985). More recent studies have examined the processes leading to cognitively stimulating parenting and found that factors including low educational attainment and less knowledge of children's development, contributed to less cognitively stimulating parenting and thus, lower school readiness in children. Similar studies on parental expectations about children's development demonstrate that parents who believe children's behaviors are inconsistent with their parental expectations are more likely to be negative about parenting (Reis, 1989). For example, a mother who does not know that early language development begins at birth may be less likely to engage her child in early responsive language interactions than a mother who has been taught that language development begins at birth. Following this line of reasoning, studies have shown that parents with more knowledge of child development are more in tune with their child's abilities and direct their interactions with their children more accordingly.

Several studies show the effect that poverty and SES have on maternal knowledge and subsequent parent-child interactions (Benasich & Brooks-Gunn, 1996; Conrad,

Gross, Fogg, & Ruchala, 1992; Rowe, 2008). One such study examined the effects of maternal knowledge on the quality of parent-child interactions of 608 mother-child dyads. They compared the quality of parent child interactions at 12 months, 24 months and 36 months of age. They found that income predicted higher scores on ratings of parent-child interactions as well as higher maternal knowledge scores, suggesting that SES mediates both maternal knowledge and the quality of parenting behaviors. The authors noted that teaching parents about child development provides a means for facilitating long-lasting changes in children's developmental outcomes and subsequent school readiness (Benasich & Brooks-Gunn, 1996). In a more recent study investigating the relationship between SES, parent knowledge, and child-directed speech, Rowe (2008) found that parental knowledge of child development mediates the relationship between SES and how parents communicate with their children on a day-to-day basis. Results of the study also indicated that parents who hold beliefs about child development that are more in tune with information provided by experts, talk more, use more diverse vocabulary and use longer utterances when speaking with their toddlers. These findings provide a rationale for educating low-income parents with critical knowledge of children's development and parenting practices that foster children's school readiness.

Parent-Child Language Interactions. Promoting early language development for young children is essential for the development of early language skills, cognitive skills, and ultimately school readiness (Hart & Risley, 1995; Lonigan, Burgess, & Anthony, 2000; Shonkoff & Pianta, 2000; Snow, Burns, & Griffin, 1998). Optimally, parents and caregivers engage their children in stimulating language and play-based interactions, which are crucial for language and cognitive skills when their children are

still very young (Hertzman, 2000). Parent's verbal behaviors have been shown to be an important contributing factor in children's cognitive performance and language development.

The early conversations caregivers have with their children and the richness of the language used (e.g. providing labels of objects and actions and providing explanations of how things go together) helps children develop vocabulary and knowledge (Hart & Risley, 1995; Weizman & Snow, 2001). As children move from infancy through toddlerhood, parents' use of prompts and close-ended questions, verbal elaboration of activities, use of cues and positive verbal reinforcement, and use of open-ended questions have been shown to facilitate the development of language and early literacy skills (Whitehurst & Lonigan, 2000). Recent research has concluded that the number of dyadic exchanges, or conversational turns, between a parent and child is one of the largest predictors of child language development, suggesting that this may be a variable that important to target in school readiness interventions (Zimmerman et al., 2009).

In a landmark study, Hart and Risley (1995) identified 5 parenting behaviors predictive of children's future achievement. These include (1) using rich vocabulary when speaking with children, (2) using words to respond to children's behavior, (3) using verbal guidance to encourage development, (4) placing emphasis on using language for communicating, and (5) being responsive to young children's emerging attempts to communicate. Children who lived in homes where parents and caregivers engage them in these interactions are more prepared to start school compared to children who lack the same quality of engagement (Hart & Risley 1995; Pianta, Smith & Reeve, 1991).

The amount of verbal engagement to which a child is exposed, an important factor

in vocabulary acquisition, varies greatly between lower- and higher-income families (Hart & Risley, 1995; Hoff, 2003). Children of more educated and economically advantaged parents have greater vocabulary skills and faster vocabulary growth in early childhood than children of less educated and less economically advantaged parents (Hoff, Laursen, & Tardif, 2002). Early differences in words spoken to children during day-to-day interactions add up to substantial differences in the language experiences of children early in life. In their seminal work on the differences in language exposure and quality in early childhood for children of varying socioeconomic status, Hart and Risley (1995) investigated the differences in the quantity, quality, and responsiveness of parent's speech when interacting with their child. To do so, researchers observed the parent-child language interactions of 42 families for one hour, one time per month, from the time children were 6 months old until they were 3 years of age. Results garnered in this investigation demonstrated that social class, defined by parent occupational status (e.g. welfare, middle income, and professional) was highly correlated with how much parents spoke around their children, the quality of the language used, and how responsive parents speech was when interacting with their child. Social class differences were also found in the number of words children were exposed.

Hart and Risley (1995) found that, on average, a child from a family receiving welfare was exposed to 616 words per hour. A child from a working class family heard 1,251 words per hour on average and a child from a professional family heard an average of 2,153 words per hour. An extrapolation of these hourly word counts revealed that by the time a child is four years old a child on welfare would be exposed to approximately 14 million words, while middle class children would hear over twice as many words (26

million words), and children of professional families would hear three times as many words (46 million words). Based on this information, for a child on welfare to “catch-up” with their middle class peers, they would have to be exposed to an additional 63,000 words per week on top of the 62,000 average words per week they were already exposed to. The authors concluded that this would require 41 hours per week of year-round intervention from the time they were born. These findings demonstrate that one avenue to helping poor children prepare for school is to support low-income parents in engaging their young children in developmentally appropriate and language rich interactions from a very young age. Brooks-Gunn and colleagues (2007) posited that if interventions were put in place to enhance parenting behaviors, specifically language use, school readiness gaps would decrease by 25-60%. This suggests that the interactions that parents have with their children can influence children’s school readiness.

Parenting Intervention Programs

Brooks-Gunn and Markman (2005) argue that interventions for parents of young children can alter parenting behaviors and therefore improve school readiness. To enhance parenting, parenting programs generally involve the following three components: (a) education on children’s development and effective parenting practices, (b) modeling (e.g. either through video or in person) effective parenting, and (c) practice of parenting strategies. These components have been shown to enhance parenting and improve children’s developmental outcomes for a range of concerns.

Parenting programs generally fall into two categories: proactive (preventative intervention) or reactive (treatment intervention) programs. Preventative and treatment-based programs, in turn, fall into three general categories of parenting programs: home-

visiting programs aimed at promoting various aspects of parenting (e.g. nurturing behaviors, language development), parenting programs designed to improve parenting in order to decrease children's problem behaviors, and family language and literacy programs (Brooks-Gunn et al., 2000). These programs vary in design, but research has shown that family programs that use a family-centered approach and employ providers who have the knowledge and skills to develop connections with families facing difficult circumstances are more successful in teaching parents the knowledge and skills to achieve desired outcomes (Shonkoff & Phillips, 2000; Smith & Fox, 2003).

Clinically-Based Parenting Programs. Preventative parenting programs which pair lessons on knowledge of child development and teach positive behavior support strategies to parents of toddler and preschool children at-risk for early behavior problems have been widely researched and well established (Gross, Louis, Webster-Stratton, & Grady, 2003; Spoth, Redmond & Shin, 1998). These programs have demonstrated evidence of improved parenting practices (Brotman et al., 2003; Reid, Webster-Stratton, & Baydar, 2004; Taylor & Biglan, 1998; Van Zeijl, Mesman, IJzendoorn, et al., 2006). For example, in a study examining the effects of a family-based prevention trial for parents of toddlers screened for risk factors of early conduct problems (i.e. Family Check-Up; Dishion & Kavanagh, 2003), Gardner and colleagues (2007) found that families who participated in the brief family centered intervention increased their use of positive discipline strategies (e.g. use of reward, praise, and playful strategies) and the frequency in which they preemptively used the strategies to prevent child misbehavior.

In another study, 30 parents of preschoolers identified as at-risk for early behavior problems were enrolled in one-year home and clinic based prevention program with the

goal of improving parent responsiveness, increasing use of verbal praise, increasing positive physical contact, and decreasing criticism during play interactions (Brotman, Klein, Kamboukos, et al., 2003). Parenting behaviors were observed and coded using standardized observational assessment techniques. Participating families received an intervention, which combined the Incredible Years Parenting Program, an empirically supported parent-training program (Webster-Stratton, 1990), with strategies to address some of the risk factors known to be present in families of children at-risk for developing conduct disorders. Findings resulted in the intervention group showing increased responsiveness, increased use of praise and increased positive physical contact. Conversely, control participants showed decreases in these behaviors over time. Although no effect on reduction of negative parenting behaviors in the treatment group was found, results were found to be promising for enhancing positive parenting practices. Similar findings have also been shown in video-feedback interventions for enhancing maternal attitudes towards sensitivity and sensitive discipline practices.

In a Dutch randomized control study conducted by Van Zeijl and colleagues (2006), 237 mothers of children between 1 and 3 years of age screened for early externalizing behavior problems received a home-based, 6-session intervention using video-taped mother-child interactions. Interventionists also provided families with information on child development in general. Each of intervention session began with videotaping of mother-child interactions (e.g. play, book reading, etc.). At the following session, families received feedback on the videos from the previous session and provided information and tips in the general themes of sensitivity and discipline. At the end of the 6 sessions, families received information summarizing the issues discussed. Changes in

mother's sensitivity during problem solving tasks and maternal discipline strategies recorded in observed laboratory sessions were compared from pre to post intervention. Results of the intervention included mother's increased favorability in attitudes towards sensitivity and sensitive discipline than control group mothers. Intervention group mothers also displayed more positive discipline from strategies from pre to post intervention (Van Zeijl et al., 2006).

Overall, results of studies of clinically-based interventions for parents of young children are limited in generalizability to a broader population of families because participants were recruited based on their children's pre-existing externalizing problem behaviors. Therefore, results are restricted to a limited risk group – parents of children with significant early behavior problems. Also, clinically based interventions rarely target families with children younger than age 3 as early problem behaviors are not as easily detected in toddlers; yet, researchers and policy makers have consistently highlighted the need for interventions for prior during infancy and toddlerhood because the earlier parents become involved the more profound the results and the longer-lasting the impact (Planty, Hussar, Snyder, et al., 2009). Additionally, the outcomes of such programs are often restricted to parenting behaviors shown to be closely associated with children's socio-emotional development and are indirectly related to other school readiness competencies. An alternative to these interventions are interventions implemented when children are still very young that target parent's language and communication strategies; strategies that are arguably more directly associated with children's developing school readiness competencies, specifically, children's language and early literacy development (Brooks-Gunn & Markman, 2005).

Early Language Parenting Programs. Parent interventions with the goals of building children's vocabulary, increasing early reading comprehension, and improving children's oral language outcomes have demonstrated positive effects in teaching parents to use various interactive reading techniques with their children (Crain-Thoreson & Dale, 1999). Many early language and literacy interventions for parents are available, including programs for older preschool aged children including dialogic reading interventions (Whitehurst, Arnold, et al., 1994) and print knowledge interventions (Justice & Ezell, 2000), yet, a limited number of intervention studies are available that have examined the effects of interventions aimed at promoting language and communication development for parents of young children who are also experiencing multiple risk factors.

The research that is available on language promoting strategies for parents of young children indicates that parents experiencing increased risk can learn to implement language-promoting strategies. For example, two studies of interventions that offered parenting sessions to improve at-risk teenage mothers' use of stimulating language to support their babies' development were found to increase infants' pre-to-post intervention scores on measures of language and early literacy development (McGowan et. al, 2008). However, no direct measures of mother-child interactions were completed. Therefore, no direct intervention effects on change in parenting behavior were addressed in the study. By only examining children's language outcomes, this study fails to take into account the direct influence of the intervention on the language behaviors, which was one aim of the intervention. Other programs have shown that by using direct measures of parent-child language interactions, parents can significantly increase the quantity and quality of words

they direct towards their children (Sacks et al., 2014; Suskind, et al., 2013; Weil & Middleton, 2010).

One home-visiting language intervention that aims to address behavior change in parents of children with hearing loss who are from underserved populations is Project Aspire (Sacks et al., 2014). The Project Aspire intervention includes providing parents with an education session focusing on child language development and early language environment enrichment strategies. The intervention included five 16-Hour home audio language environment recordings that included two pre-intervention and two post-intervention recordings. Also, four linguistic feedback reviews are completed. In these reviews parents received visual and quantitative feedback on the number of words they spoke to their child, the number of vocalizations produced by the child and the number of back and forth conversational turns between the parent and child. Audio recordings were completed with the Language Environment Analysis (LENA) system. LENA is a digital language processor that can record a child in her or her natural language environment for up to 16 hours (Gilkerson & Richards, 2008). LENA software utilizes speech-identification algorithms to automatically provide language measures of adult word count (AWC), child vocalizations (CV) and conversational turns (CT). These automated analyses provide a convenient measure of parent child language interactions (Gilkerson & Richards, 2008).

Results from a Project Aspire pilot study, which included 11 participants, showed significant increased conversational turns, which study authors referred to as parent-child linguistic interactions (Sacks et al., 2014). Authors reported that change in parent linguistic input reflected how often a parent spoke directly or in response to their child,

which was accompanied by increases in child vocalization and interactions following intervention. Limitations of the study included a small sample size, lack of a control group, and that participants were all recruited from one medical facility. However, findings from the Project Aspire pilot study provide evidence of parenting language behavior change. Arguably, the most important contribution of this study was the successful use of LENA technology to measure parent-child language interactions.

Another parent intervention program, *It Takes Two to Talk: Hanen Program for Parents*, focuses on teaching parents techniques to build language skills at home during child led interactions (Pepper, Weitzman, & McDade, 2004). The program, which involves having parents attend 6 to 8 training sessions in small personalized groups, is facilitated by a speech-language pathologist, and was designed on the premise that the amount of child-directed language received from birth-to-three-years has the greatest impact on a child's later academic success. The program specifically targets parents of young children with expressive language deficits. The program includes a pre-program consultation, followed by three individual visits with the speech-language pathologist in which parent-child interactions are videotaped while practicing strategies to help achieve specific communication goals. *It Takes Two to Talk* involved having the parent and a speech-language pathologist watch videotaped interactions to see what was helping the child and what the parent can do modify to help even more. Two experimental studies of the *It Takes Two to Talk* program, demonstrated that following intervention, mothers of children under the age of four became more responsive when interacting with their children, mother-child interactions were more balanced, and interactions were more frequent and lasted longer than the interactions of mothers in the control group

(Girolametto, 1988; Tannock, Girolametto, & Siegel, 1992).

A third study investigating the effectiveness of *It Takes Two To Talk*, conducted by Girolametto and colleagues (1996), focused on children between 22 and 33 months with severe language impairments and included teaching parents to increase their use of ten specific words during their everyday interactions with their child. Words were selected based on the child's interests, stage of development, and what sounds the child could make. Mothers were encouraged to set up routines in which the words could be used repeatedly. Findings from the study showed that when the language behaviors of mothers and children from the intervention group were compared to the control group, mothers were more responsive, used slower, less complex language when interacting with their child, and used the target words more frequently. Children in the experimental group had larger vocabularies, used more multi-word sentences, and used the target words in a number of different contexts (Girolametto, Pearce, & Weitzman, 1996).

In a more recent study of the program, Weil and Middleton (2010) piloted the use of LENA technology as a tool to evaluate the effectiveness of *It Takes Two To Talk*. In this study, 6, 20-to-30 month old children with expressive or expressive/receptive language deficits (e.g. scoring below the 10th percentile for total productive vocabulary on the MacArthur-Bates Communicative Development Inventory), and their parent took part in the *It Takes Two to Talk* intervention. LENA recordings were collected pre-intervention and post-intervention and analyses were conducted to determine what gains were made in AWC, CV, CT, and on the MacArthur Bates during the intervention period. As a group, participants demonstrated gains in all areas assessed. Two participants, who were on a wait-list to receive the intervention, showed no significant change in the four

areas assessed. However, there was not statistically significant difference between the experimental and wait-list groups at baseline or post intervention. The lack of statistical significance was attributed to the small sample size, short intervention period, and having only one LENA recording per participant at each measurement point. Authors of the study concluded that LENA had the potential to be useful in evaluating the effectiveness of an intervention program, however, they cautioned future researchers to collect multiple LENA recordings to achieve more accurate results and to minimize day-to-day variability that can result in the naturalistic recording of environments.

In summary, language-promoting parenting programs have been shown to be efficacious or promising in improving early language-based interactions. Yet, the evidence provided indicates that many available language interventions are targeted at parents of preschool-aged children (e.g. print knowledge and dialogic reading interventions) or at parents of children with language difficulties and disabilities. Again, these restricted ranges in age and target populations significantly limit the generalizability of language promoting interventions for high-risk parents of young children. Given the association between the use of child-directed language, language development, and school readiness, the lack of interventions for increasing the language and communication skills of diverse families is surprising. Furthermore, while interventions have shown to be successful in changing the parent-child language behaviors of some parents, regardless of program type, not all parents demonstrate enhanced outcomes following intervention.

Moderators and Predictors of Parenting Intervention Outcomes

A moderator is a variable that affects the direction or strength of relationship

between an independent and dependent variable (Baron & Kenny, 1986). Kraemer and colleagues' (2001) operational definition of a moderator includes the following: A moderator is a variable that is present in a population prior to an intervention and is therefore not statistically correlated with treatment status. Second, a moderator should have an effect on a particular outcome of interest by increasing or decreasing the effect of the outcome, thereby creating subgroups for who an intervention is more or less effective (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). Moderator effects can be tested in random control trials by showing that the moderator is differentially associated with an outcome for the treatment group compared to the control group; this is shown by a significant interaction effect (Hinshaw, 2002). It is also important to make the distinction between moderators and predictors.

In intervention research, both predictors and moderators are variables associated with an outcome but are unrelated to group assignment. The predictor variable has a main effect on outcome, meaning that its impact is not specific to a particular treatment condition (Kraemer et al., 2001). In true experimental trials, the randomization process for assigning participants eliminates the need for controlling for baseline levels of outcomes of interest. In treatment-only studies these same assumptions cannot be made. However, moderators can be tested in quasi-experimental studies that do not employ control groups in the study design (Kazdin & Wassell, 1999; Webster-Stratton, 1985).

In treatment-only studies, moderators of treatment outcome are assessed by examining the influence of the relationship between the variable of interest (e.g. the proposed moderator variable) and another variable of interest (e.g. the predictor variable). Very few quasi-experimental studies of moderator effects in parenting programs have

been published, however, from both treatment and program design perspectives, identification of both predictors and moderators is important because an intervention should only hold claims of treatment efficacy for all participants when there is evidence the intervention is effective for all participants and there is evidence for the conditions in which the intervention is effective. In both RCTs and treatment intervention only studies, predictors can include variables such as age, gender, family factors, number of sessions attended, and pre-intervention levels of child or parent characteristics (Beauchaine, Webster-Stratton, & Reid, 2005; Dittman, Farruggia, Palmer, & Sanders, 2014).

In random control trials, moderator analyses may provide evidence that the intervention is not efficacious or promising for different subgroups. In the case of Incredible Years, early research demonstrated that the low-income subgroup of families did not respond to the intervention to the extent that higher income families responded (Webster-Stratton, 1990). This knowledge was important from a program development standpoint because it furthered research in determining what works for low-income families or treatment non-responders. Incredible Years researchers determined that the intervention needed to be more accessible and engaging in order to reach the highest risk families. This knowledge was later used to inform the creation of more appropriate programs for low-SES families of children at-risk for conduct problems like Incredible Years and the toddler version of Family Check-Up (FCU; Dishion et al., 2008).

Moderator analysis can also be used to show what subgroups are more likely to benefit from intervention. For example, a moderator analysis of toddler version of Family Check-UP (Dishion et al., 2008), a parenting intervention for parents of children identified by their increased likelihood of developing conduct problems, indicated that

participating mothers with *less* education, a proxy for SES commonly used by researchers, responded to the intervention *more* than the mothers with higher educational attainment (Gardner et al, 2009). This example provides evidence that moderator analysis can aid in our understanding of what subgroups will benefit more or less from an intervention when compared to other subgroups or the population as a whole.

Intervention outcome research and research investigating the influential variables of treatment outcomes is needed in parenting interventions to understand for whom treatment is effective. Since families have a critical role in children's school readiness, research must be used to enhance our understanding of how characteristics of families influence treatment outcomes for children at-risk for school readiness deficits. Yet, few studies have examined treatment moderators in parent-focused interventions for high-risk parents of very young children. Several search strategies were employed to obtain relevant studies for this review. First, computerized databases including MEDLINE, ERIC, PsycInfo, Google Scholar, OVID, and PsycARTICLES were searched using combinations of the following groups of search terms (a) *parenting, family, parent(s), school readiness* (b) *program, training, education*, and (c) *moderator, moderation, predictor*. The period of time searched ranged from 1995 to 2015. Only articles from peer-reviewed journals were searched. Second, the journals that were found to have at least one relevant study were searched. Third, the citations of relevant journal articles were searched. Finally, an extensive Internet search was carried out, using all public major search engines. Results from this search included 61 studies, nine of which were meta-analyses. Studies included in the final sample were those that investigated parent-focused interventions. Of the 52 remaining studies, 35 were targeted at the parents of

children ages 5 and younger and 44 studies were based on interventions that pre-screened participants based on elevated levels of child behavior problems. Whether this is because few interventions are available that explicitly address parenting behaviors for the improvement of children's "school readiness" or the interventions available are not widely studied, there is a dearth of studies that explicitly test for moderating effects in school readiness parenting interventions. Instead, examining the evidence of similar parenting intervention research on possible influential family characteristics on intervention outcomes provides insight into selection of predictor and moderator variables.

Large meta-analyses can be useful in providing information on the broad characteristics that may be used for predicting which family characteristics are associated more or less with intervention success. Three meta-analyses (Lundahl, Risser, & Lovejoy, 2006; Reyno & McGrath, 2006; Shelleby & Shaw, 2014) sought to provide a comprehensive analysis of the role that family and parent risk factors have as moderators of parenting intervention outcomes. Across intervention program types, which included preventative and intervention programs, two of the studies found that program outcomes were reduced or poorer for families experiencing more adversity or risk compared to families with less adversity or risk (Lundahl et al., 2006; Reyno & McGrath, 2006). The third meta-analysis concluded that studies which explore sociodemographic and family process risks as moderators of parent-focused intervention outcomes are varied, but taken together, the vast majority of the studies analyzed found non significant moderation by risk variables (Shelleby & Shaw, 2014). Results of these meta-analyses can be used to provide general information about potential moderators of program outcomes and help to

guide selection of moderator variables as well as predictor variables appropriate for further consideration in research. They also provide insight into the mixed findings of the effects of moderators in the parent intervention literature.

Of the studies available on predictors and moderators of parenting intervention outcomes, the majority of the available evidence is derived from the intervention literature investigating predictors of treatment outcome for parents of children with early indicators for conduct problems (Beauchaine, Webster-Stratton, & Reid, 2005). A number of parent- and family-specific predictor variables emerge from this literature base. Parental psychopathology, which includes maternal depression, has been used to predict outcomes on children's behavior responses (Baydar et al., 2003). Parental relationship satisfaction (Webster-Stratton & Hammond, 1999), life stress (Kazdin & Wassell, 1999; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000), and substance abuse (Fuller et al., 2003) have also been studied as predictors of program response. More recent parenting intervention literature has emphasized the use of baseline levels of outcomes of interest as predictors of intervention outcomes. However, these studies mainly utilize baseline levels of children's early externalizing behaviors as predictors and do not use baseline levels of specific parenting behaviors of interest. Therefore, information on predictors of treatment response on parenting behavior outcomes derived from these studies is limited.

Research from the parenting training literature on moderators of program outcomes, framed within an ecological model of risk factors, suggests that family characteristics including parenting stress and perceived social support not only influence the quality of parenting (Belsky, 1984; Simons et al., 1993), but both variables have also

have been shown to moderate intervention outcomes when families participate in parenting interventions. In addition, The Family Stress Model (Conger et al., 2002; McLoyd, 1998) also provides theoretical evidence for the importance of investigating parent psychological factors including parenting stress and perceived social support.

Parenting Stress. Parenting stress influences parenting quality as well as the effectiveness of parent training programs (Lundahl et al., 2006; Reyno & McGrath, 2006; Webster-Stratton & Hammond, 1990; Werba, Eyberg, Boggs, & Algina, 2006). While stress on parents comes in many forms, parenting stress is defined as “a set of processes that lead to aversive psychological and physiological reactions arising from the attempts to adapt to the demand of parenthood” (Deater-Deckard, 2004, p. 6). For most caregivers, some degree of parenting stress is normal and all parents cope with daily stressors of being a parent. It is the accumulation of these stressors that influence the quality of parenting. Stress can have a powerful negative influence on how a parent functions (Belsky, 1984; Fagan, Bernd, & Whiteman, 2007; Halme, Tarkka, Nummi, Astedt-Kurki, 2006). Parenting stress is also potential moderator of the relationship between parent training and program outcomes.

The experience of parenting stress influences the effectiveness of parent training programs for low-income families (Kazdin & Wassell, 1999; Lundahl et al., 2006; Reyno & McGrath, 2006; Webster-Stratton, 1985; Webster-Stratton & Hammond, 1990; Werba, Eyberg, Boggs, & Algina, 2006). For example, in a study investigating the moderating influences of parenting characteristics, including parenting stress, on parent training outcomes for parents receiving Parent Management Training, an intervention specifically designed for families of children identified as having early signs of conduct problems,

Kazdin and Wassell (1999) found that results indicating that parenting stress significantly predicted program outcomes. Findings included evidence that children of parents with increased stress were less likely to make improvements in their behaviors following the intervention. Although stress was not assessed as a moderator of treatment outcome, study results provide valuable insight into the role that parenting stress may have on treatment outcomes. However, study participants were selected based on pre-intervention levels of behavior problems, which significantly limits the generalizability of findings to universal parenting programs. Another significant shortcoming of the study was the lack of parenting outcome measures. By examining parenting outcomes, direct evidence of intervention targeting parenting behaviors can be used to inform future iterations of an intervention.

More recent research on the moderating role of parenting stress on parenting outcomes also demonstrates that parenting stress impedes parenting intervention outcomes. In a home-visiting program targeting low-income mothers of premature babies (i.e. families with income below the federal poverty level), Teti and colleagues (2009) found that lower-income mothers showed less enhanced maternal sensitivity, as assessed by post-intervention home observations (1-2 hr.) (e.g. Maternal Behavioral Q-Set; Pederson & Moran, 1995), when interacting with their premature infants. Results of *post hoc* analyses revealed that mothers in the poverty group had higher ratings of parenting stress than mothers in the higher income group. The study authors attributed low-income mother's lack of behavior change to elevated stress levels, rather than income alone. Similar parenting intervention studies of indicated interventions confirm findings that parenting stress does influence intervention outcomes, in programs designed to enhance

parenting in children at increased risk for adverse developmental outcomes (Hartman, Stage, & Webster-Stratton, 2003; Hemphill & Littlefield, 2006; Webster-Stratton, 1992). Other intervention studies disconfirm findings that stress moderates parenting intervention outcomes.

Studies have shown that families experiencing heightened levels of stress are just as likely to respond to an intervention as their less stressed counterparts. Evidence from a 2003 study of the Incredible Years program, which was designed for low-income parents of Head Start students, demonstrated that low-income mothers with heightened stress showed similar, and in some cases greater effects on the reduction of harsh parenting practices compared to low-income mothers not experiencing heightened psychological stress levels (Baydar et al., 2003). Three moderators, depressive symptoms, anger, and experiences of abusive parenting, were each identified as psychological stressors by study authors and together served as a proxy for parenting stress. Although several risk factors were predictive of parenting skill levels, no one risk factor was shown to moderate parenting skill outcomes following intervention. Overall, findings indicated that psychological risk factors influenced parenting behaviors negatively at baseline, but participating mothers benefitted just as much as mothers not identified with those risks. While this study provides insight into the moderating effect of parenting stress on parent-training outcomes for high-risk parents of young children, it does not specifically assess parenting stress as a moderator of program outcomes. Instead, the construct for stress was limited to psychological stressors (i.e. depression, anger, experience of abusive parenting). Similarly, in an investigation of the moderating effect of stress on parent outcomes of the Triple-P Positive Parenting Program, parents successfully changed

negative parenting practices regardless of their baseline stress levels (McTaggart & Sanders, 2007). However, like many of the interventions discussed in this review, the intervention carried out in this study was targeted at parents of children at increased risk for behavior problems. Thus, findings are not readily generalizable to the broader population.

In sum, when exploring the moderating role of parenting stress on parenting intervention outcomes, results are inconsistent. On one hand, findings suggest that parenting stress leads to poorer parenting intervention outcomes in indicated and selective preventative parenting interventions, whether home-visiting programs for mothers of premature babies, home-visiting programs for parents of children identified as at-risk for conduct problems, or group-based clinical programs for parents of children pre-screened for early-onset conduct problems. On the other hand, findings suggest that parenting stress leads to similar or enhanced parenting outcomes for parents who participate in indicated clinic-referred preventive parenting programs (Baydar et al., 2003; McTaggart & Sanders, 2007). Furthermore, of the studies reviewed, only one universal parenting intervention study investigated the moderating role of parenting stress on parenting intervention outcomes (Teti et al., 2009). The lack of evidence on parenting stress as a moderating variable on parenting outcomes in a universal parenting interventions and the overall lack of clarity on the role of parenting stress on parenting prevention programs in general it is important to explore stress as a potential moderator of parenting outcomes in studies specifically designed to influence parenting in universal prevention initiatives. Additionally, of the intervention studies reviewed, outcomes of interest were restricted to the reduction of harsh parenting practices increased maternal

sensitivity, and supportive and positive parenting. Many of the studies relied solely on indirect child intervention outcomes. Finally, none of the studies available provided outcome information on specific parent-child language interactions or parenting knowledge; therefore, the applicability of the findings to parent behaviors shown to influence children's school readiness is limited.

Clearly, low-income families face greater challenges due to their increased exposure to chronic stressors associated with living in poverty (McLoyd, 1998). Poor families also often have fewer social resources to meet the challenges associated with living in poverty (Brody & Flor, 1998; Ceballo & McLoyd, 2002). Social support, specifically perceived social support, is particularly important for low-income parents and caregivers residing in disadvantaged neighborhoods, as these families, compared to families residing in communities with lower rates of poverty, are further disadvantaged by reduced social supports.

Perceived Social Support. Social support broadly refers to an individual's perception that they are cared for, loved, and a member of a social network with shared responsibilities (Cobb, 1976). Canty-Mitchell and Zimet (2000) posited, "Social support itself is a multifaceted construct which includes such diverse notions as the extent of the social network, the provision of instrumental support, and the perceptions of support adequacy" (P. 392). Social support can refer to the emotional support that one receives from friends or family or the instrumental or tangible support one receives, such as the provision of daycare or transportation. Additionally, it should be noted that research has shown that the actual receipt of social support is not necessary for achieving beneficial outcomes; the perception that one has received support is often adequate (Costello,

Pickens, & Fenton, 2001). In other words, believing that one is supported by others provides similar benefits than the actual provision of support from others. In the context of the current study, the terms *social support* and *perceived social support* are used interchangeably and are defined as a parent or caregiver's perceptions of the support provided by family members, friends, and significant others.

Low-income mother's perception of social supports influences parenting attitudes and behaviors. For example, in a qualitative study on parenting in a sample of low-income African-American mothers, Belle (1982) found that mothers perceived their support networks as both crucial to their ability to cope with the stresses of poverty as well as critical in their ability to parent their children competently. Mothers with more social support are generally more consistent in their parenting practices (McLoyd, 1990).

Social support is an important moderator in quality of parenting for families living in poverty who are more likely than their more economically sound counterparts to have fewer social, emotional, and tangible resources to cope with the greater challenges that co-occur with living in poverty (Brody & Flor, 1998; Ceballo & McLoyd, 2002). In a study of low-income African American mothers, Kotchick and colleagues (2005) found that mother's who reported lower levels of social support and who experienced more neighborhood disadvantage in terms of violence and gangs were less engaged in parenting their children. For the mothers living in these same neighborhoods who experienced higher levels of social support, the influences of neighborhood disadvantage and poverty on parenting were not significant.

Ceballo and McLoyd (2002) found somewhat different results when testing the hypothesis that the beneficial effects of emotional and instrumental social support on

parenting would vary by neighborhood context. In a study of low-income mothers living in low- and working-class neighborhoods in a city with high crime rates, a history of economic disadvantage, and chronic unemployment, the authors found that as neighborhood resources became more depleted, the positive relationship between social support and parent's nurturing behaviors (e.g. how often a mother reported telling their child they did well, showed their child affection, or talking things over with their child) was weakened. Similarly, the benefit of instrumental support on reduction of the use of negative discipline strategies diminished as neighborhood resources depleted. The authors found that in the most impoverished, high crime neighborhoods, social support less effectively enhanced parenting. They hypothesized that in the most disadvantaged neighborhoods, the mothers may have seen their relationships with friends and family as more of a source of stress instead of support. Findings from this study, as well as similar findings in similar studies (e.g. Brodsky, 1999; Dressler, 1985), highlight the importance of studying social support as a variable that may impact parenting differently depending on the environmental stressors experienced by families. Findings also underscore the importance of investigating social support as a moderator of parenting intervention outcomes for impoverished families living in disadvantaged neighborhoods.

A recent comprehensive review exploring the differential effects of risk factors on parenting intervention outcomes for parents of children at-risk for conduct problems conducted by Shelleby and Shaw (2014) identified 13 studies that tested what the authors identified as family process risks. Of these 13 studies, only one was identified as testing social support as a moderator of parenting behavior outcomes. Using a randomized control trial, Stolk and colleagues (2007) evaluated family risk characteristics in

association with changes in parenting behaviors following a preventive intervention program for enhancing sensitivity and discipline strategies for mothers of toddlers with high levels of externalizing behaviors. Although the overall purpose of the study was to determine the overall moderating effects of cumulative risk on intervention outcomes, intervention effects on parenting were assessed for individual risk factors for parents in the treatment condition only. The authors found that the intervention was successful in enhancing parenting behaviors, but treatment effectiveness was unrelated to parent's dissatisfaction with social support. Interestingly, positive child behavioral outcomes were found for the children of mothers reporting high levels of dissatisfaction with social support, as evidenced by higher reductions in overactive and oppositional behaviors following the intervention. While this study provides evidence that the children of mothers who report lower social supports show positive behavioral change following intervention, the study has two pertinent limitations; the study was conducted in the Netherlands and only parents of children identified as at-risk for conduct problems were included in the sample. Like the majority of the moderator studies reviewed, the results of this study are not generalizable to an American population of at-risk families or for families not identified for intervention based on pre-intervention levels of externalizing behaviors.

One home-visiting study was identified that assessed social support as a moderator of parenting intervention behavior outcomes. In a randomized control trial, Smith and colleagues (2005) investigated parental social support as a moderator of changes in responsive parenting behavior for low-income mothers of infants voluntarily enrolled in the Playing and Learning Strategies home-visiting prevention program. The

goal of the study was to determine if higher levels of social support moderated the impact of the intervention on parents use of language (e.g. verbal scaffolding, labeling, verbal encouragement), parents use of verbal signals to support infants attention, and parents emotional support (e.g. use of positive affect, warm sensitivity, restrictive verbal attempts, physical intrusiveness, and use of harsh tone). Parents received 10 standardized home visiting sessions aimed at teaching parents information about child development and strategies to engage infant's immature abilities. Four lab visits which involved video taping mother-child interactions were also required as part of the intervention.

Findings from growth curve modeling, which involved using multilevel models for each of the eleven targeted responsive behaviors, showed that perceived social support positively moderated mother's ability to attend and respond to their infants through use of maintaining strategies (e.g. use of maternal requests related to an activity or object an infant was visually or physically engaged, or a direct response to the infants attempts to attract their mother's attention to an object or activity), $F(1, 1026) = 4.23, p < .04$. Mothers in the control condition with less social support were less likely to increase this behavior. Further, social support did not have an impact on program effect on intervention mother's change in the ability to attend to or support their infant's signals, but all mothers in the treatment condition showed increases in targeted behaviors compared to those not receiving the intervention. Overall, study findings resulted in the confirmation that less perceived support from family members and friends did not interfere with the intervention's benefit on mothers' ability to notice and build on their children's interests. However, because the intervention (i.e. Playing and Learning Strategies) is an individually administered home-visiting program and not a group-based

preventative parenting program, even significant moderator associations should be interpreted with caution.

Social support is frequently included in studies investigating the moderating role of cumulative risk on parenting intervention outcomes (see Gardner et al., 2009; Kazdin & Wassell, 1999; McGilloyay et al., 2012). Yet, only two studies were identified which assessed social support as an independent moderator of parenting intervention effectiveness in interventions designed for parents of children under the age of 5. Social support is an important variable in parenting behaviors, yet the dearth of research investigating the moderating role of social support on parenting intervention effectiveness supports the need for further research. The current study, in part, attempts to ameliorate this weakness in the parenting intervention literature.

Critique of the Literature

Research demonstrates that long before children's entry into formal schooling there is a correlation between SES and children's school readiness (Klebanov et al., 1998) and the need for preventative interventions to ameliorate the disparities between low-SES students and their more affluent peers (Shonkoff & Phillips, 2000). Parent knowledge of child development and positive parenting practices as well as parent-child verbal interactions have been shown to influence children's school readiness (Benasich & Brooks-Gunn, 1996; Hart & Risley, 1995); these parenting behaviors also have been shown to mediate the relationship between SES and children's school readiness. Therefore, early preventative parenting interventions aimed at enhancing the parenting behaviors of low-SES families are crucial for decreasing the school readiness gap between low and higher SES families.

Low-SES families are at increased risk for experiencing a myriad of risks that influence their parenting behaviors (Mcloyd, 1998) and many of these risk factors also influence the likelihood that they will benefit from parenting interventions (Lundahl et al., 2006; Reyno & McGrath, 2006; Webster-Stratton & Hammond, 1990). There is a dearth of interventions that focus broadly on enhancing parenting behaviors for children's school readiness, yet, by investigating the literature base of parenting intervention research in general information can be gained about possible predictors and moderators and treatment outcomes. Parent intervention research has examined the variables that influence outcomes and much of the information from this literature contributed to the conceptualization of the current study. Results of such studies indicate that parenting stress and social support may moderate parenting outcomes following intervention depending on baseline levels of parenting behaviors. However, research on the extent to which these risk factors influence parenting behavior outcomes following intervention is mixed and few intervention studies are available which include baseline parenting behaviors as predictors of parenting intervention outcome.

In early intervention, second generation research is designed to address questions of specificity (Guralnick, 1993). Second-generation research, according to Guralnick (1993) is used to answer questions of whether an intervention varies in efficacy for participating families. By doing so, the tendency to overgeneralize outcomes for a specific program may be minimized. Also, information on what subgroups are more or less likely to benefit from an intervention informs future iterations of the program. While the small body of work that has examined moderators of program effects on parenting outcomes for high-risk suggests that psychological resources (e.g. increased parenting

stress and decreased social support) may positively moderate parenting outcomes, further investigation of the role of these factors in individual program outcomes is warranted.

In addition to the limited number of studies on the topic, there are three primary weaknesses in the literature base. First, the majority of moderator studies on the efficacy of parenting interventions primarily focus on populations of families that have been prescreened for intervention based on the likelihood of potential risks. This is especially true in the study of moderators of treatment effectiveness for families of young children at-risk for conduct problems. For a preventative intervention designed to influence the readiness outcomes for an entire high-risk community, it is important to test for the universality of the intervention in that community. Thus, the variables that moderate program outcomes in interventions for high-risk populations identified based on a specific risk factor may not be generalizable to another high-risk community. Simply put, a significant moderator in one population may not be a significant moderator in another population.

A second weakness in the literature is the lack of diversity in parenting behavior outcomes and the use of laboratory-based observations or observations that require a researcher to be present in order to measure intervention outcomes in moderator studies. In the parent intervention literature, parenting intervention outcomes are often limited to observed interactions between parents and their children. In these observations, families are provided with materials for interactions in non-naturalistic laboratory settings or involve in-home video-taping or have trained observers in families homes. Thus, observations of parent-child interactions that are coded and then used to measure

intervention outcomes (e.g. parent responsiveness, nurturance, and discipline practices) often take place in unnatural and controlled environments and may not reflect the actual behavioral changes that occur. Similar to other recent studies on the effectiveness of parenting interventions to enhance parent-child language interactions, which have begun to use more advanced and naturalistic measures of parent-child language interactions (e.g. Sanders et al., 2014; Weil & Middleton, 2010), the current study aims to provide a more naturalistic measure of parent-child verbal interactions.

One final unique contribution of the current study to the parenting intervention literature is the use of baseline parenting behaviors as a predictor of parenting intervention outcomes. In the research available on moderators of program effectiveness, no studies were identified which employed the use of baseline levels of parenting outcomes of interest as predictors of program effectiveness. By including baseline levels of parenting behaviors of interest, this study provides insight how variations in pre-intervention levels of outcomes of interest and changes of those specific parenting behaviors have in moderating program outcomes for participants.

To address these gaps in the literature, the goal of the current study was to determine whether two risk factors commonly experienced by high-risk families, each independently moderated preventative intervention outcomes in a universal community-based program for parents of young children. Specifically, this study tested the moderating effects of parental stress or social support and pre-intervention levels of parenting outcomes of interest on the improvement of parent-child language interactions or parenting knowledge taught during a universal preventative parenting intervention. Based on the extant literature examining the effects of moderators and predictors in

preventative intervention on the parenting behaviors of parents from high risk backgrounds, it is hypothesized that parents with lower psychological resources at baseline (i.e. high parenting stress and low perceived social support) and lower ratings baseline parenting behaviors (e.g. parent knowledge or frequency of conversational turns) would benefit more from a community-based universal preventative intervention than parents with higher resources and higher levels of baseline parenting behaviors.

Chapter 3

Methods

Participants

Forty-seven parents and caregivers participated in this study. Participants were drawn from a larger population of 103 participants taking part in a larger study designed to measure the overall effectiveness of the CBB intervention (Study Number: 1304S30982). Initial eligibility criteria for the parent study included (a) having a child younger than 36 months of age, and (b) residing in a specific geographic location of a large Midwestern city with a history of neighborhood violence, high poverty levels, and high numbers of young children with school readiness deficits. Inclusionary eligibility for the current study included (a) having consented to participate in the parent study (b) completing both the pre- and post-outcome measures for at least one of the two outcomes assessed (paper and pencil questionnaire or a Language ENvironment Analysis LENA) and (c) completed at least one of the two moderator rating scales. Of the 103 total participants 55% were screened out of this study because they failed to complete a pre and a post paper and pencil outcome questionnaire and at least one moderator rating scale. Thus, 47 parents and caregivers met inclusion criteria for analyses involving parenting practices outcomes. Of these 47, 52% were screened out for having not completed both pre and post LENA language recordings. Thus, 24 parents and caregivers, or 23% of the total sample, met inclusionary criteria for analysis involving in home measures of parent language behaviors. Independent samples t tests showed that subsamples of participants were not statistically different in ethnicity, marital status, highest achieved level of education and income (see Table 1).

Of the parents and caregivers who participated in this study, over 70% lived at or below the U.S. national poverty line. All participants' reported English as their primary language. Ages of parents were not collected for this study.

Table 1.

Demographic Characteristics by Total Enrollment Sample and Study Subsamples

Demographic Variable	Participants Enrolled in CBB Program (N=103) ^a	Participants With Pre and Post PKPQ (N=47)	Participants With Pre and Post LENA (N=24)
Gender			
Female	97 (94.2%)	46 (97.9%)	23 (95.8%)
Marital Status			
Single	40 (38.8)	21 (44.7)	10 (41.7)
Married	19 (18.4)	9 (19.1)	6 (25.0)
With Partner	23 (22.3)	14 (29.8)	6 (25.0)
Not Specified	21 (20.4)	3 (6.4)	2 (8.0)
Ethnicity			
Black/African American	75 (72.8)	39 (83)	20 (83.3)
Asian/Caucasian/Other	14 (13.6)	11 (23.2)	4 (16.7)
Not Specified	14 (13.7)	1 (2.1)	0

Table 1. (Continued)

Demographic Variable	Participants Enrolled in CBB Program (N=103)	Participants With Pre and Post PKPQ (N=47)	Participants With Pre and Post LENA (N=24)
Education			
Diploma/GED	18 (17.5)	11 (23.4)	6 (25.0)
Some Post HS	26 (25.2)	7 (14.9)	8 (33.3)
Post HS Degree	14 (13.6)	10 (21.2)	5 (20.1)
Not Specified	23 (22.4)	4 (8.5)	3 (12.5)
Monthly Income			
Less than \$850	23 (22.3)	13 (27.7)	6 (25)
\$850-\$1599	29 (28.3)	15 (31.9)	8 (33.3)
\$1600-\$3099	13 (13.5)	7 (14.8)	3 (12.5)
\$3350 or More	11 (10.7)	7 (14.9)	4 (16.7)
Not Specified	25 (24.3)	4 (8.5)	3 (12.5)

- a. Data from the parent study were accessed December 2014 and participation numbers may be reflected differently in parent study results

Measures

Demographic Questionnaire. Parents were asked to complete a demographic questionnaire containing questions about language, marital status, ethnicity, highest level of education achieved, number of individuals in a household, and monthly income. Parents completed the questionnaire at the same time the pretest was completed prior to the intervention period.

Parental Communication and Interaction. Parental communication was measured through the use of the Language ENvironment Analysis (LENA). LENA is a recording device, equipped with speech recognition software that, when placed on a child, is used to record and analyze the amount of talk spoken in the home. Young children wear a digital language processor (DLP) in a pocket of custom made clothing and the system captures sound for up to 8 hours. Data collected on the DLP is then downloaded and analyzed by speech recognition software. The software segments the audio file into adult and child sounds, removes background noise, overlapping speech, unclear speech, electronic media sounds (e.g. Television, radio), and other non-speech sounds. A statistical model is then used to estimate the number of adult words spoken in each segment. Finally, child sound segments are run through statistical analysis to detect vocalizations and filter out laughing, crying, and vegetative sounds. The speech recognition software provides 3 key reports including Adult Word Count (AWC), Child Vocalizations (CV), and Conversational Turns (CT: Gilkerson & Richards, 2009).

Adult Word Count is an estimate of the number of adult words spoken near the target child. To estimate the reliability of the LENA in detecting AWC, 70 independent 12-hour long audio files were coded by human transcribers. A significant linear correlation was found between LENA AWC and human AWC estimates ($r = .92$, $p < .01$) and results indicated that the LENA system AWC was, on average, 2% less than that of human transcribers (Xu, Yapanel, & Gray, 2009).

Child Vocalizations are defined as a child speech segment of any length surrounded by 300 ms of silence. In 70 test files, human transcribers found that in

comparison to LENA algorithms, LENA correctly detected 75% of the human-identified child vocalizations. The LENA system only misclassified 16% of non-vocalizations and vocalizations (Xu et al., 2009).

Conversational Turns (CT) are defined as a speech segment between a child (CV) and an adult (AWC) of any length separated by 5 seconds or less of silence or non-speech noise. Reliability and validity information is not available for CT. Because CT is the detection of consecutive AWC and CV, LENA publishers report that reliability and validity is supported by data that support the reliability and validity of the AWC and CV.

In this study, CT is used to measure the effect of the intervention on parent-child language interaction. A CT change score is calculated by subtracting the frequency of a participant's pretest CT to posttest CT and is a dependent variable. Pretest or baseline frequency of CT serves as an independent predictor variable. Baseline frequency of CT is the total number of CT in a 16-hour language recording.

Parenting Knowledge. The Parent Knowledge and Practices Questionnaire (PKPQ) is a 32-item questionnaire with questions presented in true/false, multiple choice, or short answer format. Each item was created to measure participant knowledge of language and literacy promoting and positive parenting practices, and the participant's typical use of specific parenting practices taught in the CBB curriculum. Each correct answer for true/false and multiple-choice items is awarded a point. Short answer items are recorded by the research team and scored by two raters trained to reliably award a specific number of points based on the accuracy of the responses. The interrater reliability for the raters was found to be Kappa = 0.76. A total of 97 points can be

obtained on the questionnaire. Fifty-six of the points can be obtained through true/false and multiple choice questions and the remaining 41 points can be obtained through short answer responses.

The PKPQ was developed in community partnership between University of Minnesota researchers and the CBB research team and is used to detect change in parent's knowledge and practices related to information and skills delivered in the CBB curriculum. The team field-tested the instrument over the course of 18 months with successive cohorts of CBB participants. Staff also conducted extensive interviews to make certain that researchers, NAZ staff and family participant in CBB shared the same meaning of words and concepts in the PKPQ.

In the current study, the change in a participant's pretest PKPQ and posttest PKPQ total score, calculated from true-false and open-ended responses, serves as a dependent variable. Total pretest or baseline PKPQ score serves as an independent predictor variable.

Caregiver Stress. The Parenting Stress Index-Short Form (PSI-SF; Abidin, 1995) is a 36-item questionnaire with statements rated on a five-point Likert-style scale. An overall score for perceived parental stress is calculated by adding ratings from each of the 36 items. Scores range from 36 to 180. Three PSI-SF sub-scales, which make up the measure, focus on Parental Distress (distress experienced in parenting), Parent-Child Dysfunction (perception that child does not meet parent's expectations), and Difficult Child (behavioral characteristics that make the child easy, or difficult to manage). Questions asked in the PSI-SF include, "I find myself giving up more of my life to meet my children's needs than I ever expected," Since having this child, I have been unable to

do new and different things,” and “I feel alone and without friends”. Abidin (1995) reports reliabilities of .91 for the total scale and .87, .80, and .85, respectively for the Parental Distress, Parent-Child Dysfunction, and Difficult Child sub-scales. The PSI-SF has high concurrent validity ($r = .94, p < .0001$) with the long form of the PSI.

In the current study, a PSI-SF total score was used as a moderator variable to describe each participant’s perceived parenting stress during the intervention.

Caregiver Social Support. The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet & Farley, 1988) is a measure of perceived social support available and perceived adequacy of social support received across three factors relating to the participants source of support (i.e., family, friends, and significant others) (Zimet et al., 1988). The MSPSS is comprised of 12 items requiring respondents to rate the extent in which they agree or disagree with a statement. Items are scored for a total social support score. Scores range from 12 to 84. A higher score indicates a higher level of social support. The MSPSS has strong internal consistency, with an alpha across several samples greater than .85; and good to excellent test-retest reliability (with a Cronbach’s alpha of 0.81 to 0.98 in non-clinical samples, and 0.92 to 0.94 in clinical samples)(Zimet et al., 1988). Construct validity testing with the MSPSS global support score has been significantly and negatively correlated with depression scores (Kazarian & McCabe, 1991). Concurrent validity has been established with the Social Support Behaviors Scale (Kazarian & McCabe, 1991). This widely used tool has also been used in minority and underserved communities.

In the current study, the MSPSS total score was used as a moderator variable to describe participants perceived social support at the onset of the intervention.

Procedures

Recruitment. All participants received one consent form and concurrently agreed or declined to participate in the larger effectiveness study and the current study. This decision was based on recommendations from CBB program staff and CBB research staff. Participants were recruited by CBB program staff and a graduate research assistant. CBB program staff recruited participants through door-to-door solicitation, community gatherings, and word of mouth. Consented participants were given the option to decline to complete rating scales for the current study. For this study, participants were given two \$10 gift cards; one gift card for completing the MSPSS and one for completing the PSI-SF.

Data Collection. Data collection began in the summer of 2013 and ended in the fall of 2014. A total of eight cohorts of participants received the weekly, twelve-week CBB intervention. Two cohorts received the intervention during the same twelve-week period; one cohort met on Thursday nights and one met on Saturday mornings. Cohort size ranged from 5 to 15 participants.

Participants completed the demographic questionnaire, the PKPQ questionnaire, a LENA recording, and the MSPSS rating scale after consenting to participate in the study but before receiving the first week of intervention. After completing the MSPSS, each participant was given a \$10 gift card. Per recommendations for the CBB research team and community leadership team, the PSI-SF was administered during the 6th week of the twelve-week intervention. Parents received a gift card after completing the questionnaire. Finally, during the last week of the session, posttest PKPQs were completed. Posttest LENA recordings were

each completed within three weeks of the last intervention class. The data collected will be used to answer the following research questions:

Research Question 1. 1) To what extent does parenting stress moderate the association between baseline parenting knowledge and change in parenting knowledge for intervention participants? To examine this research questions, the following model will be fitted to the data:

$$\text{Change in Parenting Knowledge}_i = \beta_0 + \beta_1 (\text{Baseline PKPQ})_i + \beta_2 (\text{Parenting Stress})_i + \beta_3 ((\text{Baseline PKPQ})_i * (\text{Parenting Stress})_i) + \varepsilon$$

The hypothesis that $\beta_3 = 0$ will be tested.

Research Question 2. To what extent does perceived social support moderate the association between baseline parenting knowledge and change in parenting knowledge for intervention participants? To examine this research questions, the following model will be fitted to the data:

$$\text{Change in Parenting Knowledge}_i = \beta_0 + \beta_1 (\text{Baseline PKPQ})_i + \beta_2 (\text{Social Support})_i + \beta_3 ((\text{Baseline PKPQ})_i * (\text{Social Support})_i) + \varepsilon$$

The hypothesis that $\beta_3 = 0$ will be tested.

Research Question 3. To what extent does parenting stress moderate the association between baseline frequency of conversational turns and change in

parent-child language interactions for intervention participants? To examine this research questions, the following model will be fitted to the data:

$$\text{Change in Parent-Child Language } _i = \beta_0 + \beta_1 (\text{Baseline CT})_i + \beta_2(\text{Parenting Stress})_i + \beta_3 ((\text{Baseline CT})_i * \text{Parenting Stress})_i + \epsilon$$

The hypothesis that $\beta_3 = 0$ will be tested.

Research Question 4. To what extent does perceived social support moderate the association between baseline frequency of conversational turns and change in parent-child language interactions for intervention participants? To examine this research questions, the following model will be fitted to the data:

$$\text{Change in Parent-Child Language } _i = \beta_0 + \beta_1 (\text{Baseline CT})_i + \beta_2(\text{Social Support})_i + \beta_3 ((\text{Baseline CT})_i * (\text{Social Support})_i) + \epsilon$$

The hypothesis that $\beta_3 = 0$ will be tested.

Experimental Design

A pretest-posttest within subjects intervention design was employed to evaluate the extent to which parenting stress levels or low levels of social support and baseline levels of parenting behaviors moderated either a) increases in parenting knowledge or b) increases in CT for parents who participated in the College Bound Babies parenting education program.

Data Analyses

Power Analyses. Prior to conducting the study, a power analysis was conducted to determine sample size. Based on predicted effect size of .15 for the full model, and to achieve an R^2 of .20 for the full model with main effects and interactions, the study required 127 participants to achieve a power of .80, using an alpha of .05 (Aiken & West, 1991, Table 8.2).

Data Screening. The full data set was screened to check for missing data, homogeneity of variance, normal distribution, and outliers for all variables included in the current study. Frequency histograms were obtained to determine whether continuous variables were normally distributed. Individual histograms were analyzed for each variable to check for kurtosis and skewness.

Data Analysis Plan. To answer the primary research questions, Baron and Kenny (1986) moderation analyses will be conducted to test for moderator effects. To address each question, interaction terms are created by first standardizing the independent variable and the moderator variable into z scores (Aiken & West, 1991). Standardization reduces problems associated with multicollinearity (i.e. high correlations) among the variables in the regression equation (Cohen et al., 2003; Cronbach, 1987). Standardizing also makes it easier to plot significant moderator effects because of convenient representative values (i.e. mean and plus or minus standard deviation units from the mean). After standardizing the independent and moderator variables, an interaction term is created by multiplying the standardized independent variable (e.g. baseline parenting knowledge or baseline conversational turns) by the standardized moderator variable (e.g. parenting stress or social support) (Aiken & West, 1991). A hierarchical regression

analysis is then carried out in two steps. In the first step of a hierarchical regression analysis the unstandardized independent or predictor variable and the unstandardized moderator variable are both entered into the model. In the second step of the analyses, the standardized interaction term is added to the model.

Detecting Moderation. A moderation effect in a hierarchical regression analysis is supported if the interaction between the moderator variable and the independent variable is significant in the final model full model (Aiken & West, 1991). Significance is indicated when the change in the p -value of the F statistic for the interactions term in the final model is less than or equal to .05. If the interaction between the independent variable and moderator variable is not statistically significant, then the interaction term is not a moderator variable. Instead, the interaction is just an independent variable.

Effect Size. The effect size for the interaction in the regression analysis is the amount of incremental variance explained by the interaction term after the first order effects have been controlled (i.e. the R^2 change in step 2). The standardized regression coefficient (i.e. β value) indicates the strength of the influence of the moderator on the overall effect size for that model. Each β coefficient can be interpreted as change in the outcome effect size, which is accompanied by a unit change in the moderator. Thus, higher coefficients represent a greater impact of the moderator on the effect size.

Chapter 4

Results

The primary goal of this study was to determine if the effectiveness of an intervention varied for participants depending on level of proximal risk and pre-intervention level of parenting behavior. Primary research questions included the following: 1) To what extent does parenting stress moderate the association between baseline parenting knowledge and change in parenting knowledge? 2) To what extent does perceived social support moderate the association between baseline parenting knowledge and change in parenting knowledge? 3) To what extent does parenting stress moderate the association between baseline frequency of conversational turns and change in parent-child language interactions? 4) To what extent does perceived social support moderate the association between baseline frequency of conversational turns and change in parent-child language interactions?

Descriptive Statistics

To answer the first and second research questions, complete data were available for 47 participants. The assumptions of regression were assessed prior to the analyses. Conditions of linearity and homoscedasticity were examined. One variable, PKPQ change score, was transformed using a logarithmic Base 10 transformation. This transformation was completed prior to analyses to reduce kurtosis. Descriptive statistics were computed for each variable to assess for normality (see Table 2). After the transformation was carried out, all of the variables were approximately normally distributed.

Table 2.

*Descriptive Statistics and Measures for Variables Included in Research**Question 1 and 2 (N=47)*

Construct and Measure	Min	Max	<i>M</i>	<i>SD</i>	Skew	Kurt
Parenting Stress						
The Parenting Stress						
Index-Short Form	41	117	76.00	17.75	0.33	-0.04
Perceived Social Support						
MSPSS	12	84	56.00	20.84	-0.66	-0.58
Parent Knowledge						
Pre Intervention	2	74	51.02	18.29	1.83	0.68
Post Intervention	47	89	73.62	10.31	0.37	0.68
Change in PKPQ	-13	83	22.00	17.52	1.61	3.66
Log 10 Change in PKPQ	0	4.42	2.87	0.78	-0.92	2.76

To answer the third and fourth research questions, complete data were available for 24 participants. The assumptions of regression were assessed prior to the analyses. Conditions of linearity and homoscedasticity were examined. Descriptive statistics were computed for each variable to assess for normality (see Table 3). All of the variables were found to be approximately normally distributed.

Table 3.

Descriptive Statistics and Measures for Question 3 and Question 4 (N=24)

Construct and Measure	Min	Max	<i>M</i>	<i>SD</i>	Skew	Kurt
Parenting Stress						
The Parenting Stress						
Index (PSI-SF)	41	108	68.21	14.36	0.86	2.06
Perceived Social Support						
(MSPSS)	27	81	61.38	15.60	-0.81	-0.29
Parent-Child Language						
Interactions						
Pre Intervention CT	0	693	149.29	219.68	1.07	0.92
Post Intervention CT	47	964	288.33	270.09	0.70	0.92
Change in CT Pre to Post	-13	561	139.04	227.91	-0.70	0.92

Correlations for dependent and independent variables in RQ1 and RQ2 were computed. The outcome variable, PKPQ Change Score, had a significant negative correlation with the baseline PKPQ ratings ($r = -.668^{**}$) (see Table 4).

Table 4.

Correlations Between Change in Parenting Knowledge, Baseline Parenting Knowledge, Parenting Stress and Perceived Social Support (N=47)

Variable	1.	2.	3.	4.
1. Change in PKPQ	–			
2. Parenting Stress	-.108	–		
3. Social Support	.087	-.210	–	
4. Baseline PKPQ	-.686**	-.238	-.060	–

Note. ** Correlation is significant at the .01 Level

Correlations for dependent and independent variables in RQ3 and RQ4 were computed. No significant correlations were found between the dependent and independent variables (see Table 5).

Table 5.

Correlations Between Change in Conversational Turns, Baseline Conversational Turns, Parenting Stress and Perceived Social Support (N=24)

Variable	1.	2.	3.	4.
1. Change in CT	–			
2. Parenting Stress	-0.054	–		
3. Social Support	0.372	-0.407*	–	
4. Baseline CT	-0.272	-0.151	0.090	–

Note. * Correlation is significant at the .05 Level

Research Question 1: To what extent does parenting stress moderate the association between baseline parenting knowledge and change in parenting

knowledge? A hierarchical regression analysis was performed to assess whether parenting stress interacts with baseline parent knowledge to moderate change in parent knowledge. In the first step, two variables were included in the model: baseline level of parent knowledge and parenting stress. Parenting stress scores ranged from 41 to 117. Baseline parenting knowledge scores ranged from 2 to 74 (see Table 2). The second step of the regression included baseline parenting knowledge, parenting stress, and a baseline parenting knowledge by parenting stress interaction term.

The overall regression was statistically significant, $R^2 = .549$, $F(3, 43) = 17.541$, $p < .001$ (See Table 6). However, there was not a significant baseline parent knowledge by parenting stress interaction $b = .026$, $t(47) = .221$, $p = .826$. Significant main effects were found for baseline parent knowledge, $b = -0.033$, $t(47) = -6.940$, $p < .000$, and for parenting stress, $b = -0.014$, $t(47) = 2.732$, $p = .009$.

Figure 2 displays boxplots of change in parenting knowledge for level of baseline parenting knowledge (e.g. low or high) and level of parenting stress (e.g. low or high). Boxplots in figure 2 represent mean performance and variability for each condition (i.e. low-low, low-high, high-low, and high-high). The dark horizontal lines represent the mean and the length of the box represents the difference between the 25th and 75th percentiles. Maximum and minimum values (apart from outliers) are indicated by the extremes of the whiskers. This boxplot shows overlap between levels of parenting stress (i.e. low and high) in both the low baseline parenting knowledge condition and the high

parenting knowledge conditions. The overlap between boxes demonstrates the lack of statistically significant interaction between the boxplots at a 95% confidence level.

Table 6.

Hierarchical Regression Analysis Predicting Change in Parenting Knowledge With Parenting Stress

Step and predictor variable	R^2	ΔR^2	sr	β
Step 1	.549***	.549***		
Baseline PKPQ			-.727***	-.754***
Parenting Stress			-.384**	-.288**
Step 2	.549***	.001		
Baseline PKPQ			-.727***	-.394***
Parenting Stress			-.385**	.493**
Moderator			.034	.347

Note. sr = semipartial correlation coefficient

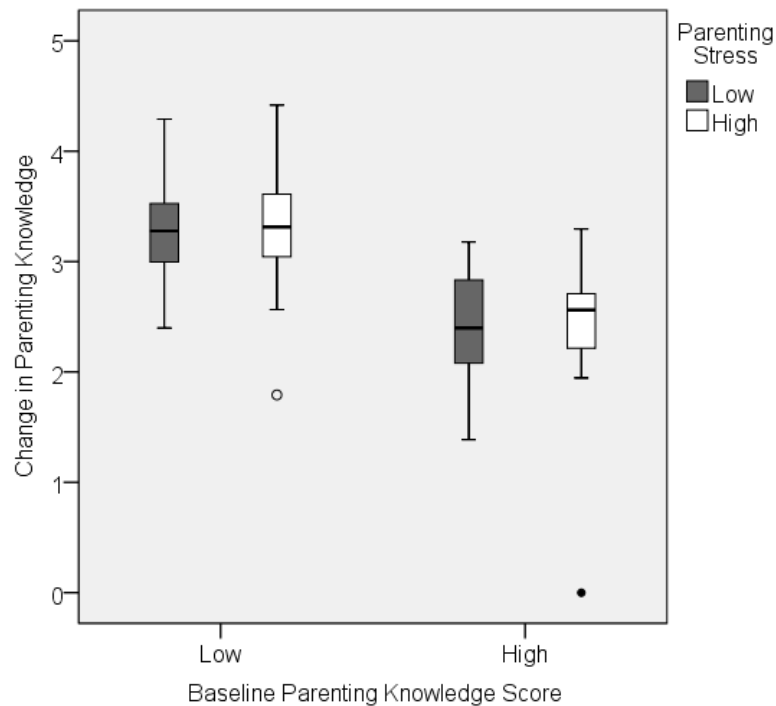


Figure 2. Boxplots for research question 1 representing change in parenting knowledge by low and high levels of baseline parenting knowledge and parenting stress

Research Question 2: To what extent does perceived social support moderate the association between baseline parenting knowledge and change in parenting knowledge? A hierarchical regression analysis was performed to assess whether perceived social support interacts with baseline parent knowledge to moderate change in parent knowledge (see Table 7). In the first step, two variables were included in the model: baseline level of parent knowledge and perceived social support. Baseline parent knowledge scores ranged from 41 to 117; baseline perceived social support scores ranged from 12 to 84 (See Table 2). The second step of the regression included baseline

parenting knowledge, perceived social support, and a baseline parenting knowledge by perceived social support interaction term.

The overall regression was statistically significant, $R^2 = .480$, $F(3, 43) = 13.218$, $p < .001$. However, there was not a significant baseline parent knowledge by perceived social support interaction $b = .086$, $t(47) = .775$, $p = .443$. There was a significant main effect for baseline parent knowledge, $b = -0.031$, $t(47) = -5.922$, $p < .000$, but a significant main effect was not found for perceived social support, $b = .002$, $t(47) = 3.68$, $p = .715$.

Table 7.

Hierarchical Regression Analysis Predicting Change in Parenting Knowledge With Perceived Social Support

Step and predictor variable	R^2	ΔR^2	sr	β
Step 1	.472***	.472***		
Baseline PKPQ			-.684***	-.683***
Social Support			.063	.046
Step 2	.480***	.007		
Baseline PKPQ			-.670***	-.724***
Social Support			.056	.041
Moderator			.117	.095

Note. sr = semipartial correlation coefficient

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

Figure 3 displays boxplots of the change in parenting knowledge for level of baseline parenting knowledge (e.g. low or high) and level of perceived social support (e.g. low or high). This boxplot shows overlap between levels of perceived social support (i.e. low and high) in both the low baseline parenting knowledge condition and the high parenting knowledge conditions. The overlap between boxes demonstrates the lack of statistically significant interaction between the boxplots at a 95% confidence level.

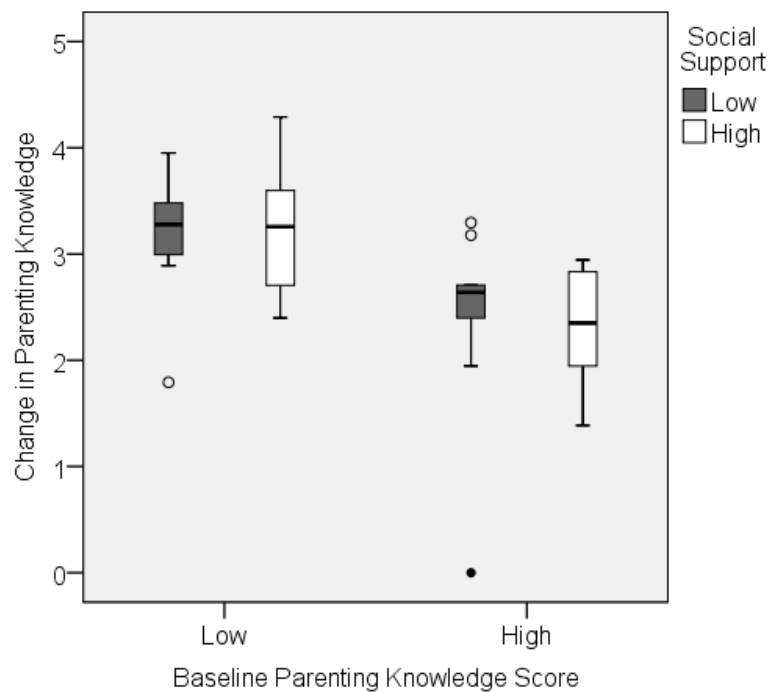


Figure 3. Boxplots for Research Question 2 representing change in parenting knowledge by low and high levels of baseline parenting knowledge and perceived social support

Research Question 3: To what extent does parenting stress moderate the association between baseline frequency of conversational turns and change in parent-child language interactions? A hierarchical regression analysis was performed to test whether parenting stress interacts with baseline frequency of CTs to moderate change in parent-child language interactions (see Table 8). In the first step of the analyses, two variables were included: baseline frequency of conversational turns and parenting stress. Parenting stress scores ranged from 41 to 108; baseline frequency of CT ranged from 0 to 693 (see Table 3). The second step of the regression included baseline frequency of CT, parenting stress, and a baseline CT by parenting stress interaction term.

The overall regression was not statistically significant, $R^2 = .200$, $F(3, 20) = 1.662$, $p = .207$. There was not a significant baseline CT by parenting stress interaction, $b = -98.334$, $t(24) = -1.407$, $p = .157$. In other words, the slope to predict change in parent-child language interactions from parenting stress was not significant as baseline CT increased. There were no significant main effects for either baseline CT or parenting stress on change in parent-child language interactions.

Figure 4 displays boxplots of the change in frequency of conversational turns for baseline frequency of conversational turns (e.g. low or high) and level of parenting stress (e.g. low or high). This boxplot shows overlap between levels of parenting stress (i.e. low and high) for participants with both high and low frequencies of baseline CTs. The overlap between boxes demonstrates the lack of statistically significant interaction between the boxplots at a 95% confidence level.

Table 8.

*Hierarchical Regression Analysis Predicting Change in Parent-Child
Language Interactions With Parenting Stress*

Step and predictor variable	R^2	ΔR^2	sr	β
Step 1	.113	.113		
Baseline CT			-.302	-.302
Parenting Stress			-.205	-.200
Step 2	.200	.086		
Baseline CT			-.413	-.475
Parenting Stress			-.341	-.391
Moderator			-.312	-.378
			Intercept =	621.620

Note. sr = semipartial correlation coefficient

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

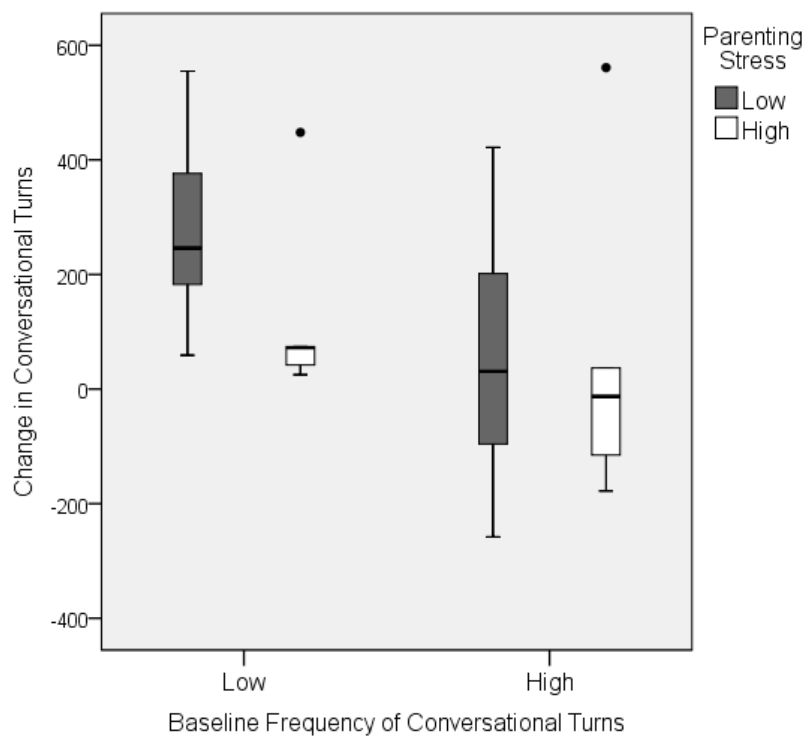


Figure 4. Boxplots for research question 3 representing change in conversational turns by low and high levels of baseline conversational turns and parenting stress

Research Question 4: To what extent does perceived social support moderate the association between baseline frequency of conversational turns and change in parent-child language interactions? A hierarchical regression analysis was performed to test whether perceived social support interacts with baseline frequency of CTs to moderate change in parent-child language interactions (see Table 9). In the first step of the analyses, two variables were included: baseline frequency of CT and perceived social support. Perceived social support scores ranged from 27 to 81; baseline frequency of CT ranged from 0 to 693 (See Table 3). The second step of the regression analysis included baseline frequency of CT, perceived social support and a baseline CT by perceived social support interaction term.

The overall regression was statistically significant, $R^2 = .338$, $F(3, 20) = 3.411$, $p = .037$. A baseline CT by parenting stress interaction term was found to be marginally significant, $b = 108.157$, $t(24) = 1.787$, $p = .089$. The effect size for this interaction was moderate ($R^2 = .106$). Additionally, significant main effects were found for baseline CT, $b = -0.409$, $t(24) = -2.087$, $p = .050$, and for perceived social support, $b = 7.195$, $t(24) = 2.595$, $p = .017$.

Table 9.

*Hierarchical Regression Analysis Predicting Change in Parent-Child
Language Interactions With Perceived Social Support*

Step and predictor variable	R^2	ΔR^2	sr	β
Step 1	.233	.233		
Baseline CT			-.331	-.308
Social Support			.414*	.400*
Step 2	.338*	.106		
Baseline CT			-.423*	-.394*
Social Support			.502*	.493*
Moderator			.371	.347
			Intercept =	-248.716

Note. sr = semipartial correlation coefficient

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

Figure 5 displays boxplots of the change in frequency of conversational turns for baseline frequency of conversational turns (e.g. low or high) and level of perceived social support (e.g. low or high). This boxplot shows overlap between levels of perceived social support (i.e. low and high) for participants with both high and low frequencies of baseline CTs. The overlap between boxes demonstrates the lack of statistically significant interaction between the boxplots at a 95% confidence level.

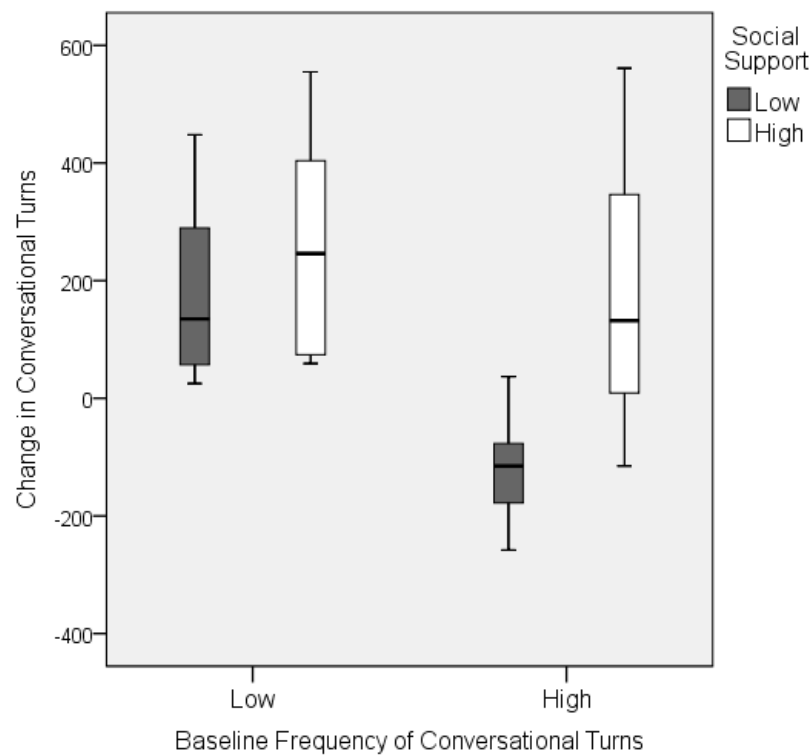


Figure 5. Boxplots for research question 4 representing change in conversational turns by low and high levels of baseline conversational turns and perceived social support.

Chapter 5

Discussion

A goal of primary preventative parenting programs is to improve parenting outcomes for entire populations of parents and caregivers before problems arise. A central tenant of primary prevention is that the program will affect the outcomes of an entire population, regardless of whether a program participant experiences higher risk. For families who experience elevated levels of risk, a universal program may not improve parenting outcomes. To better understand how universally targeted parenting programs for high-risk parents may affect changes in parenting behaviors, an investigation of the conditions that are necessary for the programs to succeed in reaching the most participants is important. The primary focus of this study was to clarify the differential effectiveness of a preventative parenting education program by investigating if participants who experienced higher levels of risk and lower levels parenting behaviors at the start of the intervention demonstrated greater intervention benefit.

Results for three of the four research questions did not support the hypothesis that greater levels of risk and lower levels of baseline parenting behaviors were associated with greater improvement in parenting behaviors for study participants. However, moderate main effects for participants with increased parenting stress were found: parents with increased levels of parenting stress showed less change in parenting knowledge following the intervention. Findings also show moderate main effects for lower levels of baseline parenting knowledge; in that parents with lower levels of baseline parenting knowledge showed more change in parenting knowledge following the intervention. A marginally significant moderation effect was found for parents with higher levels of

perceived social support who began the intervention with fewer parent-child language interactions. The following section discusses these significant and non-significant findings.

Moderating Effects of Parenting Stress and Pre-Intervention Parenting Behaviors on Change in Parenting Outcomes. Parenting stress is known to influence parenting behaviors (Ritchie & Holden, 1998) and children's school readiness outcomes (Brooks-Gunn & Markman, 2005). Results of fifteen years of parenting intervention research on the moderating effect of parenting stress on parent intervention outcomes are mixed, with some studies demonstrating greater or neutral changes in parenting behaviors following intervention (Hemphill & Littlefield, 2006) and other studies showing just the opposite to be true (Baydar et al., 2003). In quasi-experimental and experimental studies the treatment effect of the entire population does not necessarily apply to any particular person or subgroup, but rather represents the average effect across all individuals in the population (Kraemer, et al., 2006). The results from the current study did not identify statistically significant moderating effects for elevated levels of parenting stress and baseline levels of parent knowledge, or elevated levels of parenting stress and baseline levels of parent-child language interactions; in other words, this study does not provide evidence that parenting stress moderates the effect of the intervention. However, significant main effects were found for elevated levels of parenting stress and pre-intervention levels of parenting knowledge in the first research question.

Moderating Effects of Parenting Stress and Baseline Parent Knowledge. The first research question in this study investigated the moderating influence of parenting stress and pre-intervention levels of parent knowledge on change in parent knowledge, as

measured by parent questionnaires. This study provided no evidence that a change in parenting knowledge was influenced by elevated levels of parenting stress and reduced parenting knowledge at baseline.

A lack of moderation between parenting stress and baseline parent knowledge may demonstrate that parents with elevated levels of parenting stress were equally as likely to benefit or not benefit from the intervention regardless of pre-intervention level of knowledge about child development. However, due to the lack of a control group in this study of moderators and the small sample size, it is not possible to definitively conclude that the change in parent knowledge from pre-intervention to post-intervention resulted from the intervention. Instead, the only conclusion that can be made is that there was an increase in overall parenting knowledge across participants (e.g. average increase of 22 points on the PKPQ) and that the strength of this relationship was not significantly moderated by the interaction between baseline knowledge of child development and parenting stress.

In answering the first research question two main effects were found. The first main effect showed that elevated levels of parenting stress were significantly associated with less change in parenting knowledge ($p = .009$). In this sample, less-stressed parents showed greater change from pre- to post-intervention in their parent knowledge than more stressed parents. This finding is consistent with the findings of Kazdin and Wassell (1999) who demonstrated that parents with higher levels of overall stress showed less improvement in parenting behaviors than parents with lower levels of stress. The CBB parenting program did not include intervention components that directly address parenting stress. Therefore, future iterations of the intervention may want to consider

putting in place intervention components that directly address the reduction of parenting stress throughout the intervention along with the school readiness curriculum. In future studies, parenting stress should be measured pre- and post-intervention to demonstrate if CBB participants showed a reduction in parenting stress.

Another important contribution of this study is the main effect of baseline level of parent knowledge on increased change in parenting knowledge for study participants ($p < .001$). In this sample, study participants who had less parenting knowledge prior to the intervention made greater changes in their overall acquisition of parenting knowledge than parents with more knowledge at the onset of the intervention. Many studies of parent interventions include parenting knowledge as an outcome of interest. Studies on similar parenting programs, including the 2009 study of Toddler Family Check-Up, have shown that parents who begin a parenting intervention with less education make greater improvements in parenting practices than parents with more education, yet no intervention study was identified that controlled for pre-intervention parenting knowledge on overall change in that outcome (Gardner et al., 2009). Logically, it would follow that parents with less parenting knowledge at the onset of the intervention would have the potential to make greater gains in knowledge. Other studies have shown that children with higher levels of baseline problem behaviors make greater reductions in negative behaviors following intervention (Webster-Stratton, 1990), due to the lack of research investigating the role of pre-intervention levels of parenting knowledge on change in parenting knowledge, the current finding adds to the parenting intervention literature by demonstrating that high-risk parents with less parenting knowledge at the beginning of an

intervention have the potential to make larger gains in parenting knowledge than their more knowledgeable peers in parent education programs for low-income families.

Parenting Stress and Parent-Child Language Interactions. Another research question in this study investigated the moderating influence of parenting stress and how much a parent spoke with their child on overall change in how much a parent talked with their child. No significant moderating effect or main effects on change in how much a parent talked with their child were found, suggesting that change from pre-intervention to post intervention parent-child language was not influenced by how much a parent talked with their child before the intervention and how much parenting stress they reported.

For the 24 participants that completed both pre and post LENA recordings, the average frequency of conversational turns went from a pre-intervention level of 149.29 conversational-turns in a 16-hour recording to a post-intervention average of 288.29 conversational turns in a 16-hour recording. The average improvement from pre to post intervention was 139.04 conversational turns. While there seems to be an improvement in the frequency of parent-child language interactions across participants, these improvements were not influenced by how often a parent spoke with their child prior to the intervention or whether they reported elevated levels of parenting stress as no significant main effects were found for either variable.

Moderating Effects of Perceived Social Support and Pre-Intervention

Parenting Behaviors on Change in Parenting Intervention Outcomes. Research on the determinants of parenting has emphasized the role of stress and social support on parenting (for a review see Belsky, 1984). Social support in particular has been identified as a predictor of the quality of parenting behavior (Powell, 1988). Bronfenbrenner's

ecological theory has influenced the focus on children's social context as a powerful influence on children's development. Mobility issues, neighborhood disadvantage, and poverty have been shown to lead to social isolation and its associated consequences on parenting. One question that has arisen as a result of the increased focus on the role of social support on children's development asks the following question: In what ways does the social context of parent functioning (e.g. existing sources of social support) relate to intervention outcomes? While several studies suggest that parental perceived social support might effect parenting intervention outcomes, there is insufficient empirical evidence to demonstrate a conclusive relationship.

As previously stated, the study results did not support the hypothesis that reduced support from friends and family and lower baseline levels of parenting knowledge moderated change in parenting knowledge. However, a marginally significant moderation effect was found for parents who reported higher levels of perceived social support who began the intervention with fewer parent-child language interactions. In addition, main effects were found for perceived social support and pre-intervention levels of parent-child language interactions in the fourth research question. The following section of this chapter addresses significant and non-significant findings in regards to the moderating effects of perceived social support and pre-intervention levels of parenting behaviors on change on the parenting behavior outcomes.

Perceived Social Support and Parenting Knowledge. The second research question in this study investigated the moderating influence of pre-intervention level of perceived social support and pre-intervention levels of parent knowledge on change in parent knowledge as measured by parent questionnaire. A significant moderating effect

on change in parenting knowledge was not found. The lack of a significant moderation effect for perceived social support is similar to the findings of Stolk and colleagues (2007) and Smith and colleagues (2005). Similar to the findings of the current study, both of these studies failed to demonstrate that lower levels of support from family and friends moderated change in parenting behaviors for participants in the intervention condition. While this study does not replicate the findings in these earlier studies, due to the lack of a control group and the addition of baseline parent knowledge as a predictor variable, the lack of a significant moderating relationship does indicate one important result: regardless of parents pre-intervention levels of knowledge of parenting and child development and how supported much they perceived themselves to be by family and friends, on average, intervention parents increased their parenting knowledge over the course of the intervention.

Perceived Social Support and Parent-Child Language Interactions. The final research question in this study investigated the moderating influence of pre-intervention frequency of parent-child language interactions and perceived support from friends and family on change in how much parents spoke with their children as measured by a 16-hour audio recording. A moderating effect on change in how much a parent spoke with their child was found to be marginally significant for participants who spoke less with their children prior to the intervention and also reported increased levels of parenting stress ($p = .089$). This finding suggests that from pre-intervention to post-intervention participants who spoke less with their child prior to the intervention and who reported more support from friends and family actually spoke to their child more following the intervention when compared to other parents in the study. The same finding was not true

for mothers who reported less social support from friends and family or for those participants who spoke more with their child prior to the intervention. While one might expect that parents who spoke less with their child prior to the intervention would make greater improvements in how much they spoke with their children following an intervention that emphasized increasing the frequency parents spoke with their children, this main effect was not shown in the current study. It was only through the interaction with higher levels of perceived social support that a significant moderating effect resulted. Perhaps, this finding might suggest that mothers who saw themselves as having more support from their friends, families and significant others, were able to better utilize the parent-child communication strategies taught during the intervention. Research on social support has consistently shown that parents with social support networks of friends and families are able to parent more effectively (Belle, 1982; Ceballo & McLoyd, 2002; McLoyd, 1990). The intervention itself may have capitalized on parents' pre-existing sources of support.

Anecdotal evidence collected during the intervention suggests that many parents enrolled in the intervention based on the recommendation of a friend or family member. These parents may have received additional support from these friends and family members to improve communication styles because of the support they received from an individual who had previous experience with the intervention or was a community affiliate of NAZ. However, this does not explain why parents who saw themselves as receiving more support from others and began the intervention with less parenting knowledge did not see a significant increase parenting knowledge as well.

Limitations

Several limitations are important to consider in the interpretation of study results. First is the use of a quasi-experimental design. The major weakness of a quasi-experimental design is the lack of random assignment, and thus the lack of nonbiased estimates of treatment effect. The parent study used a wait-list control design, where participants were randomly assigned to either attend CBB or go to a wait-list for CBB; pre/post measures were collected for treatment and control groups. Wait-list members were then invited to attend CBB and pre/post measures were collected for them as well. The sample size of participants who completed both the LENA and the moderator scales was too small to allow for meaningful comparison of treatment and control. The final sample in the current moderator study used data from the parent studies' treatment group and the participants from the wait-list control who completed the intervention. Associations identified in quasi-experimental designs meet some requirements of causality, because the intervention precedes the measurement of the outcome. Also, the outcome can be demonstrated to vary statistically with the intervention. The pretest-posttest design is a commonly used study design in quasi-experimental studies (Shadish et al., 2002). In this design a single pretest observational measure is made and intervention is implemented, and a posttest measurement is made. The inclusion of the pretest provides some information about what the acquisition rates might have been had the intervention not occurred (Shadish & Heinsman, 1997). However, single measure pretest-posttest designs are less likely than other quasi-experimental designs to permit causal interpretations of observed associations. The design of the current study could have been strengthened through the use of a control group. In the absence of a control

group, a simple design change that could have strengthened the current study would have been the addition of a second pretest measure. By adding a second pretest measure, it would be less likely that regression to the mean or maturation effects would occur. It is much harder for quasi-experimental studies to be considered rigorous. Therefore quasi-experimental designs must employ creative design features to be considered well designed and rigorous. In the current study, the use of baseline parenting outcomes as predictor variables was employed to strengthen the design.

A second limitation of the current study is inherent to the nature of examining moderating effects. In RCTs, moderating effects are often studied; however, efforts to detect these effects are often unsuccessful due to insufficient statistical power. In quasi-experimental studies moderated effects can be expected, however, greater confidence can be placed in findings of moderating effects when they are based on randomization. Detecting moderating effects in studies that employ continuous variables, as was the case of this study, has been shown to be particularly difficult. The ability to detect marginally significant moderating effects for parents who spoke less with their child prior to the intervention and reported increased social support from friends and family, given the limitation with the small sample size, may be a testament to the strength of the intervention on parent-child language interactions for parents who perceive themselves as receiving comparatively higher levels of perceived social support from friends and family. However, this assumption is extremely optimistic given the methodological limitations of the study. The small sample size in study as well as the difficulty in detecting significant moderating effects likely limited the ability to detect a full range of effects.

Of the 103 parent-child dyads that began the intervention only 24 of the dyads completed both a pre and a post LENA recording. Power analyses, which are used to estimate the appropriate sample size in order to increase the power or overall effect of the outcomes, indicated that at least double the number of participants were needed to show a moderate effect size. This sample size was obtained for research questions one and two, but was not obtained for research questions 3 and 4. With the sample size of 24 participants completing both a pre and post LENA recording, a post hoc power analysis predicted an effect size of .63 to achieve a power of 0.8 when using an alpha of .05.

In order to reduce barriers to completing the recordings, the parent study provided monetary incentives for completion of the recordings, LENA devices were dropped off and picked up at family homes by a intervention team member from the NAZ community, and an intervention team member who participated in pilot versions of the intervention spoke to intervention participants about their positive experiences using LENA. Despite these efforts, many parents who completed the intervention did not complete the LENA recordings. Several parents either completed a pre- or a post-intervention recording, but not both. Because participants did not complete both recordings, these parents were not included in the final sample. Due to the small number of recordings as well as the lack of multiple baseline measures, even significant results garnered from LENA recordings in this study should be interpreted with extreme caution.

Attrition of participants arguably poses the most significant limitation of the current study. Universal prevention programs are intended to reach entire populations. In the parent study, most of the pre-tests were collected at an orientation session prior to the start of CBB. Less than half of the participants who attended the orientation sessions

completed the intervention. Most who attended the first session of CBB did graduate.

At the time of writing this, the parent study team was in the process of analyzing attendance data and thus it cannot be reported here. The majority of the participants who completed the intervention completed pre- and post-intervention PKPQ questionnaires, however less than a quarter of the initial participants completed LENA recordings. The significant attrition of participants in the research, and the small numbers who completed both the moderator scales and a pre/post LENA limits the generalizability of any significant findings to the population because the final sample does not reflect the outcomes of the entire population.

The two outcome measures utilized in the study, Parent Knowledge and Practices Questionnaire (PKPQ) and the Language Environment Analysis (LENA), may also pose some limitations. The PKPQ was used to measure a parent's knowledge of child development. A research base for the use of questionnaires in intervention research would demonstrate the reliability and validity of the questionnaire. To date, there is not a substantive body of research on the psychometric properties of the PKPQ. While the instrument was piloted and refined several times using feedback from past CBB participants, research staff, and community members, there is little psychometric data on the measure. Strengths of the measure are that it is user friendly, sensitive to change, and that it provides a direct measure of the information taught in the intervention. High levels of inter-rater reliability were established for the PKPQ, however, to date, no evidence is available on test-retest reliability or internal consistency of the measure. However, the research team determined that the PKPQ accurately represented the content taught during the intervention and piloting of the measure provided evidence on the appropriateness of

the measure for the sample population. The research team for the parent study determined that the PKPQ was the most efficient and accurate measure to test for program effects on parent knowledge. Therefore, further research is needed to establish more robust psychometric data for the questionnaire.

The use of the LENA was a strength and a limitation of the current study. Unlike traditional methods for measuring parent-child interactions, the LENA provides a relatively non-invasive means for observing the language interactions between parents and their children. The LENA is smaller than the size of an average cell phone and can be inconspicuously placed in a pocket of a custom-made shirt. Oftentimes, parents and children forget that the LENA is recording throughout the day. Compared to the lab-constructed interactions or the video monitoring used in intervention participant's homes, the LENA provides a relatively natural measure of parent-child language interactions. For many parents, the use of LENA allowed them to retain a sense of privacy that lab-based and video-based observations do not provide, thus providing a more naturalistic or representative measure of what the language interactions between parents and children.

To date, few parenting intervention studies have utilized LENA technology to measure change in parent-child language interactions. Of these studies, only two studies have demonstrated somewhat reliable change in parent-child language interactions (Rafdal, 2011; Sacks et al., 2014). In their study, Sacks and colleagues (2014) took two pre-intervention LENA recordings, one mid-intervention recording, and two post-intervention recordings. By taking multiple measures at baseline, the study authors were able to demonstrate a relatively stable baseline measure of parent-child language interactions. This allowed for the authors to demonstrate if changes in parent-child

language interaction were really the result of the intervention and not merely a product of variability in the day-to-day language interactions between parents and children. Similarly, in a multiple baseline single case study investigating how an intervention enhanced the quantity and quality of parent-child language interactions among 4 mother-child dyad's experiencing multiple social and environmental risk factors, Rafdal (2011) employed a minimum of three LENA data-points to establish baseline. Once several baseline data points were collected and a stable trend was observed, the intervention was then carried out. Additional evidence for utilizing multiple baseline LENA measures was reported in the LENA normative study; study authors found a coefficient for variation of 53% for conversational turns (Gilkerson & Richards, 2008). In other words, on a day-to-day basis, a family can show a significant amount of variability in their conversational turns.

In the discussion of LENA's potential for use in evaluating the effectiveness of parenting programs, Weil and Middleton (2010) recommended collecting three consecutive LENA recordings at baseline as well as three recordings post-intervention to account for the day-to-day variability that may exist in naturalistic language recordings. The current study repeated the mistakes of Weil and Middleton (2010) by employing a single LENA recording prior to and following the CBB intervention. The lack of multiple baseline measures was clearly a limitation in the methodology of the current study as multiple measurements on the same individuals can improve statistical power without increasing the sample size (Shadish, et al., 2002). However, other significant limitations, particularly high attrition, limits the usefulness of the marginally significant results found in the investigation of the fourth research question, which demonstrated that parents who

started the intervention with fewer conversational turns and reported higher levels of perceived social support from friends and family made greater gains in their parent-child language interactions than the rest of the intervention participants.

Implications

The consideration of moderating influences in universal preventative parent intervention for parents of young children in a high-risk community is notably absent in the empirical evidence. In the parenting intervention literature specifically, it has been recommended that moderators be considered to determine the circumstances in which interventions are differentially effective. This pursuit is especially important in determining the overall effectiveness in primary parenting interventions that should provide positive results across participants, and this study begins to address this gap. In this study, the risk factors of increased parenting stress and decreased perceived social support were not found to moderate parenting outcomes for parents regardless of baseline levels of parenting behaviors of interest (e.g. parenting knowledge and parent-child language interactions).

The role of parenting stress as a moderating variable on parenting intervention outcomes is mixed. In this study the moderating role of elevated parenting stress and pre-intervention parenting knowledge and pre-intervention parent-child language interactions adds to the intervention literature through the inclusion of baseline measures of parenting behaviors and the use of LENA technology. However, findings from this study do not support the hypothesis that elevated parenting stress levels moderate parenting behavior outcomes. This can be seen as a positive finding. Even with the limitations of the study, non-significant findings may demonstrate that parents from high-risk communities who

are at increased likelihood to start interventions with fewer resources prior to intervention as well as elevated risk levels may be equally as likely to benefit as parents with more resources and less risk. A universal prevention is designed to reach an entire population, without regard to individual risk factors. Non-significant moderating effects would suggest that the intervention is effective for these specific subpopulations; however, this cannot be concluded from the results from the current study.

Like parenting stress, the limited evidence available on the moderating role of perceived social support on parenting intervention outcomes is mixed. Findings from the current study may suggest that parents who start an intervention with fewer parent-child language interactions and increased levels of perceived social support make greater gains in their parenting skills than other parents in the intervention, however, because of the significant limitations that result from study design and attrition, it would be presumptuous to make this claim. Instead, what this information does provide is a great deal of evidence on future directions for research on the moderating role of perceived social support and pre-intervention parenting behaviors on universal prevention programs for parents of children at-risk for school readiness delays. Suggestions for future research follow, including the future research on the moderating roles of risk on universal primary prevention programs.

Areas of Future Research

To ameliorate the methodological issues of the current study, one clear avenue for improving the design of the study is through the use of an experimental design in which a randomized control trial, a wait-list control trial or in an Intention-to-treat design is utilized. For example, because of the high levels of missing data from participants in the

current study an Intention-to-treat (ITT) design, which includes every subject who is randomized, would allow an analysis of all randomized participants, regardless of their adherence to the study's inclusionary criteria, whether they received the intervention, or if they withdrew from treatment (Fisher, Dixon, Herson, Frankowski, Hearn, & Peace, 1990). ITT design and analysis preserves sample size and allows researchers to avoid making assumptions about differences in the treatment population that might be better explained by participant dropout or noncompliance (Gupta, 2011). In the current study, moderator effects could not be attributed to the intervention, due to the lack of a control group. By employing an experimental design like ITT, significant moderator effects of parental risk factors, or any independent variable for that matter, can be more readily attributed to an intervention (Kraemer et al., 2001) rather than confounding variables including high attrition rates or noncompliance..

As previously discussed, the reduced number of participants who completed all aspects of data collection as well as the significant attrition of participants severely limits the generalizability of any significant findings to the population; this is because the final sample does not reflect the outcomes of the entire population. In light of the significant attrition problems in the current study, it would be advisable that future studies focus on which family or program characteristics predict program engagement to first establish the universality of the program in retaining the most participants and then future steps can be taken to examine moderating influences.

Future studies should also use a larger sample size to explore the role of risk on intervention outcomes. Results of moderator analyses are only generalizable to people who are within the range of scores for predictor variables and outcome scores that are

represented in adequate numbers in the sample. To improve statistical power to detect an interaction effect it is extremely important to have a large sample size. In the absence of a large sample size, Whisman and McClelland (2005) suggest that it may be useful to oversample cases with more extreme values for both of the predictor variables, however, they caution that this strategy may result in an overestimation of effect size for the interaction. Therefore, an overall increase in sample size is likely to be the better option in future studies. An increase in sample size would also increase the generalizability of study findings to a subpopulation within the overall population, rather than restricting the findings to a smaller subpopulation of a subpopulation - which was the case in the current study.

Another future study should explore change in parenting stress as an outcome of the intervention. Because parenting stress has been shown to be such a powerful influence on parenting behaviors and intervention outcomes, parenting stress should be measured prior to the intervention and following the intervention. Parenting stress may have been lowered as a result of the CBB intervention and intervention effects may be more attributable to the mediating role of the reduction of parenting stress rather than the moderating role of any one risk factor. By measuring parenting stress pre and post intervention, it may be possible to determine if the intervention benefits participants as a function of increased or decreased parenting stress, rather than as a moderating influence of increased levels of stress.

A final area for improvement may be through the selection of an alternative measure of perceived social support. In this study, perceived social support was measured through a 12-item Likert-type scale that required parents to rate how well they were

supported by friends, family, and significant others on general behaviors. No information was collected on who referred the parents to the intervention, if they had friends or family in the intervention group they were assigned to, or how supportive friends and family were throughout the intervention. By investigating the process that social support played throughout the intervention, any conclusions on the moderating role of social support could be further clarified. It may be that parents who joined the intervention with a friend or family demonstrated more enhanced outcomes during and after the intervention. By providing more nuanced information on the role that specific types of social support played throughout the intervention process, more information could be gathered to shed light on participation engagement, program retention rates, and outcomes of interest.

Conclusions

The primary objective of this study was to examine if parents with increased levels of risk (e.g. increased parenting stress and lower perceived social support) and less developed parenting behaviors prior to the intervention would show more change in key parenting behaviors (e.g. parent knowledge and parent-child language interactions) over the course of the intervention. While positive changes in parenting outcomes were detected for each of the parenting behaviors examined, these changes could not reliably be attributed to the moderators investigated due to the limitations previously discussed.

A great deal of research has established that, from birth, parenting behaviors significantly contribute to children's school readiness outcomes. School readiness disparities are a significant concern for low-income families and researchers and interventionists have shown that these parenting behaviors associated with positive

school readiness outcomes can be enhanced through parenting interventions. Universal parenting interventions for low-income families are one avenue for improving children's school readiness. The current intervention was designed in reference to the available research and aimed to improve parenting knowledge and parent-child language interactions for all families enrolled. Universal parenting programs for parents with children at-risk for school readiness delays are virtually nonexistent. This investigation is an indicator that universal parenting education programs can be successful in enhancing parenting knowledge and increasing parent-child language interactions, however, future studies are needed to clarify moderating effects of risk and pre-intervention levels of parenting behaviors on universal parenting intervention outcomes. When improvements in methodology in future studies are implemented and moderator analyses are again carried out, only then can we more accurately answer the questions that arise from years of mixed findings on the moderating roles of risk on parent intervention outcomes for high-risk populations.

References

- Abidin, R. R. (1995). *Parenting Stress Index, Third Edition: Professional Manual*. Odessa, FL: Psychological Assessment Resources, Inc.
- Agostin, T.M., & Bain S.K. (1997) Predicting early school success with developmental and social screeners. *Psychology in the Schools, 34*, 219–228.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage.
- Allen, L., Sethi, A., & Astuto, J. (2007). An evaluation of graduates of a toddlerhood home visiting program at kindergarten age. *NHSA Dialog: A Research-to-Practice Journal for the Early Intervention Field, 10*, 36–57.
- Ayoub, C.A., Vallotton, C.D., & Mastergeorge, A.M. (2011). Developmental pathways to integrated social skills: The roles of parenting and early intervention. *Child Development, 82*, 331–345.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Baydar, N., Reid, J. B., & Webster-Stratton, C. (2003). The role of mother mental health factors and program engagement in the effectiveness of a preventive parenting program for Head Start mothers. *Child Development, 74*, 1433–1456.

- Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, 55, 83-96.
- Benasich, A.A., & Brooks-Gunn, J. (1996). Maternal attitudes and knowledge of child-rearing: Associations with family and child outcomes. *Child Development*, 67, 1186-1205.
- Bendersky, M., & Lewis, M. (1994). Environmental risk, biological risk, and developmental outcome. *Developmental Psychology*, 30, 484 – 494.
- Beauchaine, T.P., Webster-Stratton, C., & Reid, M.J. (2005) Mediators, moderators, and predictors of one-year outcomes among children treated for early-onset conduct problems: A latent growth curve analysis. *Journal of Consulting and Clinical Psychology*, 7, 371–388.
- Belle, D. (1982). The stress of caring: Women as providers of social support. In *Handbook of Stress: Theoretical and Clinical Aspects*, Ed. L. Goldberger, S. Breznitz, pp. 496- 505. New York: Free Press
- Bierman, K.L., Nix, R.L., Greenberg, M.T., Blair, C., & Domitrovich, C.E. (2008). Executive Functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI program. *Development and Psychopathology*, 20, 821-843.
- Brody, G.H., & Flor, D.L. (1998). Maternal resources, parenting practices, and child competence in rural, single-parent African American families. *Child Development*, 69, 803-816.

- Brodsky, A.E. (1999). Making it: The components and process of resilience among urban, African American, single mothers. *American Journal of Orthopsychiatry*, 69, 148-160.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32, 515-531.
- Bronfenbrenner, U. (2005). Making human beings human: Bioecological perspectives on human development. Thousand Oaks, CA: Sage.
- Bronfenbrenner, U. & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1: Theoretical models of human* 993-1023). New York: John Wiley and Sons, Inc.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1: Wiley and Sons, Inc.*
- Brooks-Gunn, J., Berlin, L. J., Leventhal, T., & Fuligni, A. S. (2000). Depending on the kindness of strangers: Current national data initiatives and developmental research. *Child Development*, 71, 257–268.
- Brooks-Gunn, J., & Markman, L.B. (2005). The contribution of parenting to ethnic and racial gaps in school readiness. *The Future of Children*, 15, 139-168.
- Brotman, L. M., Klein, R. G., Kamboukos, D., Brown, E. J., Coard, S. I., & Sosinsky, L. S. (2003). Preventive intervention for urban, low-income preschoolers at familial risk for conduct problems: A randomized pilot study. *Journal of Clinical Child and Adolescent Psychology*, 32, 246–257.

- Burchinal, M. R., Peisner-Feinberg, E., Pianta, R., & Howes, C. (2002). Development of academic skills from preschool through second grade: Family and classroom predictors of developmental trajectories. *Journal of School Psychology, 40*, 415-436.
- Burkam, D. T., & Lee, V.E. (2002). *Inequality at the starting gate: social background differences in achievement as children begin school*. Washington, D.C.: Economic Policy Institute.
- Canty-Mitchell, J., & Zimet, G.D. (2000). Psychometric properties of the multidimensional scale of perceived social support in urban adolescents. *American Journal of Community Psychology, 28*, 391-400.
- Carlton, M. P., & Winsler, A. (1999). School readiness: The need for a paradigm shift. *School Psychology Review, 28*, 338–352.
- Ceballo, R., & McLoyd, V. (2002). Social support and parenting in poor, dangerous neighborhoods. *Child Development, 73*, 1310–1321.
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine, 38*, 300-314.
- Cole, R., Kitzman, H., Olds, D., & Sidora, K. (1998). Family context as a moderator of program effects in prenatal and early childhood home visitation. *Journal of Community Psychology, 26*, 37-48.
- Conger, R. D., Ebert-Wallace, L., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. H. (2002). Economic pressure in African American families: A replication and extension of the family stress model. *Developmental Psychology, 38*, 179–193.

- Connell, C. M., & Prinz, R. J. (2002). The impact of child-care and parent-child interactions on school readiness and social skills development for low-income African American children. *Journal of School Psychology, 40*(2), 177–193.
- Conrad, B., Gross, D., Fogg, L., & Ruchala, P. (1992). Maternal confidence, knowledge, and quality of mother-toddler interactions: A preliminary study. *Infant Mental Health Journal, 13*, 353-362.
- Costello, J., Pickens, L. M., & Fenton, J. (2001). *Social Support: A Matter of Connections*. Chicago, IL: Chapin Hall Center for Children at the University of Chicago.
- Crain-Thoreson, C., & Dale, P. S. (1999). Enhancing linguistic performance: Parents and teachers as book reading partners for children with language delays. *Topics in Early Childhood Special Education, 19*, 28–39.
- Damast, A. M., Tamis-LeMonda, C. S., & Bornstein, M. H. (1996). Mother-Child play: Sequential interactions and the relation between maternal beliefs and behaviors. *Child Development, 67*, 1752-1766.
- Deater-Deckard, K. (2004). *Parenting Stress*. New Haven, CT: Yale University Press.
- Denham, S. A., Brown, C., & Domitrovich, C. E. (2011). ‘Plays nice with others’: Social-emotional learning and academic success. *Early Education and Development, 22*, 652-680.
- Desforges, C., & Abouchaar, A. (2003). The impact of parental involvement, parental support, and family education on pupil achievement and adjustment: A literature review. *DfES Research Report, 433*. Retrieved from

http://www.bgfl.org/bgfl/custom/files_uploaded/uploaded_resources/18617/Desforges.pdf

- Dickinson, D.K., McCabe, A., & Essex, M. (2006). A window of opportunity we must open to all: The case for high quality center-based preschool. In D.K. Dickinson & S.B. Neuman (Eds). *Handbook of early literacy research: Vol. II.* (pp. 11-28). New York: Guilford Press.
- Dichtelmiller, M., Meisels, S. J., Plunkett, J. W., Bozynski, M. E. A., Claflin, C., & Mangelsdorf, S. C. (1992). The relationship of parental knowledge to the development of extremely low birth weight infants. *Journal of Early Intervention, 16*, 210-220.
- Dishion, T. J., & Kavanagh, K. (2003). *Intervening in adolescent problem behavior: A family-centered approach.* New York: Guilford Press.
- Dittman, C., Farruggia, S.P., Palmer, M.L., Sanders, M.R., & Keown, L.J. (2014). Predicting success in an online parenting intervention: the role of child, parent, and family factors. *Journal of Family Psychology, 28*, 236-243.
- Dore, M. M., & Lee, J. M. (1999). The role of parent training with abusive and neglectful parents. *Family Relations, 48*, 313–325.
- Dressler, W.W. (1985). Extended family relationships, social support, and mental health in a Southern Black community. *Journal of Health and Social Behavior, 26*, 39–48.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Brooks-Gunn, J., Sexton, H., Duckworth, K. & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology, 43*, 1428-1446.

- Duncan, G.J., & Magnuson, K.A. (2005). Can family socioeconomic resources account for racial and ethnic test score gaps? *The Future of Children, 15*, 35-54.
- 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.M., Xu, Y., Eppe, S., & Lonigan, C.J. (2006). Home environments and young Latino children's school readiness. *Early Childhood Research Quarterly, 21*, 196-212.
- Fisher, L.D., Dixon, D.O., Herson, J., Frankowski, R.K., Hearron, M.S., & Peace KE. Intention to treat in clinical trials (1990). In K.E. Peace (Ed.), *Statistical issues in drug research and development*.(p. 331-350). New York: Marcel Dekker
- Fry, P.S. (1985). Relations between teenagers' age, knowledge, expectations and maternal behaviour. *British Journal of Developmental Psychology, 3*, 47-55.
- Fuller, B. E., Chermack, S. T., Cruise, K. A., Kirsch, E., Fitzgerald, H. E., & Zucker, R. A. (2003). Predictors of aggression across three generations among sons of alcoholics: Relationships involving grandparental and parental alcoholism, child aggression, marital aggression and parenting practices. *Quarterly Journal of Studies on Alcohol, 64*, 472- 483.
- Garbarino J. (1992, November). Helping children cope with the effects of community violence. Paper presented at the annual conference of the National Association for the Education of Young Children, New Orleans, L.A.
- Gardner, F., Connell, A., Trentacosta, C.J., Shaw, D.S., Dishion, T.J., & Wilson, M.N.

- (2009). Moderators of outcome in a brief family-centered intervention for preventing early problem behavior. *Journal of Consulting and Clinical Psychology, 77*, 543–553.
- Gardner, F., Hutchings, J., Bywater, T., & Whitaker, C. (2010). Who benefits and how does it work? Moderators and mediators of outcome in an effectiveness trial of a parenting intervention. *Journal of Clinical Child and Adolescent Psychology, 39*, 568-580.
- Gardner, F., Shaw, D.S., Dishion, T.J., Burton, J., & Supplee, L. (2007). Randomized prevention trial for early conduct problems: Effects on proactive parenting and links to toddler disruptive behavior. *Journal of Family Psychology, 21*, 398-406.
- Gilkerson, J., & Richards, J. A. (2008). The LENA natural language study. (LTR-02-2) Boulder, C.O.: LENA Foundation
- Girolametto, L. (1988). Improving the social-conversational skills of developmentally delayed children: An intervention study. *Journal of Speech and Hearing Disorders, 53*, 156-167.
- Girolametto, L., Pearce, P., & Weitzman, E. (1996). The effects of focused stimulation for promoting vocabulary in children with delays: A pilot study. *Journal of Childhood Communication Development, 17*, 39-49.
- Gross, D., Conrad, B., Fogg, L., Willis L., & Garvey C. (1993). What does the NCATS (Nursing Child Assessment Teaching Scale) measure? *Nursing Research, 42*, 260–265.

Gross, D., Fogg, L., Webster-Stratton, C., Garvey, C., Julion, W., & Grady, J. (2003).

Parent training of toddlers in a day care in low-income urban communities.

Journal of Consulting and Clinical Psychology, 71, 261–278.

Gupta, S.K. (2011). Intention-to-treat concept: A review. *Perspectives in Clinical*

Research, 2, 109-112.

Guralnick, M. J. (1993). Second generation research on the effectiveness of early

intervention. *Early Education and Development, 4*, 366–378.

Halle, T., Forry, N., Hair, E., Perper, K. Wandner, L., Wessel, J., & Vick, J. (2009).

Disparities in early learning and development: Lessons from the Early Childhood

Longitudinal Study – Birth Cohort (ECLS-B). Child Trends. Retrieved from

<http://www.childtrends.org/wp-content/uploads/2013/05/2009->

[52DisparitiesELExecSumm.pdf](#) on November 11, 2014.

Halme, N., Tarkka, M.T., Nummi, T., & Astedt-Kurki, P. (2006). The effect of parenting

stress on father's availability and engagement. *Child Care in Practice, 12*, 13-26.

Hart, B., & Risley, R. (1995). *Meaningful differences in the everyday experience of*

young American children. Baltimore, M.D.: P.H. Brookes.

Hartman, R. R., Stage, S. A., & Webster-Stratton, C. (2003). A growth curve analysis of

parent training outcomes: Examining the influence of child risk factors

(inattention, impulsivity, and hyperactivity problems), parental and family risk

factors. *Journal of Child Psychology and Psychiatry, 44*, 388-398.

Hertzman, C. (2000). The case for an early childhood development strategy. *Canadian*

Journal of Policy Research, 1, 11-18.

- Hess, C.R., Teti, D.M., & Hussey-Gardner, B. (2004). Self-efficacy and parenting of high-risk infants: The moderating role of parent knowledge of infant development. *Journal of Applied Developmental Psychology, 25*, 423-437.
- Hemphill, S.A., & Littlefield, L. (2006). Child and family predictors of therapy outcome for children with behavioral and emotional problems. *Child Psychiatry and Human Development, 36*, 329-349.
- Hill, N.E. (2001). Parenting and academic socialization as they relate to school readiness: The roles of ethnicity and family income. *Journal of Educational Psychology, 93*, 686-697.
- Hinshaw, S.P. (1992). Academic underachievement, attention deficits, and aggression: Comorbidity and implications for intervention. *Journal of Consulting and Clinical Psychology, 60*, 893-903.
- Hinshaw, S. P. (2002). Intervention research, theoretical mechanisms, and causal processes related to externalizing behavior patterns. *Developmental Psychopathology, 14*, 789-818.
- Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74*, 1368-1378.
- Hoff, E., Laursen, T. & Tardif, T. (2002). Socioeconomic status and parenting. In M.H. Bornstein (Ed). In *Handbook of Parenting* (2nd Ed) (pp. 231-252). Mahwah, N.J.: Lawrence Erlbaum Associates

- Irwin, L.G., Siddiqi, A., & Hertzman, C. (2007). Early Child Development: A Powerful Equalizer. Retrieved from http://www.who.int/social_determinants/resources/ecd_kn_report_07_2007.pdf
- Isaacs, J.B. (2012, March). Starting school at a disadvantage. The school readiness of poor children. Retrieved from http://www.brookings.edu/~media/research/files/papers/2012/3/19-school-disadvantage-isaacs/0319_school_disadvantage_isaacs.pdf
- Isaacs, J., & Magnuson, K. (2011, December). Income and Education as Predictor's of Children's School Readiness. Retrieved from http://www.brookings.edu/~media/research/files/reports/2011/12/15-school-readiness-isaacs/1214_school_readiness_isaacs.pdf
- Janus, M., & Daku, E. (2007). The school entry gap: Socioeconomic, family, and health factors associated with children's school readiness to learn. *Early Education and Development, 18*, 375-403.
- Jeon, L., Buettner, C.K., & Hur, E. (2014). Family and neighborhood disadvantage, home environment, and children's school readiness. *Journal of Family Psychology, 28*, 718-727.
- Justice, L. M., & Ezell, H. K. (2002). Use of storybook reading to increase print awareness in at-risk children. *American Journal of Speech-Language Pathology, 11*, 17-29.
- Kazarian, S. S., & McCabe, S. B. (1991). Dimensions of social support in the MSPSS: Factorial structure, reliability, and theoretical implications. *Journal of Community Psychology, 19*, 150-160.

- Kazdin, A. E., & Wassell, G. (1999). Barriers to treatment participation and therapeutic change among children referred for conduct disorder. *Journal of Clinical Child Psychology, 28*, 160-172.
- Kjobli, J., Naerde, A., Bjornebekk, G., & Askeland, E. (2014). Maternal mental distress influences child outcomes in brief parent training. *Child and Adolescent Mental Health, 19*, 171-177.
- Klebanov, P.K., Brooks-Gunn, J., McCarton, C., & McCormick, M.C. (1998). The contribution of neighborhood and family income to developmental test scores over the first three years of life. *Child Development, 69*, 1420-1436.
- Kohen, E. D., Leventhal, T., Dahinten, V. S., & McIntosh, C. N. (2008). Neighborhood disadvantage: Pathways of effects for young children. *Child Development, 79*, 156–169.
- Komro, K.A., Flay, B.R., & Biglan, A. (2011). Creating nurturing environments: A science-based framework for promoting child health and development within high-poverty neighborhoods. *Clinical Child and Family Psychology Review, 14*, 111-134.
- Kotchick, B.A., Dorsey, S., & Heller, L. (2005). Predictors of parenting among African American single mothers: Personal and contextual factors. *Journal of Marriage and Family, 67*, 448–460.
- Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry, 158*, 848-856.
- Ladd, G.W., Kochenderfer, B.J., & Coleman, C. (1997). Classroom peer acceptance,

- friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment. *Child Development*, 68, 1181–1197.
- Laird, J., Lew, S., DeBell, M., & Chapman, C. (2006). Dropout rates in the United States: 2002 and 2003 (NCES 2006-062). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Landry, S.H., Smith, K. E., & Swank, P. R. (2006). Responsive parenting: establishing early foundations for social, communication, and independent problem-solving skills. *Developmental Psychology*, 42, 627–642.
- LaParo, K. M., & Pianta, R. C. (2000). Predicting children's competence in the early school years. A meta-analytic review. *Review of Educational Research* 70, 443–484.
- Lavigne, J.V., LeBailly, S.A., Gouze, Z.R., Cicchetti, C., Pochyly, J., Arend, R., & Binns, H.S. (2008). Treating oppositional defiant disorder in primary care: a comparison of three models. *Journal of Pediatric Psychology*, 33, 449-461.
- Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin*, 126, 309–337.
- Lonigan, C.J., Burgess, S.R., & Anthony, J.A. (2000). Development of emergent literacy and reading skills in preschool children: Evidence from a latent variable longitudinal study. *Developmental Psychology*, 36, 596-613.
- Lundahl, B., Risser, H.J., & Lovejoy, M.C. (2006). A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review*, 26, 86–104.

- Lunkenheimer, E.S., Dishion, T.J., Shaw, D.S., Connell, A., Gardner, F., Wilson, M.N., & Skuban, E.M. (2008). Collateral benefits of the Family Check-Up on early childhood school readiness: Indirect effects of parents' positive behavior support. *Developmental Psychology, 44*, 1737–1752.
- Magnuson, K.A., Ruhm, C., & Waldfogel, J. (2007). Does prekindergarten improve school preparation and performance? *Economics of Education Review, 26*, 33-51.
- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., & Tellegen, A. (2005). Developmental cascades: Linking academic achievement, externalizing and internalizing symptoms over 20 years. *Developmental Psychology, 41*, 733-746.
- McClelland, M.M., Acock, A.C., & Morrison, F.J. (2006). The impact of kindergarten learning-related skills on academic trajectories at the end of elementary school. *Early Childhood Research Quarterly, 21*, 471-490.
- McGee, R., Prior, M., Williams, S., Smart, D., & Sanson, A. (2002). The long-term significance of teacher-rated hyperactivity and reading ability in childhood: findings from two longitudinal studies. *Journal of Child Psychology and Psychiatry, 43*, 1004-1017.
- McGilly, K. (2000) *Chicago Born to Learn Neuroscience Project: Final Report to Robert R. McCormick Tribune Foundation*. St. Louis, M.O. Parents as Teachers National Center. Retrieved from
- McGilloway, S., Ni Mhaille, G., Bywater, T., Furlong, M., Leckey, Y., Kelly, P., ... Donnelly, M. (2012). A parenting intervention for childhood behavioural

- problems: A randomised controlled trial in disadvantaged community-based settings. *Journal of Consulting and Clinical Psychology, 80*, 116-127.
- McGowen, M., Smith, L., Noria, C., Culpepper, C., Langhinrichsen-Rohling, J., Borkowski, J., & Turner, L.A. (2008). Intervening with at-risk mothers: Supporting infant language development. *Child and Adolescent Social Work Journal, 25*, 245-254.
- McGroder, S.M. (2000). Parenting among low-income, African American single mothers with preschool-age children: patterns, predictors, and developmental correlates. *Child Development, 71*, 752-771.
- McLoyd, V.C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61*, 311-346.
- McLoyd, V.C. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53*, 185-204.
- McTaggart, P., & Sanders, M. (2007). Mediators and moderators of change in dysfunctional parenting in a school-based universal application of the Triple-P Positive Parenting Programme. *Journal of Children's Services, 2*, 4 – 17.
- Mistry, R.S., Benner, A.D., Biesanz, J.C., Clark, S.L., & Howes, C. (2010). Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly, 25*, 432-449.
- McLoyd, V.C. (1998). Socioeconomic disadvantage and child development. *American*

Psychologist, 53, 185-204.

Mowder, B.A. (2005). Parent development theory: Understanding parents, parenting perceptions and parenting behaviors. *Journal of Early Childhood and Infant Psychology*, 1, 45-64.

NICHD Early Childhood Network Research Policy (2005). Early child care and children's development in the primary grades: Follow-up results from the NICHD Study of Early Child Care. *American Educational Research Journal*, 42, 537-570.
doi: 10.3102/00028312039001133

Pianta, R.C. (2007). Early education in transition. In R.C. Pianta, M.J. Cox, & K.L. Snow (Eds.), *School readiness and the transition to kindergarten in the era of accountability* (pp. 3–10). Baltimore, MD: Paul. H. Brookes

Pianta, R. C., Smith, N., & Reeve, R. E. (1991). Observing mother and child behavior in a problem-solving situation at school entry: Relations with classroom adjustment. *School Psychology Quarterly*, 6, 1-15.

Pepper, J., Weitzman, E., & McDade, A. (2004). *Making Hanen happen: It Takes Two to Talk - The Hanen Program for Parents. Leader's guide for certified speech-language pathologists*. Toronto: Hanen Centre.

Pederson, D.R., & Moran, G. (1995). A categorical description of infant-mother relationships in the home and its relation to Q-sort measures of infant-mother interaction. *Monographs of the Society for Research in Child Development*, 60, 111–132.

Pinderhughes, E.E., Dodge, K.A., Bates, J.E., Pettit, G.S., & Zelli, A. (2000). Discipline responses: Influences of parents' socioeconomic status, ethnicity, beliefs about

- parenting, stress, and cognitive-emotional processes. *Journal of Family Psychology*, 7, 380–400.
- Planty, M., Hussar, W., Snyder, T., Kena, G., KewalRamani, A., Kemp, J., ... Dinkes, R. (2009). *The Condition of Education 2009* (NCES 2009-081). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- Powell, D.R. (Ed.) (1988). *Parent education as early childhood intervention*. Norwood, NJ: Ablex.
- Rafdal, B. (2011). Effects of graphical feedback and coaching on the quantity and quality of parent-child language interaction. (Unpublished Doctoral Dissertation). University of Minnesota, Twin Cities.
- Reid, M., Webster-Stratton, C., & Baydar, N. (2004). Halting the development of conduct problems in Head Start children: The effects of parent training. *Journal of Clinical Child and Adolescent Psychology*, 33, 279–291.
- Reis, J., Barbara-Stein, L., & Bennett, S. (1986). Determinants of parenting. *Family Relations*, 36, 547-564.
- Reis, J. (1989). A comparison of young, teenage, older teenage, and adult mothers on determinants of parenting. *Journal of Psychology*, 123, 141-151.
- Respler, M., Mowder, B., Yasik, A., & Shamah, R. (2012). Parenting beliefs, parental stress, and social support relationships. *Journal of Child and Family Studies*, 21, 190-198.

- Reyno, S.M., & McGrath, P.J. (2006). Predictors of parent training efficacy for child externalizing behavior problems - A meta-analytic review. *Journal of Child Psychology and Psychiatry, 47*, 99–111.
- Rimm-Kaufman, S.E., Curby, T.W., Grimm, K.J., Nathanson, L., & Brock, L.L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology, 45*, 958-972.
- Ritchie, K. L., & Holden, G. W. (1998). Parenting stress in low income battered and community women: Effects on parenting behavior. *Early Education & Development, 9*(1), 97-112.
- Roberts, G., & Bryant, D. P. (2011). Early mathematics achievement trajectories: English language learner and native English speaker estimates using the early childhood longitudinal survey. *Developmental Psychology, 47*, 916-930.
- Roberts, M.Y., & Kaiser, A.P. (2011). The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology, 20*, 180-199.
- Rowe, M. L. (2008). Child-directed speech: Relation to socioeconomic status, knowledge of child development, and child vocabulary skill. *Journal of Child Language, 35*, 185-205.
- Sabol, T. J., & Pianta, R. C. (2012). Patterns of school readiness forecast achievement and socioemotional development at the end of elementary school. *Child Development, 83*, 282-299.

- Sacks, C., Shay, S., Replinger, L., Leffel, K.R., Sapolich, S.G., Suskind, E., ...
Suskind, D. (2014). Pilot testing of a parent-directed intervention (Project ASPIRE) for underserved children who are deaf or hard of hearing. *Child Language Teaching and Therapy*, 30, 91–102.
- Sameroff, A.J., Seifer, R., Barocas, R., Zax, M. & Greenspan, S. (1987). Intelligence quotient scores of 4-year-old children: Social-environmental risk factors. *Pediatrics*, 79, 343-350.
- Sameroff, A. J. & Seifer, R. (1990). Early contributors to developmental risk. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein, & S. Weintraub (Eds.), *Risk and Protective Factors in the Development of Psychopathology* (pp. 52-66). New York: Cambridge University Press.
- Sanders, M.R. (1999). Triple P-Positive Parenting Program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review*, 2, 71–90.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
- Shadish, W. R., & Heinsman, D. T. (1997). Experiments versus quasi-experiments: Do they yield the same answer? *NIDA Research Monograph*, 170, 147-164.
- Shelleby, E.C., & Shaw, D.S. (2014). Outcomes of parenting interventions for child conduct problems: A review of differential effectiveness. *Child Psychiatry and Human Development*, 45, 628-645.

- Shonkoff, J.P., & Phillips, D.A. (Eds) (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Sigel, I.E., & McGillicuddy-De Lisi, A.V. (2002). Parenting beliefs are cognitions: The Dynamic Belief Systems Model. In M.H. Bornstein (Ed). *Handbook of Parenting*. (Vol. 3). Mahway, New Jersey: Lawrence Erlbaum Associates.
- Simons, R. L., Beaman, J., Conger, R. D., & Chao, W. (1993). Stress, support, and antisocial behavior trait as determinants of emotional well-being and parenting practices among single mothers. *Journal of Marriage and the Family*, 55, 538-398.
- Smith, B., & Fox, L. (2003, January). *Systems of service delivery: A synthesis of evidence relevant to young children at risk of or who have challenging behavior*. Tampa, FL: Center for Evidence-Based Practice: Young Children with Challenging Behavior, University of South Florida. Retrieved from http://challengingbehavior.fmhi.usf.edu/explore/publications_docs/systems_of_service.pdf
- Smith, K.E., Landry, S.H., & Swank, R.R. (2005). The influence of decreased parental resources on the efficacy of a responsive parenting intervention. *Journal of Consulting and Clinical Psychology*, 73, 711-720.
- Snow, K.L. (2006). Measuring school readiness: Conceptual and practical considerations. *Early Education and Development*, 17(1), 7-41.
- Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

- Spoth, R., Redmond, C., & Shin, C. (1998). Direct and indirect latent-variable parenting outcomes of two universal family-focused preventive interventions: extending a public health-oriented research base. *Journal of Consulting and Clinical Psychology, 66*, 385-399.
- Stevens, J. H. (1984). Child development knowledge and parenting skills. *Family Relations, 33*, 237-244.
- Stoiber, K.C., & Houghton, T.G. (1993). The relationship of adolescent mothers' expectations, knowledge and beliefs to their young children's coping behavior. *Infant Mental Health Journal, 14*, 61-79.
- Stolk, M.N., Mesman, J., van Zeijl, J., Alink, L.R.A., Bakermans-Kranenburg, M.J., van Ijzendoorn, M.H., Juffer, F. & Koot, H.M. (2007). Early parenting intervention: Family risk and first parenting related to intervention effectiveness. *Journal of Child and Family Studies, 17*, 55-83.
- Suskind, D., Leffel, K. R., Hernandez, M. W., Sapolich, S. G., Suskind, E., Kirkham, E., & Meehan, P. (2013). An exploratory study of "Quantitative Linguistic Feedback": Effect of LENA feedback on adult language production. *Communication Disorders Quarterly, 20*, 1-11.
- Tabors, P. O., Roach, K. A., Snow, C.E. (2001) Home language and literacy environment final results. In Dickinson, D. K., Tabors, P. O. (Eds.), *Beginning Literacy with Language*. (pp.111-138). Baltimore: Paul H. Brookes Publishing Co.
- Tannock, R., Girolametto, L., & Siegel, L. (1992). Language intervention with children who have developmental delays: Effects of an interactive approach. *American Journal of Mental Retardation, 97*, 145-160.

- Taylor, T. K., & Biglan, A. (1998). Behavioral family interventions for improving child-rearing: A review for clinicians and policy makers. *Clinical Child and Family Psychological Review*, 1(1), 41–60.
- Teti, D.M., Black, M.M., Viscardi, R., Glass, P., O’Connell, M.A., Baker, L., Cusson, L., & Reiner Hess, C. (2009). Intervention with African American premature infants: Four-month results of an early intervention program. *Journal of Early Intervention*, 31, 146-166.
- Umek, L., Kranjc, F., Fekonja, M., & Bajc, K. (2008). The effect of children’s gender and parental education on toddler language development. *European Early Childhood Education Research Journal*, 16, 325-342.
- Vallotton, C.D., Harewood, T., Ayoub, C.A., Pan, B., Mastergeorge, A.M., & Brophy-Herb, H., (2012). Buffering boys and boosting girls: The protective and promotive effects of Early Head Start for children’s expressive language in the context of parenting stress. *Early Childhood Research Quarterly*, 27, 696-707.
- Van Zeijl, J., Mesman, J., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Juffer, F., Stolk, M. N., Koot, H.M. & Alink, L.R. (2006). Attachment-based intervention for enhancing sensitive discipline in mothers of 1- to 3-year-old children at risk for externalizing behavior problems: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 74, 994– 2005.
- Waldfoegel, J. & Washbrook, E. (2011). Early years policy. *Child Development Research*, 1-12. DOI: 10.1155/2011/343016

Webster-Stratton, C. (1985). Comparisons of behavior transactions between conduct-disordered children and their mothers in the clinic and at home. *Journal of Abnormal Child Psychology, 13*, 169-184.

Webster-Stratton, C. (1990). Long-term follow-up of families with young conduct problem children: From preschool to grade school. *Journal of Clinical and Child Psychology, 19*, 144–149.

Webster-Stratton, C. (1992). Individually administered videotape parent training: “who benefits?”. *Cognitive Therapy and Research, 16*(1), 31-52.

Webster-Stratton, C. (2001). The incredible years: Parents, teachers, and children training series. *Residential Treatment for Children & Youth, 18*(3), 31-45.

Webster-Stratton, C., & Hammond, M. (1990). Predictors of treatment outcome in parent training for families with conduct problem children. *Behavior Therapy, 21*, 319–337.

Webster-Stratton, C., & Hammond, M. (1999). Marital conflict management skills, parenting style and early-onset conduct problems: Processes and pathways. *Journal of Child Psychology and Psychiatry, 40*, 917–927.

Webster-Stratton, C., Reid, M.J., & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychology, 33*, 105–124.

Webster-Stratton, C., Reid, M. J., & Stoolmiller, M. (2008). Preventing conduct problems and improving school readiness: Evaluation of the incredible years teacher and

- child training programs in high-risk schools. *Journal of Child Psychology and Psychiatry*, 49(5), 471-488.
- Weil, L. W., & Middleton, L. (2010). Use of the LENA tool to evaluate the effectiveness of a parent intervention program. *Perspectives on Language Learning and Education*, 17, 108-111.
- Weizman, Z.O., & Snow, C.E. (2001). Lexical input as related to children's vocabulary acquisition: Effects of sophisticated exposure and support for meaning. *Developmental Psychology*, 37, 265-279.
- Welsh, J.A., Nix, R.L., Blair, C., Bierman, K.L., & Nelson, K.E. (2010). The Development of cognitive skills and gains in academic school readiness for children from low-income families. *Journal of Educational Psychology*, 102, 45-53.
- Werba, B., Eyberg, S.M., Boggs, S.R., & Algina, J. (2006). Predicting outcome in parent-child interaction therapy: Success and attrition. *Behavior Modification*, 30, 618-646.
- Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of Family Psychology*, 19, 111-120.
- Whitbeck, L. (1999). Primary socialization theory: It all begins with the family. *Substance Use & Misuse*, 4, 1025-1032.
- Whitehurst, G. J., Arnold, D. S., Epstein, J. N., Angell, A. L., Smith, M., & Fischel, J. (1994). A picture book reading intervention in day care and home for children

from low-income families. *Developmental Psychology*, 30, 679-689.

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy.

Child Development, 69(3), 848-872.

Wright, M.O., & Masten, A.S. (2005). Resilience processes in development: Fostering

positive adaptation in the context of adversity. In S. Goldstein & R.B. Brooks

(Eds.) *Handbook of resilience in children* (pp. 17-37). New York: Springer.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The

Multidimensional Scale of Perceived Social Support. *Journal of Personality*

Assessment, 52, 30-41.

Zimmerman, F. J., Gilkerson, J., Richards, J. A., Christakis, D. A., Xu, D., Gray, S., &

Yapanel, U. (2009). Teaching by listening: the importance of adult-child

conversations to language development. *Pediatrics*, 124, 342-349.

Appendix A

College Bound Babies Intake Form

Dear Parent: These questions will help us learn about the children in the classroom and the concerns of parents. All of this information will be kept confidential. Thanks very much for your time and your help.

Part A

If you have more than one child between the ages of 0 – 3 in this study please fill out a separate survey for each child.

1. Your child's birth date: ___ / ___ / ___
2. Your child's gender: Boy Girl
3. How would you describe **your child's** ethnicity? *Please check all that apply:*

<input type="checkbox"/> Black / African-American	<input type="checkbox"/> Hispanic / Latino
<input type="checkbox"/> Asian / Asian-American	<input type="checkbox"/> Native American
<input type="checkbox"/> White / Caucasian	<input type="checkbox"/> Other – <i>Please describe:</i> _____
4. How would you describe **your** ethnicity? *Please check all that apply:*

<input type="checkbox"/> Black / African-American	<input type="checkbox"/> Hispanic / Latino
<input type="checkbox"/> Asian / Asian-American	<input type="checkbox"/> Native American
<input type="checkbox"/> White / Caucasian	<input type="checkbox"/> Other – <i>Please describe:</i> _____
5. Please indicate your relationship to the child:

<input type="checkbox"/> Mother/father	<input type="checkbox"/> Foster parent
<input type="checkbox"/> Grandparent	<input type="checkbox"/> Other – <i>Please describe:</i> _____
<input type="checkbox"/> Other relative –	

Please describe: _____
6. *During the past week*, how many times have you (or someone in your family) read to your child?

<input type="checkbox"/> Not at all	<input type="checkbox"/> Once or twice	<input type="checkbox"/> 3 or more times	<input type="checkbox"/> Every day
-------------------------------------	--	--	------------------------------------
7. Does your child have any children's books at home? Yes No
8. *During the past week*, how often have you (or someone in your family) done any of the following things with your child?

Please check one column for every question:

	None	1 or 2 Times	3 or More Times
7a. Told your child a story			
7b. Taught or practiced letters, words, or numbers with your child.			
7c. Taught your child songs or music, or sang songs with your child			

1. What languages do **you** use when you talk to your child? *(Check all that apply)*
 English Spanish Other language – please specify _____
2. What languages do **other people at home** use with your child? *(Check all that apply)*
 English Spanish Other language – please specify _____
3. What languages does **your child** use when talking at home? *(Check all that apply)*
 English Spanish Other language – please specify _____
4. What language do you think your child is most comfortable with now? *(Check one)*
 English Spanish Other language – please specify _____
5. Have you ever had a concern about delays or differences in your child's development?
 Yes No
6. Has a care provider or teacher stated concerns about delays or differences in your child's development?
 Yes No
7. Has your child been identified as having developmental delays or special needs?
 Yes No

Part B

If you have already answered these questions for another child in this study, you may skip this part.

8. What is the highest level of education that you have completed? *(Check one)*

<input type="checkbox"/> Grade less than high school	<input type="checkbox"/> Some education after high school
<input type="checkbox"/> Some high school	<input type="checkbox"/> Associate degree (AA)
<input type="checkbox"/> GED	<input type="checkbox"/> College degree (BA/BS)
<input type="checkbox"/> High school diploma	<input type="checkbox"/> Graduate degree
9. Please describe your marital status:
 - Single
 - Cohabiting (living with) with partner
 - Engaged or with partner
 - Married
10. How many times has your family moved during the past year? _____
11. Please indicate the number of people who live in your home:
 - Number of children (under the age of 18) _____
 - Number of adults (18 or older) _____
12. Please check the amount that best describes your family's current monthly income. This would include salaries of any people in your household who work.

<input type="checkbox"/> Less than \$850	<input type="checkbox"/> \$1600 – \$1849	<input type="checkbox"/> \$2600 – \$2849
<input type="checkbox"/> \$850 – \$1099	<input type="checkbox"/> \$1850 – \$2099	<input type="checkbox"/> \$2850 – \$3099
<input type="checkbox"/> \$1100 – \$1349	<input type="checkbox"/> \$2100 – \$2349	<input type="checkbox"/> \$3100 – \$3349
<input type="checkbox"/> \$1350 – \$1599	<input type="checkbox"/> \$2350 – \$2599	<input type="checkbox"/> \$3350 or more

Appendix B

Name: _____ Date: _____ Child's Age: Years ___ Months ___

PARENTING KNOWLEDGE AND PRACTICES QUESTIONNAIRE

***If you have more than one child under age 4, please complete this Questionnaire while keeping in mind which of your children has or will wear the LENA.**

These Questions are about *PLAYING WITH YOUR CHILD*

1. What can a parent do to help improve or expand their child's vocabulary?
2. What is "Child-Directed" play?
3. What is Descriptive Commenting?
4. Why is it important to be at your child's level when playing with them (i.e.: if child is playing on the floor, get down and play with him/her)?
5. How does imaginary play (pretending) help children's development?

Name: _____ Date: _____ Child's Age: Years ___ Months ___

These Questions are about *READING WITH YOUR CHILD*

6. Why are open-ended questions (i.e. questions that start with who, what why, where or how) more effective than yes/no questions in helping build vocabulary and knowledge?
7. What are four strategies (CARE) you can use to promote vocabulary and knowledge when reading books with your children?
8. When reading with your child, why is it important to talk about how the pictures and stories relate to your life?

Answer the following questions based on your experiences <i>READING</i> with your child over the <i>LAST TWO WEEKS</i>.	Rarely	Some of the Time	Frequently	Almost Always
9. I showed my child the cover of the book before reading it.				
10. I pointed to and described the pictures in more detail.				
11. I asked my child questions about what we were reading.				
12. When my child babbled or commented on the book, I repeated and expanded on it.				

Name: _____

Date: _____

Child's Age: Years ___ Months ___

These Questions are about *TALKING WITH YOUR CHILD*

13. Why is it important to talk to a child even when he/she is too young to speak?

14. How does the amount of time you spend talking to your child *now* impact their *later* academic success?

15. The *BEST* way to help my child increase the number of words she or he knows is to (select one)

- a. Let them watch a lot of children's programs
- b. Put them in preschool
- c. Talk with them
- d. None of the above

Answer the following questions based on your experiences <i>TALKING</i> with your child over the <i>LAST TWO WEEKS</i> .	Rarely	Some of the Time	Frequently	Almost Always	N/A
16. I pointed out objects and named them for my child.					
17. When my child looked at an object, I used words to describe its features.					
18. I made an effort to introduce new words for my child.					
19. I talked to my child about how I was feeling.					
20. I labeled other peoples' emotions for my child (e.g. She's happy).					
21. I said out loud what I was doing as I was doing it.					

Name: _____ Date: _____ Child's Age: Years ___ Months ___

These Questions are about *DISCIPLINING AND PRAISING YOUR CHILD*

22. Why is praising good behavior an effective discipline strategy?

23. To be most effective, when should praise be delivered to the child?

24. Why is it important to give specific praise to your child?

25. What is the purpose of a time out?

26. Describe the difference between a bribe and a reward.

27. What is a natural consequence?

28. What does discipline mean?

Answer the following questions based on your experiences <i>DISCIPLINING</i> your child over the <i>LAST TWO WEEKS</i>.	Rarely	Some of the Time	Frequently	Almost Always	N/A
29. I described clear consequences for my child's behavior.					
30. When my child misbehaved, I said what he/she did wrong & what he/she could do better next time.					
31. When my child did something I liked, I gave him/her specific praise.					
32. When my child did something I liked, I gave him/her a reinforcement (e.g. smile, hug, sticker).					

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
 Circle the "2" if you **Strongly Disagree**
 Circle the "3" if you **Mildly Disagree**
 Circle the "4" if you are **Neutral**
 Circle the "5" if you **Mildly Agree**
 Circle the "6" if you **Strongly Agree**
 Circle the "7" if you **Very Strongly Agree**

1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7	SO
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	SO
3.	My family really tries to help me.	1	2	3	4	5	6	7	Fam
4.	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7	Fam
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7	SO
6.	My friends really try to help me.	1	2	3	4	5	6	7	Fri
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7	Fri
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7	Fam
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	Fri
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7	SO
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7	Fam
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7	Fri

The items tended to divide into factor groups relating to the source of the social support, namely family (Fam), friends (Fri) or significant other (SO).