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Level of Maternal Depressive Symptoms and Children's Expressive Language:

Examining Mediation by Parenting Interactions

by

Amanda L. Gernhart

Presented to the Graduate and Research Committee
of Lehigh University
in Candidacy for the Degree of
Doctor of Philosophy

in

School Psychology

Lehigh University

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Certificate of Approval

Approved and recommended for acceptance as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

Expressive language acquisition and growth in the first three years of life is predictive of school-age literacy and academic achievement (Dickinson, Golinkoff, & Hirsh-Pasek, 2010; National Early Literacy Panel, 2008). Young children experiencing economic hardship are at greater risk for expressive language delays than their economically advantaged peers (Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010). Parental engagement in developmentally supportive parent-child interactions can overcome the negative impact of poverty on language development (Roggman et al, 2013). However, a significant challenge to fostering healthy parent-child interactions is the threat of depressive symptoms. Depression is prevalent among economically disadvantaged mothers of young children and compromises engagement in parenting practices that support language development (Hwa-Froelich, Cook, & Flick, 2008). Despite the association among maternal depression, parenting practices, and children's expressive language outcomes, limited research investigating the mediating role of parenting interactions lacks psychometric quality and construct validity. Thus, the current investigation evaluated the association between maternal depressive symptoms and children's expressive language in a racially and ethnically diverse sample of mothers and their young children. Additionally, five simple mediation analyses using ordinary least squares regression in PROCESS (Hayes, 2013) assessed the roles of affectionate, responsive, encouraging, teaching, and overall parenting practices through the use of a standardized, psychometrically validated observational tool of parenting practices. Analyses revealed no significant relationship between maternal depression and children's expressive language. All five mediation analyses found non-significant indirect effects.

Teaching behaviors had a positive association with children's expressive language scores, however this relationship lost statistical significance after controlling for children's age and Early Head Start enrollment duration. Explanation of results and future research directions are discussed.

Chapter I: Introduction

Nearly 2.8 million children under the age of 3 live in poor families in the United States (Jiang, Ekono, & Skinner, 2014). Families need approximately two times the federal poverty line just to meet their most basic needs (Engelhardt & Skinner, 2013; Fass, 2009). As a result, a staggering 48% of children under the age of 3 are born and raised in low-income families. Racial and ethnic minorities are disproportionately represented among young children living in poverty and low-income families, with 66% of all Hispanic infants (i.e., 1.9 million) and 71% of black infants (i.e., 1.1 million) living in low-income families (Jiang et al., 2014). The magnitude of this problem is put into context when making comparisons between child poverty rates within the United States and other economically advantaged nations. When ranking 35 economically advantaged countries from the lowest to the highest percentage of children living in poverty, the United States ranks a disappointing 34th, suggesting this country has one of the highest rates of child poverty (UNICEF Innocenti Research Centre, 2012). Taken together, the population of children ages 3 and younger living in poverty within the United States is considerably large within the global context.

The rise in poverty among children, especially those from racial and ethnic minority families, is a growing concern because of the numerous negative outcomes associated with poverty. The neurological foundations of developmental competencies essential to future school success such as motor skills, language, self-confidence, play, and problem-solving (Masten & Coatsworth, 1998) are formed in the early years of life with decreased likelihood of developing these competencies as children age (Shonkoff & Phillips, 2000). When comparing competencies of children living in poverty to those

from higher income families, results show that children experiencing poverty are at greater risk for physical, developmental, and cognitive delays, academic underachievement, poorer social-emotional functioning, and negative behavioral outcomes (Evans, 2004; Gershoff, 2003; McLoyd, 1998). Thus, when poverty is extreme, experienced early in childhood, and lasts for several years, it has the most significant impact on children's outcomes in these critical developmental domains (Brooks-Gunn & Duncan, 1997). Children living in poverty are also at greater risk for negative outcomes in adulthood, such as greater risk for developing adult psychopathology and experiencing poorer attainment-related outcomes such as adult earnings and work hours (Duncan, Ziol-Guest, & Kalil, 2010; Gilman, Kawachi, Fitzmaurice, & Buka, 2003).

A critical developmental domain impacted by poverty is language acquisition. When compared with children living in higher socioeconomic status families, children living in poverty are more likely to experience delayed onset and rate of language acquisition as well as a reduced complexity and size of vocabulary (Hart & Risley, 1995; Hoff, 2006; Hoff-Ginsberg, 1998; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010). This relationship is disconcerting because the continued growth of expressive language throughout childhood is predictive of future oral reading skills and early academic achievement (Hohm, Jennen-Steinmetz, Schmidt, & Laucht, 2007; Wise, Sevcik, Morris, Lovett, & Wolf, 2007). Not only is early vocabulary development a key prerequisite of literacy skills and competencies at school entry, elementary, and middle school (Bracken, 2005; Dickinson & McCabe, 2001; Rowe, Raudenbush, & Goldin-Meadow, 2012), but oral language skills including expressive and receptive processing

and communication at the age of 3 years plays both a direct and an indirect role in word recognition during the transition to school. Further, expressive and receptive language abilities serve as better predictors of early reading skills than does vocabulary alone (NICHD, 2005).

Early exposure to poverty can drastically disrupt expressive language development, because expressive language grows substantially during the first few years of life. The exponential rate of growth is astounding from the first word spoken around the first birthday to an average of over 550 words produced by 30 months of age (Fenson et al., 1994). By 18 months of age, typically developing children are expanding their communication skills by producing several new words each day (Rescorla, Mirak, & Singh, 2000). When expressive language develops late and grows slowly, performance on vocabulary, grammar, and verbal memory assessments are significantly compromised throughout elementary and secondary school (Rescorla & Achenbach, 2002; Rescorla, 2009). Therefore, young children exposed to poverty are more likely to struggle academically through the indirect influence of expressive language delay on future language and literacy skills.

Supporting language development is extremely important for the future of young children living in poverty. Developmentally supportive parenting practices are those specific, measureable parenting behaviors that have been demonstrated in the research to support child development. The two categories of developmentally supportive parenting associated with a wide range of child outcomes are social-affective and stimulation-communication behaviors (Shonkoff & Phillips, 2000). More specifically, affectionate and responsive behaviors constitute the social-affective parenting practices and

encouraging and teaching behaviors comprise the stimulation-communication parenting practices that are critical to English and Spanish language development (Roggman, Boyce, & Innocenti, 2008; Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson 2009; Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Affectionate parenting includes physical and verbal expressions of warmth toward a child. Emotional expression, evaluation, and regard for the child are considered positive by observing smiling, physical closeness, joint engagement, and an enthusiastic and tender tone of voice. Behaviors are considered responsive when parents sensitively reaction to children's cues, emotions, needs, and interests. Responsive parents actively attend, adapt, and reply to child led activities and language. Encouragement is a classification of supportive parenting behaviors that encourage and support child exploration, effort, autonomy, creativity, and play. Specifically, encouraging parents wait for a child to respond while verbally and physically assisting and encouraging child exploration and play. Teaching behaviors and interactions include shared conversation and play, cognitive stimulation, explanations and questions. Dialogue that labels, explains, expands, and elicits conversation teaches children about the world around them.

Taken together, engagement in affectionate, responsive, encouraging, and teaching behaviors by low-income, racially and ethnically diverse parents during a child's first three years of life predict language and literacy outcomes at the ages of 3 and 5 years (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Among the social-affective developmentally supportive parenting behaviors, affectionate parenting such as positive regard, emotion, and warmth exhibited during the first three years of life correlate with advanced vocabulary and pre-literacy skills by preschool for children participating in

Early Head Start (Dodici, Draper, & Peterson, 2003; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). When mothers produce affectionate speech at a slower rate, with greater pitch variation, higher fundamental frequency, more pauses, and repetition, young children also learn more novel words (Kitamura & Lam, 2009; Ma, Golinkoff, Houston, Hirsh-Pasek, 2011). Responsiveness and sensitivity to children's cues, needs, and interests also predict greater receptive and expressive language and academic skills in young children (Hirsh-Pasek & Birchinal, 2006). Specifically, jointly attending and pointing to the focus of children's attention accelerates vocabulary growth through the first 2 years of life (Brooks & Melzoff, 2008; Carpenter, Nagell, Tomasello, Buttersworth, & Moore, 1998; Morales et al., 2000). Infants also produce more complex and mature vocalizations when parental social interactions are contingently responsive to infant vocalizations (Goldstein, King, & West, 2003; Goldstein & Schwade, 2008).

Among the stimulation-communication parenting behaviors supporting child development, encouragement of child exploration as well as engagement and communication during cognitively stimulating activities facilitate language development in low-income, racially and ethnically diverse children. Parents considered most supportive of their child's development scored two-thirds of a standard deviation higher on parental encouragement of exploration during play than parents considered unsupportive (Cook, Roggman, & D'zatko, 2012). When parents of Early Head Start children sensitively and positively support engagement in cognitively stimulating activities during play at 14 and 36 months, children demonstrate greater vocabulary growth and letter word identification at pre-kindergarten entry (Chazen-Cohen et al., 2009; Fuligni et al., 2009). Children's language abilities at 24 months are also predicted

by caregiver's engagement in stimulation activities, such as books, symbolic toys, and manipulatives, when children are 6 months of age (Cates et al., 2012; Raikes et al., 2006). It is important to note that language-based teaching behaviors experienced during infancy and early childhood are also crucial for language development (Hoff, 2003; Rodriguez et al., 2009). However, hearing a large number of words is not sufficient for a young child to develop language competence (Hirsh-Pasek & Golinkoff, 2012; Hurtado, Marchman, & Fernald, 2008). The extent to which maternal speech is varied, complex, and frequent predicts the extent to which children's vocabulary is varied, complex and spoken (Hart & Risley, 1998). These associations are particularly salient for Spanish and English speaking children 1 to 3 years of age living in low-income families (Hurtado et al., 2008; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Pan, Rowe, Singer, & Snow, 2005). Parental communication that includes reciprocal, conversational turn taking results in the greatest gains in language abilities when children are 4-years-old (Zimmerman et al., 2009). Communication during the cognitively stimulating activity of storybook sharing also improves expressive and receptive language development in this at-risk population of young children (Farver, Xu, Lonigan, & Eppe, 2013; Hargrave & Sénéchal, 2000; Sénéchal, Pagan, Lever, & Ouellette, 2008; Zajicek-Farber, 2010).

Maternal depression is one of the most threatening obstacles to facilitating healthy mother-child interaction, because the symptoms of the disorder make it challenging for mothers to engage in developmentally supportive parenting behaviors. According to the *Diagnostic and Statistical Manual of Mental Disorders- Fifth Edition* (*DSM-V*; American Psychiatric Association, 2013), depressive disorders include the presence of sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly

impact an individual's capacity to function. Among low-income families, 40% of mothers with young children experience depressive symptoms (Goodman & Brand, 2009; Knitzer, 2007). For example, within the Early Head Start population, 52% of low-income mothers reported enough symptoms to constitute depression (Early Head Start Research and Evaluation Project, 2003), with approximately 60% of mother's served by home-visiting programs in the United States reporting elevated levels of depression during service delivery (Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010). Compared to middle income mothers, low-income mothers with young children are four times as likely to report depressive symptoms (Canuso, 2007; National Center for Health Statistics, 2011).

Research findings paint a complex picture of the relationship between maternal depression and children's expressive language abilities. Although a large body of research supports a negative relationship between maternal depression and expressive language abilities of children 3 years of age and younger (Kaplan et al. 2014; Pan, Rowe, Singer, & Snow, 2005; Quevedo et al., 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber, 2010) a smaller sample of research findings report no such relationship (Piteo, Yelland, & Makrides, 2012; Porritt, Zinser, Bachorowski, & Kaplan, 2014). Comparing the findings of these research investigations suggest an inconsistent relationship between maternal depression and expressive language. For example, the presence of maternal depression at 3, 10, and 18 months has been shown to negatively correlate with children's expressive language at 18 and 36 months (Zajicek-Farber, 2010; Stein et al, 2008). Longitudinal research also supports the negative impact of maternal depressive symptoms on the trajectory of expressive

language growth over the second year of life (Pan, Rowe, Singer, & Snow, 2005). However, Porritt and colleagues (2014) do not detect a statistically meaningful association between maternal depression and children's expressive language at 14 months. Additionally, Piteo et al. (2012) did not find meaningful differences in expressive language between 18-month-old children of mothers with and without depression. These divergent findings warrant the question of whether patterns exist within the participants and methodology of these investigations that could account for such differences.

A closer investigation of the literature reveals that unique aspects of maternal depression, expressive language, and sample demographics may play a role in this disparity within the research. The majority of investigations find negative relationships between children's expressive language and maternal depression when language assessments take place from the latter part of the second year through the third year of life (Horowitz et al., 2003; NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber, 2010). In addition, a negative relationship is more often found between expressive language and maternal depression when depressive symptoms are more severe and extend for longer periods of time (NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005). For instance, research conducted by NICHD Early Child Care Research Network (1999) revealed that children whose mothers reported chronic depression over a 3-year period had significantly lower expressive language scores than children of mothers we were never or sometimes depressed. When considering expressive language growth, the greatest disparity was observed at the end of the second year of life when children of mothers

without depression produced five times as many distinct words as their peers with mothers with depression (Pan et al., 2005). Because expressive language does not accelerate in growth until approximately 18 months of age (Rescorla, Mirak, & Singh., 2000), it is logical that the impact of maternal depression on children's expressive language would not be fully realized until there is a large enough language base to detect significant variations.

Participant variability in socioeconomic status may also account for mixed findings between studies. All four studies finding a nonsignificant relationship between maternal depression and children's expressive language outcomes failed to recruit families experiencing poverty, suggesting a moderating role of socio-economic status (Cornish, et al., 2005; Paulson, Keefe, & Leiferman, 2009; Piteo, Yelland, & Makrides, 2012; Porritt, Zinser, Bachorowski, & Kaplan, 2014). Concurrently experiencing economic hardship with depressive symptoms exposes mothers and children to the combined impact of multiple risk factors threatening language development. In summation, young children experiencing high levels of maternal depression and economic hardship in the latter portion of the second year and third year of life are at greatest risk for expressive language delays.

In contrast to the conditional research findings relating maternal depression to children's expressive language outcomes, depressive symptoms are negatively associated with developmentally supportive parenting practices in a more consistent, predictable manner. Within the social-affective domain of developmentally supportive parenting behaviors, mothers with depression engage in less affectionate, sensitive, and responsive interactions with their young children. The affectionate quality of maternal speech and

behavior is impaired in mothers with depression with decreased vocalizations; restricted pitch ranges; greater negative, coercive behaviors and less pleasant, enthusiastic behaviors (Breznitz & Sherman, 1987; Kaplan, Bachorowski, Smoski, & Zinser, 2001; Lovejoy et al, 2000; Porritt, Zinser, Bachoraowski, & Kaplan, 2014). Mothers with depressive symptoms are less responsive to their children's needs and are more irritable, anxious, and uncomfortable in their relationship with their child (Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009; NICHD, 1999). Contingent social interactions, such as smiling, joint attention, and engagement, are also less likely to occur when mothers experience depression (Feldman, 2007; Field, et al., 2005; Jameson, Gelfand, Kulcsar, & Teti, 1997). Developmentally supportive stimulation-communication parenting behaviors are compromised when depressive symptoms affect the mother-child dyad. Autonomy and exploration during play interactions are restricted for infants and toddlers due to intrusive, controlling parenting behaviors from mothers with depression (Kelley & Jennings, 2003; McFadden & Tamis-LaMonda, 2013). Mothers experiencing severe and chronic depression while also experiencing a low income-to-needs ratio engage in less sensitive, highly intrusive and withdrawn parenting practices (NICHD, 1999; Wang & Dix, 2013). In fact, mothers affected by depressive symptoms endorse the developmental importance of play significantly less frequently than healthy mothers (LaForett & Mendez, 2014). Compared to mothers without depression, mothers with depression engage their young children in less cognitively stimulating activities, including weekly book reading, singing songs, telling stories, and literacy oriented activities (Paulson, Dauber, & Leiferman, 2006; Paulson, Keefe,& Leiferman, 2009; Zajicek-Farber, 2010). When depressive symptoms are present, children also hear fewer, less varied words from

their mothers (Breznitz & Sherman, 1987; Lovejoy et al, 2000; Rowe, Pan, & Ayoub, 2005).

Given disproportionately high rates of maternal depression among vulnerable infants and toddlers, research that illuminates pathways between depression, parenting behaviors, and children's expressive language can advance early intervention efforts. Research supports the differential impact of depression on low-income mothers through restricted engagement in developmentally supportive parenting behaviors that facilitate language development (Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013). Unfortunately, research that explicitly tests the mediating role of parenting behaviors on the relationship between maternal depression and children's expressive language outcomes are limited to only six studies (Haabrekke et al., 2014; NICHD, 1999; Paulson, Keefe, & Leiferman, 2009; Piteo, Yelland, & Makrides, 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Zajicek-Farber, 2010). Taken together, these studies are strong in their large sample sizes and primary use of recommended analytical procedures for testing mediation (i.e., Structural Equation Modeling and test of indirect effects utilizing bootstrapping procedures). All studies utilized either the *Edinburgh Postnatal Depression Scale* or the *Center for Epidemiologic Studies-Depression Scales* that are both psychometrically valid assessment tools for depressive symptoms in community-based samples. All investigations assessed language with standardized language assessments with the majority being direct assessments of language.

Despite these strengths, significant weaknesses exist within this small literature base that severely limit the understanding of the mediating effect of parenting behaviors on the relationship between maternal depressive symptoms and children's expressive

language outcomes. The overarching limitation is the questionable construct validity of the parenting behavior latent variables. Specifically, changes in instrumentation, inconsistencies between latent variables, and inaccurate variable labels within and between studies significantly impair the construct validity of parenting behaviors. A total of seven latent variables representing parenting behaviors are generated within this body of research: (a) maternal responsiveness; (b) opportunity to learn; (c) stimulation and home environment; (d) participation in literacy oriented stimulation activities; (e) maternal sensitivity; (f) parent-to-child reading; and (g) maternal intrusiveness. Although some constructs appear similar by label (i.e., maternal responsiveness and maternal sensitivity; opportunity to learn and stimulation and home environment), the measureable variables representing each construct are very different even within the same investigation. For example, when infants were 10 months of age, Stein and colleagues (2008) measured maternal responsiveness through a unique combination of assessment tools that represented maternal warmth, enthusiasm, detachment, and emotional and verbal responsiveness. At 36 months, maternal responsiveness represented a litany of parenting behaviors assessed with different measurement tools to evaluate pride, warmth, affection, sensitivity to distress, stimulation of cognitive development, and intrusiveness. Similarly, the NICHD Early Child Care Research Network (1999) defined maternal sensitivity as sensitivity to nondistress, positive regard, and limited intrusiveness at the 6-, 15-, and 24-month assessments. When children were 36 months of age, maternal sensitivity was measured by supportive presence, respect for autonomy, and limited hostility. The changes in assessment tools and behavioral definitions impact the stability of the parenting behavior constructs, making it impossible to compare results of the

construct within or between studies. Also, the actual behaviors being assessed are so diverse that they do not represent a single construct of sensitivity or responsiveness. Instead, they span many dimensions of parenting behaviors including affection, encouragement, responsiveness, and teaching. The mislabeling of latent variables makes findings related to specific parenting constructs ambiguous.

Additionally, weaknesses in the psychometric quality of assessment tools and the lack of racial and ethnic diversity within participant samples also limit the validity and generalizability of research findings. No two studies used the same assessment tools to measure parenting behaviors with three studies utilizing self-report measures and three studies using observational assessments. Among the self-report measures, two were created for the purpose of the investigation without reference to factor analysis confirming construct validity (Paulson, Keefe, & Leiferman, 2009; Zajicek-Farber, 2010). Two studies utilize observational assessments relied on a psychometrically validated tool intended to assess parenting behaviors (i.e., *Home Observation for Measurement of the Environment* (*HOME*) & *Parent–Child Early Relational Assessment* (*PCERA*)). However, a unique aggregate of subscales within the *HOME* assessment tool were combined with other observational systems without demonstrating the validity of the newly constructed measurement system (Stein et al., 2008). Thus, the construct validity of parenting behaviors within studies is compromised by the absence of reliability and validity of assessment tools. Additionally, racial and ethnic diversity has not been fully represented in the research, with only one study sampling racially and ethnically diverse, low income families (Zajicek-Farber, 2010). Therefore, the current literature does not present a clear understanding of the mediating role of parenting

behaviors for an at-risk population due to the psychometric limitations of the assessment tools compromising construct validity.

Taken together, the use of psychometrically questionable assessment tools to test an array of divergent, often mislabeled parenting behaviors highlights the need for a comprehensive evaluation of developmentally supportive parenting practices though the use of a psychometrically validated assessment tool. The current study will contribute to the literature by using the *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (i.e., *PICCOLO*; Roggman et al., 2009) to assess the four discrete parenting practices of affection, responsiveness, encouragement, and teaching that are developmentally supportive of language development. The *PICCOLO* not only aligns with discrete, measurable parenting practices reflective of developmentally supportive parenting behaviors, but it is validated on racially and ethnically diverse, low income families that experience multiple risk factors impacting children's expressive language development. Therefore, the relationships among maternal depression, children's expressive language outcomes, and types of parenting behaviors for low-income, racial and ethnic minority families will be better understood through the following research questions:

1. To what extent is the severity of mothers' depressive symptoms concurrently associated with children's expressive language and communicative behaviors? Based on previous research, it is hypothesized that level of depressive symptoms in mothers will be negatively correlated with expressive language outcomes in children (Breznitz & Sherman, 1987; Kaplan et al., 2014; NICHD, 1999; Pan,

Rowe, Singer, & Snow, 2005; Quevedo et al., 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013).

2. Is the relationship between severity of maternal depression and children's expressive language and communication outcomes uniquely mediated by the level of affectionate, responsive, encouraging, and teaching behaviors and a summative indicator of the quality of mother-child interactions as assessed by the *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (Roggman et al., 2009)? Given previous findings, it is hypothesized that the relationship between maternal depression and children's language outcomes will be uniquely mediated by level of affectionate, responsive, encouraging, teaching, and total parenting interactions (NICHD, 1999; Paulson, Keefe, & Leiferman, 2009; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Zajicek-Farber, 2010).

Chapter II: Literature Review

Introduction

Obtaining oral language competence is critical for the future academic success of children. The present chapter reviews the importance of oral language development followed by a theoretical framework for understanding the proximal processes within mother-child interactions that facilitate language growth. Because language development is enmeshed within the context of a dynamic mother-child relationship, maternal risk-factors place children in jeopardy of delayed and restricted language growth. A synthesized review of the literature relating maternal depression and children's impaired language development reinforces the importance of better understanding the specific parenting behaviors affected by the symptoms of depression. The conclusion of the chapter rationalizes the need for a psychometrically strong, culturally sensitive evaluation of the distinct parenting behaviors affected by maternal depression that in turn negatively impact children's language abilities.

Importance of Oral Language

Achieving oral language competence is a foundational developmental task for the future success of children (Kaiser & Roberts, 2011; Masten & Coatsworth, 1998) as evidenced by the preference, acquisition, and development of language during the earliest years of life. From birth through 8-months of age, infants demonstrate their propensity and impetus to learn language through preference for familiar speech- such as stories heard while in the womb, their mother's voice, and human over artificial language, as well as attunement to statistical structures in continuous speech- such as syllables of speech that reliably co-occur within words (DeCasper & Fifer, 1980; DeCasper &

Spence, 1986; Johnson & Tyler, 2010; Saffran, Aslin & Newport, 1996; Teinonen, Fellman, Näätänen, Alku, & Huotilainen, 2009; Vouloumanos & Werker, 2007). Infants utilize their sensitivity to spoken words to make the developmental leap from understanding to producing language. Based on foundational, longitudinal research of vocabulary production between the ages of 8 and 30 months (Fenson et al., 1994), it is known that children achieve the developmental milestone of their first spoken word between 10 and 13 months. Word production expands at an accelerated rate over time during the first three years of life (Fenson et al., 1994; Ganger & Brent, 2004; Rowe, Raudenbush, & Goldin-Meadow, 2012). Until 18 months of age, word production grows at a rate of 10 new words per month followed by a spurt of vocabulary production, with several new words acquired daily (Rescorla, Mirak, & Singh., 2000). This equates to the average infant progressing from less than 10 words at 12 months to 44 words at 16 months to a staggering 573 words at 30 months, constituting a nearly ten-fold increase in expressive vocabulary over a 15 month period (Fenson et al., 1994).

Expressive language growth from birth to three years is considered the platform for developing phonological awareness (Whitehurst & Lonigan, 1998) and foundational to reading success in elementary school (Dickinson, Golinkoff, & Hirsh-Pasek, 2010; Scarborough, 2005). A synthesized review of approximately 500 research articles on children's early literacy skills concluded that expressive language, including vocabulary and grammar, moderately correlates with and predicts code-related, emergent literacy skills as well as future literacy achievement in elementary school (National Early Literacy Panel, 2008). Several longitudinal investigations spanning the first three years of life support the long term impact of expressive language development on future

language and academic success. Expressive and receptive language abilities at 10 months positively predict cognitive and academic performance at 11 years of age (Hohm, Jennen-Steinmetz, Schmidt, & Laucht, 2007). In a prospective longitudinal study of children 1 to 8 years of age, expressive vocabulary at 1 and 2 years directly predicted inflection forms (i.e., word form such as tense or case) at 3 and 4 years and phonological awareness skills of alliteration and rhyming at 5 years. Phonological awareness skills at 5 years in turn directly predicted first grade word reading (Silven, Poskiparta, Niemi, & Voeten, 2007). Structural equation modeling confirms that children's expressive and receptive vocabulary between 16 and 24 months predicts phonological awareness, reading accuracy, and reading comprehension 5 years later (Duff, Reen, Plunkett, & Nation, 2015). Additionally, twenty-five-month-old children who rapidly recognize spoken words and have larger vocabularies not only have greater lexical and grammatical development over the second year of life (Fernald, Perfors, & Marchman, 2006), but by eight years of age, these same children score higher on assessments of expressive language, intelligence, and working memory (Marchman & Fernald, 2008). Thus, expressive language growth over the first years of life supports development of critical literacy skills while also bolstering intellectual and processing abilities needed for overall academic success.

The significant relationships between expressive language, phonological awareness, and reading skills are also particularly relevant for children from low-income households. A longitudinal investigation of 1,137 children beginning at 36-months also revealed an indirect effect of expressive and receptive language on first grade reading through a direct effect on code-related skills at 54 months (NICHD Early Child Care

Research Network, 2005). The effects of expressive and receptive language at 3 years even extended to third grade reading achievement through a direct impact on comprehensive oral language, vocabulary, and phonological knowledge by the age of school entry (i.e., 54-months), which then positively predicted first grade vocabulary skills. Only two paths significantly differ when comparing the performance of children from low, medium, and high income families. Children in the low-income group had a larger magnitude of effect between expressive and receptive language at 36-months and 54-months and between code-skills in first grade and passage reading in third grade. Thus, the combined role of language expression and comprehension for children from low-income households carries substantial weight in predicting pre-literacy and reading skills at school entry and in elementary school. Taken together, the growth of expressive language throughout the first three years of life, particularly for children experiencing economic hardship, plays a pivotal, predictive role in future language, code-related skills, and reading achievement by school entry and into elementary school.

With the knowledge that the enduring and prolific nature of vocabulary production for infants and toddlers leads to school-age success, it is disconcerting that many children embark on an expressive language trajectory that falls behind their same age peers. Vocabulary production has a 'fan effect' beginning at 13 months of age, with children in the 10^{th} percentile producing no speech and children in the 90^{th} percentile producing 26 or more words. In fact, some infants do not produce their first words until approximately 17 months (Fenson et al., 2007). Consequently, by 30 months the vocabulary gap increases to nearly 300 words between the top and bottom 10^{th} percentiles (Fenson et al., 1994) which positions 2 to 3 year old children with language delays more

than a year behind their typically developing peers (Rescorla, Mirak, & Singh, 2000). Thirteen to fifteen percent of children 24 months old and 17.5% of children 30 to 36 months old experience expressive language delays as defined by productive vocabulary scores in the lowest ten percent of their age and sex group (Desmarais, Sylvestre, Meyer, Bairati, & Rouleau, 2008; Horowitz et al., 2003). For many children, expressive language onset and growth is delayed which compromises competency within this developmental domain.

Substantial consequences result from a smaller, delayed vocabulary during this critical time period, specifically related to future vocabulary development and school success. Twenty-four to thirty-one month-old children with expressive language delays perform significantly poorer than their typically developing peers on numerous language tasks throughout their elementary and secondary careers (Rescorla, 2009; Rescorla & Achenbach, 2002). Late talkers scored lower on vocabulary, grammar and phonological awareness at 6 years, on vocabulary at 7 years, on vocabulary, grammar, and reading and listening comprehension at 8 years, and reading ability at 9 years (Rescorla & Achenbach, 2002). These consequences of delayed expressive language extend to performance on vocabulary, grammar, and verbal memory tasks when assessed at 17 years of age (Rescorla, 2009). Delayed language production also has implications beyond impairments to literacy and language skills. By 8 years of age, neural activity is significantly lower in the speech and print processing networks of the brain for late talkers compared to typical developing peers (Preston et al., 2010). Due to the prevalence and expansive impact of delayed and limited expressive vocabulary, researchers have attempted to identify the variables perpetuating this critical problem.

Experiencing socio-economic hardship during the first three years of life accounts for a proportion of variance in vocabulary production (Fenson et al., 1994; Hart & Risley, 1995; Hawa & Spanoudis, 2014; Hoff, 2003; Horowitz et al, 2003; Love, Chazan-Cohen, Raikes, & Brooks-Gunn, 2013; Reilly et al., 2010), with children of more educated parents with higher incomes demonstrating greater vocabularies and faster rate of language acquisition than children from less educated, low income families (Fernald, Marchman, & Weisleder, 2013; Rowe, Raudenbush, & Goldin-Meadow, 2012). Research has shown that poverty affects vocabulary production as early as 18 months, with children from lower socio-economic status (SES) groups having less advanced vocabularies and slower and more inaccurate processing of spoken words than children from high SES families. By the time children are 24 months of age, a 6 month vocabulary gap is observed between high and low SES groups (Fernald et al., 2013). Extending into the school age years, the vocabulary of children exposed to poverty early in life is three times smaller than children living in middle-income families with highly educated parents (Klein & Knitzer, 2007). Although the relationship between low SES and limited child vocabulary is widely accepted, children from low-income families also demonstrate an increasing disparity in vocabulary production with age. Observations of vocabulary production of 108 low-income mother-child dyads enrolled in Early Head Start revealed a range of 22 unique words produced by children at 14 months of age, 95 words produced at 24 months, and 122 word produced at 36 months (Pan, Rowe, Singer, & Snow, 2005). Consistent with the findings of Pan and colleagues (2005), a sample of 75 low-income children enrolled in Early Head Start produced a range of 26 to 100 unique word forms during a 10 minute, semi-structure play session with their mother

(Cristofaro & Tamis-LeMonda, 2012). Variability in maternal lexical input accounted for differences in children's language production in both studies of low-income mother-child pairs with more maternal vocabulary input resulting in higher child vocabulary production. Taken together, the experience of poverty alone does not necessitate delays in language production. Instead, the experience of poverty influences variables that directly affect provisions of supports for communicative opportunities subsequently resulting in variable language development (Hoff, 2006).

Parenting Behaviors Critical to Language Development

Urie Bronfenbrenner's (1979) bioecological model of development provides a theoretical lens to better understand the multiple influences shaping language acquisition and development in young children experiencing economic hardship. According to this model, children learn and develop within the context of nested systems of influence that are differentiated based on degree of proximity to the child. The more distal systems such as community, culture, and socioeconomic status influence the proximal systems such as school and family that more directly influence the child. It is within these levels of influence that a child progresses through numerous developmental domains, including language development, with the most direct influences taking place through the progressively more complex reciprocal interactions between the continuously developing child and those in the child's immediate environment (Bronfenbrenner, 2001). Taken together, it can be conceptualized that the development of language is embedded within the most proximal social interactions between a child and primary caregiver (Baldwin & Meyer, 2007), with variations in social context and exposure to language impacting language acquisition and its development trajectories (Hoff, 2006).

Parent-child interactions within the home environment act as the initial and most proximal context for language acquisition (Gonzalez, Rivera, Davis, & Taylor, 2010**)** with a range of parenting interactions accounting for differences in language, school readiness, and achievement outcomes between children from low-income and economically advantaged families **(**Brooks-Gunn & Markman, 2005; Dotterer, Iruka, & Pungello, 2012; Hart & Risley, 1995; Hoff, 2003; Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). A wide range of observable parenting behaviors have been researched and shown to promote language development and competence. For instance, a quality home learning environment has been broadly defined as parental engagement in literacy activities, quality of maternal engagement, and access to learning materials. Using this construct of parenting behavior, research shows that low-income, racially and ethnically diverse children demonstrate more advanced expressive language abilities at 36 months when they have been exposed to high quality parenting practices at 14, 24, and 36 months (Rodriguez et al., 2009). When considering trajectories of parenting behaviors over the first years of life, exposure to stable, high quality parenting interactions predict the greatest language comprehension and production from infancy to preschool age (Rodriquez & Tamis-LaMonda, 2011; Schmitt, Simpson, & Friend, 2011). In addition, not only does the quantity of words heard by a young child positively relate to vocabulary development (Hart & Risley, 1995), but the diversity and complexity of parental language input during conversation predicts more complex language development in children (Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Pan, Rowe, Singer, & Snow, 2005). Taken together, numerous, distinct dimensions of parenting behaviors are supportive of children's early language development, however

research studies often analyze a single or idiosyncratic combination of behaviors. Utilizing a framework of supportive parenting behaviors advanced within the developmental parenting literature (Roggman, Boyce, & Innocenti, 2008; Roggman, Cook, Innocenti, Norman, & Chrstiansen, 2013), a range of behaviors facilitate language development within the parenting domains of affection, responsiveness, encouragement, and teaching.

Affection. Quality parent-child interactions are defined as affectionate, which includes positive emotions, regard, and evaluation of a child as well as a general warmth and fondness within the relationship (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013; Fuligni & Brooks-Gunn, 2013). Affectionate parenting behavior within the reciprocal, language-based interactions between parents and their young children positively influences vocabulary development and future literacy skills. When parents experiencing economic hardship engage in more positive interactions and use more positive verbal comments with their toddlers, children demonstrate more advanced vocabulary at preschool entry. In addition, positive parenting at 24 and 36 months positively correlates with the pre-literacy skill of letter-word identification and word segmentation, respectively, when children reach preschool age (Dodici, Draper, & Peterson, 2003). In an investigation of the impact of maternal sensitivity on six child outcomes at 36 months of age, higher levels of positive, nonintrusive interactions parenting behaviors were related to higher levels of school readiness and more advanced expressive language and verbal comprehension, even after controlling for maternal depression symptoms, site, maternal education, child sex, and birth order (NICHD, 1999). Thus empirical support exists for the value of positive, warm parenting

interactions to support young children's language development and school readiness. The long term impact of this relationship has also been demonstrated as children progress into kindergarten and early elementary school years (Estrada, Arsenio, Hess, & Holloway, 1987).

Infant-directed speech (IDS) is a dimension of parenting behaviors that supports a warm, positive verbal exchange between a parent and child leading to language development. IDS includes speech qualities of slowed, simplified expressions stretched temporally with greater pitch variations, higher fundamental frequencies, more pauses, and repetition (Fernald, 1984; Snow, 1977). These variations in parental speech toward their infants equates to a signaling of positive affect (Kitamura & Lam, 2009). In natural observations of parent-child communication, parents tend to produce speech in this unique quality that is interpreted as more interesting and preferred by infants due to increased attention and learning occurring during the use of IDS (Cooper & Aslin, 1990; Fernald, 1992; Trainor, Clarke, Huntley, & Adams, 1997; Schachner & Hannon, 2011). Recent research has begun to support the influence of IDS on children's language learning. In a study of 7-month-old infants exposed to sentences with nonsense words and nonsense syllables, infants attended longer to the sentences with whole words read using IDS than those using adult-directed speech. This suggests that IDS aided in facilitation of word segmentation by increasing infants attending behaviors toward language that is more meaningful for learning (Thiessen, Hill, & Saffran, 2005). When investigating the role of IDS on novel word learning during the beginning of word acquisition, 21-month-old infants learned novel words more reliably when presented with words using IDS than when presented using adult-directed speech (Ma, Golinkoff,

Houston, & Hirsh-Pasek, 2011). These investigations highlight the importance of IDS as a quality speech indicator during the critical period of language acquisition.

Responsiveness. Parent engagement in responsive behaviors with their young children facilitates language acquisition and development (Nozadi et al., 2013; Tamis-Lamonda, Kuckirko, & Song, 2014). As is consistent with other dimensions of parenting behaviors, the category of responsiveness includes a group of specific behaviors that encapsulate the behavioral repertoire which includes reacting sensitively to children's cues and indications of need and/or interests as well as the degree to which parents are "in sync" with their children (Bornstein & Tamis-LeMonda, 2006; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Fuligni & Brooks-Gunn, 2013; Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). More specifically, the amount of time parent-child dyads jointly attend to a single object or activity is a dimension of responsive parenting consistently linked to language acquisition (Baldwin, 1995; Tomasello & Farrar, 1986) because joint attention directs a child's focus to the speaker's intent allowing for mapping between words and referents (Hirsh-Pasek & Golinkoff, 2012) . Beginning in the earliest stages of language production, following the visual gaze of an adult at 10 and 11 months not only predicts a larger receptive vocabulary at 18-months of age (Beuker, Rommelse, Donders, & Buitelaar, 2013), but growth curve analysis reveals that infants who spend more time jointly attending to visual images with adults demonstrate accelerated vocabulary growth through the first two years of life (Brooks & Melzoff, 2008). As children age, joint attention continues to be influential in language development, with more time spent in joint attention at 18 months predicting children's vocabulary growth (Carpenter, Nagell, & Tomasello, 1998). In another foundational

study on the importance of joint attention on language development, children's vocabulary grew more rapidly when raised by mothers who attended to their child's attentional focus as opposed to prescriptively directing the child's focus to another object or event. Joint attention and responsiveness as assessed at 1 year, 1 month accounted for 60% of the variance in children's vocabulary scores at 1 year, 10 months (Akhtar, Dunham, & Dunham, 1991).

Socially contingent behaviors occurring during child vocalizations are also facilitators of early language development. Utilizing a strong research design, Goldstein, King, and West (2003) provided powerful evidence for the positive association between social contingencies on infant vocalizations and language gains. Thirty infants with an average age of 8 months interacted naturally in a laboratory room. When mothers provided contingent social feedback following child vocalizations, such as leaning into the child, touching the child, or verbally responding, the children produced more and higher quality vocalizations compared to a yoked controlled group in which social feedback was given noncontingent on verbalizations. The association between social contingencies and language development was expanded by Goldstein and Schwade (2008) by varying the complexity of maternal verbal contingencies for children ages 9.5 months. When mothers were prompted to contingently vocalize using either fully-resonant vowels or consonant-vowel alternations, children in these conditions produced more vocalizations with greater inclusion of the respective phonological components. Similar to the 8-month old children, those who heard a yoked, noncontingent vocalization from their parents did not produce a significantly higher frequency of vocalizations. By contingently responding to early vocalizations, parents are actually building their

children's pre-language skills. When parenting interventions target responsive behaviors, the intervention not only positively affects expressive and receptive language compared to a comparison group, but the effects of the intervention on vocabulary skills are mediated only by contingent responsive behaviors (Guttentag et al., 2014; Landry, Smith, Swank, & Guttentag, 2008). Even despite initially low levels of responsiveness at 6 months of age, parents who engage in increasingly more responsive behaviors over the first 6 years of a child's life have children with more enhanced language and academic skills (Hirsch-Pasek and Birchinal, 2006).

Encouragement. The extent to which parents encourage and support children's efforts and initiatives to explore, play, and act independently and creatively foster language development in young children (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Longitudinal research consistently supports the role of encouragement in the facilitation of language development. In a sample of 53 primarily low-income mother-child dyads (Kelly, Morisset, Barnard, Hammond, & Booth, 1996), the mother's ability to lead and follow a child in play activities at 20 months of age significantly predicted children's vocabulary at 3 years of age. In another longitudinal study of language development for low-SES children from infancy through 8 years of age, parenting interactions significantly related to language growth over time (Landry, Smith, & Swank, 2002). Specifically, when mothers more frequently encouraged and maintained interest in the child's activity and less frequently used directives, children language grew at faster rates.

The relationship between parental encouragement and language outcomes is also important for low-income, racially and ethnically diverse parents as demonstrated by

several investigations of the Early Head Start Research and Evaluation Project. Supportive parenting during play when children were at 14-months of age significantly predicts higher vocabulary scores and higher letter-word identification when assessed at pre-kindergarten entry (Chazen-Cohen et al., 2009). In an unpublished manuscript also utilizing an Early Head Start sample, children's language outcomes at age five were the highest among children experiencing high levels of supportive parenting during play between the ages of 14-months and 3 years (Fuligni et al., 2009). Supportive parenting not only predicts later language skills in young, racially and ethnically diverse children from low-income families, but it also predicts future supportive behavior, less negative parenting behavior, and child self-regulation (Paschall & Mastergeorge, 2014).

Unlike the parenting behaviors of responsiveness, affection, and teaching, encouraging parenting practices are less clearly and consistently defined in the literature; thus making it challenging to accurately distinguish this class of parenting behaviors. Research operationally defines encouraging parenting practices as supportive behaviors that encompass various dimensions of responsive, affectionate, and teaching practices. It is logical that parents would be more effective in encouraging exploration, autonomy, and play though engagement in empirically supported parenting practices of positive responding during engagement in cognitively simulating activities. For example, Chazen-Cohen and colleagues (2009) investigated supportive parenting behaviors as define by the average of three 7-point ratings scales: sensitivity, cognitive stimulation, and positive regard. In fact, attempting to statistically distinguish encouraging parenting behaviors has also proven to be challenging. Not only does the Encouragement sub-scale of the *Parenting Interactions with Children: Checklist of Observations Linked to*

Outcomes (*PICCOLO*; Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009) have poor construct validity compared to the other three behavior scales, but confirmatory factor analysis indicates poor model fit with four distinct parenting domains (Roggman et al, 2013). Although encouraging child effort and exploration is important for children's language development, it is not necessarily a unique set of practices distinct from parental responsiveness, affection, and teaching.

Teaching. Teaching is the extent to which parents include their children in cognitively stimulating activities, conversations, explanations and shared play (Fuligni & Brooks-Gunn, 2013; Hoff, 2003; Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Parental teaching behaviors are particularly meaningful for language growth in infants and toddlers from low-income families, with parenting conversation mediating the relationship between low socioeconomic status and children's expressive language at 2-years of age (Hoff, 2003). In a seminal study demonstrating this mediated relationship, Hart and Risley (1995) observed 42 children and their caregivers from upper, middle, and lower socioeconomic backgrounds from one to three and half years. The amount and quality of different words used by parents positively related to children's vocabulary use and growth, as well as their overall intellectual performance. Disconcertingly, children from low SES homes heard only one third the number of words heard by children from high SES families, suggesting quantity of language input is compromised for children experiencing economic hardship. Children raised in low-income, Spanish-speaking households experience similar effects from parent lexical input. The number of grammatical phrases, sentences, and individual words used by Spanish-speaking mothers at 18 months positively relates to children's vocabulary at 24 months, even after

controlling for children's vocabulary at 18 month. The effect of high quantities of maternal lexical input also extends to children's processing speed. When Spanish-speaking mothers used more words at 18 months, children were faster at processing new language at 24 months even after controlling for initial processing speed (Hurtado, Marchman, & Fernald, 2008).

Language input alone does not support language competence (Hirsh-Pasek & Golinkoff, 2012). Instead, variability in mother's word use and children's active engagement in conversation promote vocabulary development. When considering the direct language exchanges between mothers and their 14 to 46 month old children, it is the diversity of mothers' speech that predicts the diversity of child speech at corresponding levels. For example, the quantities of lexical diversity (i.e., number of different words produced), constituent diversity (i.e., use of additional words within a clause), and clausal diversity (i.e., different ways of combining clauses) predicted diversity in children's speech in these respective areas (Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010). Children from low-income families also have faster, more linear vocabulary growth between 14 and 36 months when mothers use more varied vocabulary (Pan, Rowe, Singer, & Snow, 2005). Additionally, active, two-sided conversations between a mother and child as opposed to passive exposure to language (i.e., television) relates most strongly to children's language development (Roseberry, Hirsh-Pasek, Parish-Morris, & Golinkoff, 2009; Roseberry, 2010; Zimmerman et al., 2009), Taken together, multiple dimensions of maternal language input act as teaching behaviors to improve vocabulary growth.

Engagement in cognitively stimulating activities is another dimension of teaching behavior that parents can engage in to foster their children's language development. Cognitively stimulating activities are a broad category for activities that instill learning such as storybook reading and dialogue between mother and child during chores. Storybook reading has been evidenced throughout the literature to support language acquisition (Bus, van IJzendoorn, & Pellegrini, 1995; Hargrave & Sénéchal, 2000; Scarborough & Dobrich, 1994; Sénéchal & LeFevre, 2001; Sénéchal, LeFevre, Hudson, & Lawson, 1996; Zajicek-Farber, 2010). Specifically, reading storybooks within the home environment predicts language outcomes for low-income, racially and ethnically diverse children. Utilizing the data collected during the Early Head Start Research and Evaluation Project, Raikes and colleagues (2006) identified a predictive relationship between engagement in child-focused activities, or those activities that include the child to promote development, and children's language outcomes. Engagement in child-focused activities at 14 months significantly predicted children's vocabulary at three-years of age above and beyond the quantity of involvement in the home visiting program, quality of parent engagement in home visiting, level of child functioning at 14 months, and demographic/family factors including an index of demographic risk, mother's language ability, race, and family relocation during the program. When considering parenting behaviors across the first three years of life, more literacy activities, higher quality engagement with their children, and increased availability of learning materials at 14, 24, and 36 months improve children's language abilities at each time point (Rodriguez et al., 2009). Even as children enter preschool, the importance of literacy

activities such as sharing storybook are influential in oral and receptive language skills for both English and Spanish speaking children (Farver, Xu, Lonigan, & Eppe, 2013).

Depressive Symptoms Threaten Parenting Behaviors

The extensive literature supporting the influence of parenting behaviors on children's language acquisition and development, specifically affection, responsiveness, encouragement, and teaching, justifies the parenting focus of early childhood intervention programs (Roggman, Boyce, & Cook, 2009; Sweet & Applebaum, 2004). In fact, Early Head Start programs identify parenting as the program's primary theory of change and the target of program outcomes. Such an emphasis is warranted because parenting behaviors at 24-months mediate the relationship between Early Head Start and children's cognitive skills at 36 months (Raikes et al., 2014).

Mothers of infants and toddlers experiencing economic hardship are particularly vulnerable to the threat of depressive symptoms which can impede effective parent-child interactions (Hwa-Froelich, Cook, & Flick, 2008; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Compared to middle income mothers, low-income mothers with young children are four times as likely to report depressive symptoms (Canuso, 2007; National Center for Health Statistics, 2011). Depression is common in low-income families with 40% of economically disadvantaged mothers of young children reporting depressive symptoms (Goodman & Brand, 2009; Knitzer, 2007). Fifty-two percent of mothers enrolled in Early Head Start reported enough symptoms to constitute depression (Early Head Start Research and Evaluation Project, 2003), with approximately 60% of mother's served by home-visiting programs in the United States reporting elevated levels of depression during service delivery (Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010).

Depression is arguably a substantial barrier to effective parenting because its symptoms compromise a mother's ability to engage in affectionate, responsive, encouraging, and teaching behaviors.

Affection. In a meta-analysis investigating the relationship between maternal depression and parenting behaviors, a moderate effect size (d = .40) was found between maternal depression and negative parenting practices (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Depression most strongly affected negative parenting practices (i.e., coercive, hostile, negative in affect) suggesting that affectionate parenting is substantially compromised by the presence of depressive symptoms. In a sample of primarily Caucasian mothers with and without depression, those mothers with depression of 20-month-old children scored significantly higher on ratings of child criticism than mothers without depression as assessed by a five minute, uninterrupted speech sample describing their child (Gravener et al., 2012). In fact, the stronger a mother's depressive symptoms the more likely she will engage in negative parenting during the first three years of life, especially if her child is high in negative emotionality (Dix & Yan, 2014). These findings are consistent with previous research on differences between positive regard and warmth between mothers with depression and their young children (Rogosch, Cinncheti, & Toth, 2004).

The quality of infant-directed speech is also compromised in mothers with depression. When comparing the difference between the highest and lowest speech pitch averaged across three utterances (i.e., average change in fundamental frequency) between four groups of mothers (i.e., never depressed, depressed, full remission, and partial remission), the average change in fundamental frequency of speech was negatively

correlated with maternal report of depressive symptoms. Between group comparisons indicated that mothers never depressed and in full remission were significantly different from the depressed and partial remission group in average change in fundamental frequency (Porritt, Zinser, Bachorowski, & Kaplan, 2014). This is consistent with previous research demonstrating nontypical patterns of IDS speech in untreated, clinically depressed mothers (Kaplan, Bachorowski, Smoski, & Zinser, 2001).

Responsiveness. The literature consistently demonstrates that mothers with depression demonstrate less responsive, sensitive, positive interactions with their children compared to mothers without depression (Kiernan & Huerta, 2008; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Experiencing depression diminishes a mother's ability to engage in emotional, motivational, and technical scaffolding with her 3 year old child (Hoffman, Crnic, & Baker, 2006). When considering the chronicity of depression and its impact on responsive parenting practices, mothers without depression demonstrated more sensitivity to their children when compared to mothers who were sometimes and chronically stressed. During the second year of life when children are making significant gains in vocabulary, mothers with chronic depression are the least sensitive to their children (NICHD, 1999). Mothers with depression also score less optimally on measures of reciprocity compared to mothers without depression (Feldman, 2007). In contrast to the effective contingencies and levels of engagement and responsiveness that have been shown to improve children's language, mothers with depression are engaging in less contingent social interactions with their children such as smiling, joint attention, and engagement (Feldman, 2007; Field, et al., 2005; Jameson et al., 1997). Low-income,

Hispanic mothers of young children also engage in less sensitive parenting practices when experiencing depression symptoms (Diener, Nievar, & Wright, 2003).

Encouragement. Similar to the difficulty in distinguishing encouraging parenting behaviors that impact language development, encouraging parenting is not a unique construct within the literature on maternal depression and parenting, However, a converse parenting behavior construct that undermines specific encouraging behaviors is intrusiveness. Intrusive parenting is described as a constellation of behaviors that interferes and restricts a child's autonomy during play and exploration through redirection or termination in self-initiated activities (Ispa et al., 2004). Because intrusive parenting fails to support children's interests, it is counter to the encouraging parenting behaviors critical to language development. Mothers affected by depressive symptoms are more likely to engage in intrusive, controlling behaviors and less likely to be responsive and conversational during interactions when children are 15 and 25 months old (Kelley & Jennings, 2003; McFadden & Tamis-LaMonda, 2013). In addition, maternal depressive symptoms relate to lower endorsement of the developmental significance of play. As a result, the presence of depressive symptoms negatively correlate and predict encouragement and support during play as children enter preschool (LaForett & Mendez, 2014). These restricted findings highlight the need for additional research on the impact of maternal depression on specific, encouraging parenting behaviors.

Teaching. Mothers experiencing depressive symptoms engage in fewer teaching behaviors, such as conversations, cognitively stimulating activities, and joint attention that support vocabulary growth. Compared to mothers without depression, mothers with

depression produced fewer vocalizations using less diverse vocabulary when conversing with their 3 year old children (Rowe, Pan, & Ayoub, 2005). Mothers with depression also responded more slowly to the cessation of children's speech compared to mothers without depression, highlighting children's limited exposure to lexical input (Breznitz & Sherman, 1987).

Depressive symptoms are associated with engagement in fewer enriching cognitively stimulating activities such as reading, singing songs, telling stories and playing games (Paulson, Dauber, & Leiferman, 2006). Zajicek-Farber (2010) investigated the impact of parent knowledge of child development, parenting practices, and maternal depression on engagement in stimulation activities and language development. In this low-income, racially and ethnically diverse sample, mothers with depressive symptoms had significantly lower knowledge of infant development, engaged in more risking parenting practices, and involved their children in less direct literacy-oriented stimulation or enrichment literacy activities than women without depressive symptoms. Path analysis confirmed that maternal depression predicted engagement in risky parenting practices, which in turn predicted engagement in stimulation activities and language outcomes. Thus maternal depression played an indirect role in negatively impacting child language outcomes through reduction in literacy oriented activities such as engaging in storybook reading. When comparing book sharing of mothers of 2 to 4 month infants with and without depression, adjusted odds ratios indicated a reduced likelihood for mothers with depression to share books with their children (AOR = 0.81), play with the child (AOR = 0.70), and talk with the child (AOR = 0.74). Through decreased engagement in cognitively simulating activities that have been shown to

increase language acquisition and development in young children, maternal depression is an important factor to consider when evaluating the various influences on language development (McLearn, Minkovitz, Strobino, Marks & Hou, 2006).

Gaps in Research Literature: Mediating Influence of Parenting Behaviors

With strong empirical support for the influential role of specific parenting behaviors on expressive language development and additional research emphasizing the impact that maternal depression can have on these specific behaviors, it would be anticipated that research would consistently support a negative relationship between maternal depression and children's expressive language abilities. However, of the thirteen studies identified as having investigated this relationship, only nine (Breznitz & Sherman, 1987; Kaplan et al., 2014; NICHD, 1999; Horowitz et al., 2003; Pan, Rowe, Singer, & Snow, 2005; Quevedo et al., 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber, 2010) indicated statistically significant relationships. The remaining four studies (Cornish et al., 2005; Paulson, Keefe, & Leiferman, 2009; Piteo, Yelland, & Makrides, 2012; Porritt, Zinser, Bachorowski, & Kaplan, 2014) did not find a statistically significant relationship. Although substantial variations in measurement of maternal depression and children's expressive language outcomes could account for variable findings, patterns of assessment age, depression severity, and socioeconomic status may better reflect inconsistencies within the literature.

Most studies finding negative associations between maternal depression and expressive language assessed children's communication between one and a half and three years of age (Horowitz et al., 2003; NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber,

2010). This time period may be particularly critical for assessing relationships between maternal depression and expressive language because indicators of parenting behaviors (i.e., lexical input and maternal sensitivity) were lowest when assessed in this timeframe (NICHD, 1999; Pan et al., 2005). For example, an expressive language gap was most pronounced between children of mothers producing high and low levels of lexical input when assessed at 24 months. The gap in expressive language was not significantly at the 14 month assessment and dissipated at the 36 month assessment (Pan et al., 2005). This pattern was also found when assessing correlations with language delays in children of varying age groups (i.e., 12 – 17 months; 18-23 months; 24 – 29 months; and 30 – 36 months), with parental depression only related to language delays during the assessment period of 18 to 23 months (Horowitz et al., 2003). Therefore, additional research is needed to assess the impact of maternal depression on children's expressive language in the latter portion of the second year of life.

Additionally patterns within the literature include dimensions of maternal depression and sample demographics. The chronicity of maternal depression plays a role in children's expressive language outcomes, with children of mothers reported chronic depression over a three year period having significantly lower expressive language scores than children of mothers we were never or sometimes depressed (NICHD Early Child Care Research Network, 1999). However, children's assessment age also has impact on the role of chronicity of depression. Cornish and colleagues (2005) did not find a significant relationship between chronic maternal depression through a child's first year of life and expressive language when assessed at 12 months for an economically advantaged sample (Cornish et al., 2005) Thus, the negative relationship between

maternal depression and children's expressive language may not be fully realized until (a) language development is robust enough to reflect significant variability and (b) maternal depression has substantial time to influence the parent-child relationship. The additional risk of economic hardship is a final theme to consider in the literature based on the economically advantaged participants within the four studies finding a non-significant relationship between maternal depression and children's expressive language outcomes (Cornish, et al., 2005; Paulson, Keefe, & Leiferman, 2009; Piteo, Yelland, & Makrides, 2012; Porritt, Zinser, Bachorowski, & Kaplan, 2014). Therefore, a significant contribution to the literature would be to assess the relationship between maternal depression and expressive language for children at least one and half years old experiencing the effects of poverty.

Within the limited studies evaluating the relationship between maternal depression and expressive language outcomes, only six have explored the mechanisms through which maternal depression influences expressive language development (Haabrekke et al., 2014; NICHD, 1999; Paulson, Keefe, & Leiferman, 2009; Piteo, Yelland, & Makrides, 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Zajicek-Farber, 2010). Table 1 provides a detailed review of each study with particular emphasis on the definitions and measurement of parenting behaviors. A review of this literature reveals critical shortcomings that hinder the ability to make definitive conclusions about the role of specific parenting behaviors as mediating variables. The primary limitations include poor measurement quality and inconsistent and inaccurate representations of parenting behavior latent variable that significantly compromise the construct validity of and generalization of findings.

Measurement quality. The first limitation within this small literature base is the inconsistent use of psychometrically validated parenting behavior assessments. A total of 7 latent variables representing parenting behaviors are generated within this body of research: (a) maternal responsiveness; (b) opportunity to learn; (c) stimulation and home environment; (d) participation in literacy oriented stimulation activities; (e) maternal sensitivity; (f) parent to child reading; and (g) maternal intrusiveness. Such a wide array of parenting behaviors is produced from the use of eight distinct measures of parenting behaviors with no two studies use the same assessments. Three studies relied on parent self-report of behaviors, which is disconcerting due the relative weakness of self-report compared to observational measures when assessing behaviors of ethnically and racially diverse parents of young children (Zaslow et al., 2006). Of the three studies, only one used an assessment with psychometric properties (i.e., *Home Screening Questionnaire*; *HSQ*; Frankenburg & Coons, 1986). The other two investigations relied on items generated for the purpose of the study without accounting for reliability or validity (Paulson, Keefe, & Leiferman, 2009; Zajicek-Farber, 2010). Limitations with the *HSQ* is its broad conceptualization of parenting behaviors that exceed the scope of parent-child interactions. For example, the parenting construct of stimulation and home environment include doctors' visits, babysitting practices, and provisions of play materials. Thus, the strongest study utilizing a psychometrically validated self-report measures is limited in the actual parent-child interactions actually assessed.

It appears promising that the remaining assessment tools utilized were direct observational measures of parenting behaviors: (a) *Home Observation for Measurement of the Environment* (*HOME*; Bradley & Caldwell 1988); (b) *Caregiver Interaction Scale*

(*CIS*; Arnett, 1989); (c) *Observation Rating Scale of the Environment* (*ORCE*; NICHD 1996); and (d) *Parent–Child Early Relational Assessment* (*PCERA*; Clark, 1999). However, these four assessment tools span only two investigations (Haabrekke et al., 2014; Stein, Malmberg, Sylva, Barnes, & Leach, 2008) with Stein and colleagues (2008) creating aggregate composite scores of maternal responsiveness and opportunities for learning that have not been psychometrically evaluated for construct validity. Therefore, only Haabreeke et al. (2014) used a psychometrically validated observational tool of parenting practices. However, the use of the *PCERA* when assessing maternal depression in a sample of Norwegian mothers found no mediating relationship of parenting behaviors. Thus, the inconsistencies in assessment tools, with only one study using a psychometrically sound observational tool, makes it challenging to pinpoint which parenting behaviors are truly acting as a mediator between maternal depression and children's expressive language.

Latent variable construct validity. The most salient limitation within this literature base is the questionable construct validity of parenting behavior latent variables. Table 1 provides definitions of all seven parenting behavior constructs as reported by the authors. Four of the six investigations use observable measures of parenting behavior that do not align with the parenting behavior latent construct (Haabrekke et al., 2014; NICHD Early Child Care Research Network, 1999; Piteo, Yelland, & Makrides, 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008). For example, the NICHD Early Child Care Research Network (1999) investigation assessed the latent construct of maternal sensitivity at 6, 15, and 24 months using observational ratings of sensitivity to non-distress, positive regard, and intrusiveness. At 36 months, the observational measures

constituting the sensitivity construct changed to supportive presences, respect for autonomy, and hostility. Two key concerns must be addressed. Within both time points, the observational behaviors representing maternal sensitivity span multiple developmental parenting behaviors outlined by the *PICCOLO*. Although sensitivity to non-distress aligns with the construct of sensitivity, positive regard is related to affectionate behaviors and intrusiveness is negatively associated with encouraging parenting behaviors as defined by the *PICCOLO*. Therefore, labeling the parenting behavior observed in this study as maternal sensitivity is misleading because the observational measures reflect an array of parenting practices. The second concern is that the definition of maternal sensitivity actually changes within the same investigation to supportive presences, respect for autonomy, and hostility. While it is appropriate to expect changes in parenting behaviors based on child development, the changes observed in the measurable variables represent different behaviors altogether. For example, positive regard is no longer considered a component of sensitivity by 36 months whereas respecting autonomy is included in the definition. A similar pattern of questionable latent construct validity exists in the investigation of maternal responsiveness and opportunities to learn conducted by Stein and colleagues (2008). Not only do the observational indicators change from the 10 to 36 month assessment, but the actual observational tools used change as well.

Another phenomenon observed is inconsistencies of similar parenting behaviors between studies which limit comparisons between studies. Two studies investigate cognitively stimulating parenting practices (Piteo, Yelland, & Makrides, 2012; Zajicek-Farber 2010). Although the latent constructs sound similar (i.e., Stimulation and Home

Environment versus Literacy Oriented Stimulation Activities), the observable indicators comprising these parenting constructs are distinct. Whereas Zajicek-Farber (2010) outlines direct literacy activities and enrichment activities as cognitively stimulating, Piteo et al. (2010) defines stimulation is a wide range of behaviors. These behaviors include not just direct reading and enrichment activities, but also broader parent involvement concepts such as taking children to doctors' visits, limiting multiple babysitters, and organization of physical environment. Comparisons between studies and generalization of findings cannot occur because the behavioral constructs are not similar or consistent. Because measurable indicators of parenting behavior constructs an inconsistent both within and between studies, it is challenging to identify the important parenting behaviors critical to children's language development within the context of maternal depression.

When considering all of the literature that has investigated the mediating variables impacting the relationship between maternal depression and children's language, parenting behaviors appear to be acting as the mechanism at play in this relationship. However, from this literature it is unclear what dimensions of parenting behaviors are essential to language development and acting as mediators, specifically in a low-income, racially and ethnically diverse sample. Thus, an investigation of parenting behavior is needed that uses a standardized, observational assessment tool that has been shown through research to reflect the key behaviors reflecting the four primary developmental parenting behaviors. This will allow for a more valid assessment of the mediating role of parenting behaviors on the relationship between maternal depression and children's

expressive language which will allow for future investigations of reliability and generalization.

The *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (*PICCOLO*; Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009) is a psychometrically strong, observational assessment system that evaluates discrete parenting behaviors predictive of specific developmental outcomes. Not only was the *PICCOLO* developed and validated with a population most at risk for negative child outcomes (i.e., low-income, racial and ethnic minority families), but it is also an empirically-supported observational tool of parenting behaviors shown to influence language acquisition and growth in young children. A systematic evaluation and integration of parenting behavior literature generated four domains of specific, observable parenting behaviors: (a) affection, (b) responsiveness, (c), encouragement, and (d) teaching as well as a total combined parenting behavior score (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). The twenty-nine *PICCOLO* items constituting the four domains were validated on over 4,500 video recordings of low-income families from three ethnic groups (i.e., European American, African American, and Latino American). Validity evaluation confirmed the four *PICCOLO* domains and the total score significantly correlate with measures of similar parenting behaviors in the literature within and between ethnic groups (Brady-Smith, Fauth, & Brooks-Gunn, 2005). Most critical to the current research investigation is the predictive validity of the four domain scores and total *PICCOLO* score to language and literacy outcomes at ages 3 and 5 (Roggman et al., 2013).

Chapter III: Method

Participants and Setting

Participants were mothers and children who participated in a larger research project investigating implementation supports for home visitors to apply evidence-based interventions with parents and infants/toddlers. A total of 70 mother-child pairs satisfied initial inclusion criteria: (a) a completed depression, parenting, and expressive language assessment was available at baseline; (b) the same parent completed the depression and parenting behavior assessments; (c) the parent self-identified as the child's mother. Participants were excluded based on *Early Communication Indicators (ECI) for Infants and Toddlers* (Luze et al., 2001) administration adherence. A total of three *ECI* assessments were administered with less than 80% adherence and were also considered invalid following review by the primary investigator and the lead certified *ECI* scorer on the Little Talks Project. Following exclusion of these three participants, a total of 67 mother-child dyads were included in the current investigation. Post hoc power analysis using a significance level of $\alpha = .05$, Cohen's $f^2 = 0.15$ medium effect size, and 67 mother-child pairs achieves a power of .80 when conducting single mediation analysis (Faul, Erdfelder, Buchner, & Lang, 2009).

Mother, child, and CDP descriptive statistics are detailed in Tables 2 - 4. All 67 caregivers included in the present investigation are mothers with an average age of 27.82 years (*SD* = 6.25). Nearly half of all mothers were born outside of the United States (48.4%) with the largest proportion of mothers from the Dominican Republic (14.9%), Puerto Rico (14.9%), and Mexico (9%). Most mothers were unemployed at the time of assessment (58%) and were never married (50.7%). A quarter (26.9%) of all mothers had

earned a minimum of a high school diploma. Over 40% of mothers had additional college education.

Child participants were primarily female (61.2%) with an average age of 17.42 months (*SD* = 9.27). Child ages ranged from 1 to 34 months. Mother's identified their children as primarily Latino/Hispanic (68.7%). Children and their mothers were enrolled in EHS for an average of 10.49 months (*SD* = 9.26). The ranges of EHS enrollment varied greatly 1 to 31 months. Only a small percentage (7.5%) of students were identified with a disability. Half of mothers speak to their children in English within the home environment with one-third of mothers speaking only Spanish to their children.

Sixteen home visitors served the 67 participating mother-child dyads. All home visitors were female with an average age of 33.67 (*SD* = 10.94) years. The group was racially and ethnically diverse, with 50% identifying as Hispanic/Latino, 37.5 % identifying as White, and 13% African American and multiracial. One-third of all home visitors identified Spanish as their primary language with nearly half being bilingual English and Spanish speakers. The home visitors were divided evenly between RCT 1 and 2. Most home visitors had eight families on their caseload, with a range 8 to 10 families. Within the current investigation, the number of participants assigned to each home visitor varied from two to seven mother-child dyads. There was a wide range within the number of years worked at CSC/EHS from newly employed to 19 years.

Measures and Materials

Maternal depression. The *Center for Epidemiological Studies Depression Scale* (*CES-D*; Radloff, 1977; see Appendices A & B) was administered to mothers by the family's regularly-assigned home visitor to assess symptom level of depression

experienced over the past week. The *CES-D* is a self-report measure of symptom levels of depression developed by the National Institute of Mental Health for use with the general (nonpsychiatric) adult population. Both English and Spanish versions of the measure are composed of 20 items rated by the mother on a scale of 0 to 3. Scores of 0 indicate frequency of symptoms rarely or none of the time (i.e., less than 1 day), 1 indicating some of a little of the time (i.e., 1-2 days), 2 indicating occasionally or a moderate amount of time (i.e., 3-4 days), and 3 indicating most or all of the time (i.e., 5-7 days). Scores range from 0 to 60, with total scores equal to or greater than 16 differentiating between clinically depressed and nondepressed individuals (Irwin, Artin, & Oxman, 1999).

The psychometric properties of the *CES-D* are strong with internal consistency reliability ranging from an alpha of .84 to .90, as well as acceptable test-retest reliability (r = .51 - .67) in two to eight week intervals (Radloff, 1977). Internal consistency reliability is strong when the *CES-D* is administered to Hispanic outpatients (α = .93; Roberts, 1980) as well as low-income, primarily Hispanic mothers of infants and toddlers (α = .90; Manz, 2014). The *CES-D* Spanish version is considered an accurate depression screener for Spanish speaking adults (Rueland et al., 2009) with sensitivity of 73% and specificity of 72% when administered to a Puerto Rican sample (Robison, Gruman, Gaztambide, & Blank, 2002).

Expressive language. Children's communication abilities were assessed using the *Early Communication Indicators (ECI) for Infants and Toddlers* (Luze et al., 2001). The *ECI* is a direct, observational general outcome measure (i.e., GOM; Deno, 1977; McConnell, 2000) of expressive communication skills exhibited by children during

interaction with an adult play partner. The *ECI* is an appropriate assessment tool for the current investigation, because it supports the assessment of children's primary expressive language. The four communication skills assessed by the *ECI* are gestures, vocalizations, single words, and multiple words. A gesture is a physical movement made by a child in an attempt to communicate with a partner. A vocalization is a non-word or unintelligible verbal utterance that is produced by a child and directed at the play partner. A single word utterance is an understood isolated word voiced by a child. Lastly, a multiple word utterance is a combination of two or more different words verbalized by a child.

ECI administration was completed by trained home visitors during regularly scheduled home visits. Because CSC/EHS assigns families to home visitors' caseloads based on language considerations, the *ECI* administration was completed in the child's primary language. Home visitors video recorded a 6-minute play session in which the home visitor-child pair interacted with a standardized activity (i.e., Fisher Price® House). Home visitors were trained as play partners during a two-hour assessment training session. Through video and real-time modeling examples as well as practice with trainers, the home visitors learned the following standard set-up and administration guidelines: (a) orientation of play activity to elicit engagement; (b) adult play that encourages interaction; (c) follow child's lead; (d) comment on child and adult's actions; and (e) ask minimal questions to elicit language (Carta, Greenwood, Walker, & Buzhardt, 2010).

Video recorded sessions were collected and coded by research assistants at Lehigh University who are certified as *ECI* scorers. The *ECI* scorer training process began with the project coordinator of the larger research study becoming a certified *ECI*

scorer based on the following publisher requirements: (a) reviewing *ECI* coding definitions; (b) watching and scoring two *ECI* certification videos; (c) entering and confirming scores against publisher's master database; (d) repeating until 85% total agreement is achieved for both videos (Carta, Greenwood, Walker, & Buzhardt, 2010). The project coordinator provided support to research assistants as they completed the same certification requirements. Specialized meetings of all *ECI* scorers were held intermittently as booster sessions and opportunities to address concerns. Videos recorded in Spanish were assigned to one of two English and Spanish-speaking research assistants. Videos recorded in English were assigned to any of the trained *ECI* scorers. Due to the limited number of research assistants on the Lehigh University research team, it was impractical for *ECI* scorers to be completely blind to the conditions to which participants were assigned and to the participants' performance on other measures. However, *ECI* scorers were not readily knowledgeable of participant performance on the *PICCOLO* or *CES-D*, unless the scorers independently sought out this information.

Certified *ECI* scorers recorded the frequency of each communication skill over the 6-minute session using the ECI Scoring Sheet (see Appendix D). Because more complex vocalizations (i.e., single and multiple word utterances) gradually predominate and supersede less complex vocalizations (i.e., gestures and vocalizations), a weighted scoring system is used to approximate an absolute estimate of total words produced by a child. Total communication was calculated based on a weighted combination of total gestures (i.e., 1 X each event), vocalization (i.e., 1 X each event), single words (i.e., 2 X each event), and multiple word (i.e., 3 X each event). For the purposes of this

investigation, weighted total communication will be used as a continuous variable of expressive language.

Intraclass correlation coefficients (ICCs; Field, 2005; Shrout & Fleiss, 1979) were calculated to assess inter-rater reliability *ECI* ratings. Correlation coefficients ranging from .60 to .74 are considered good with coefficients of .75 to 1.00 considered excellent (Cicchetti, 1994). Twenty percent of *ECI* videos were randomly selected and scored for reliability by an additional rater. Interrater reliability for the *ECI* weighted total communication score was excellent (ICC = .97).

Administration integrity was calculated by *ECI* scorers based on the percentage of completed items on the *ECI* Administration Checklist (see Appendix C). The Administration Checklist includes 12 setup and administration items that were completed by the research assistant during *ECI* scoring. Each item was rated on a binary scale; if the home visitor adhered to the administration item, the *ECI* scorer recorded a 1 on the Administration Checklist. If the home visitor did not adhere to the administration item, the *ECI* scorer recorded a 0 on the checklist. The 12 items were summed, divided by 12, and multiplied by 100%. Each *ECI* administration below 80% adherence was reviewed by the primary investigator and the lead certified *ECI* scorer on the Little Talks Project. When administration adherence fell below this threshold, a booster training on *ECI* administration was conducted during routine Monday morning check-ins conducted by Little Talks research assistants at the CSC/EHS office. Three *ECI* videos were eliminated following review due to administration errors compromising validity. Following removal of these *ECI* videos, the average *ECI* administration integrity of the 67 videos was 84.33%.

The *ECI* was normed on an aggregated sample of 1,486 predominantly low SES, racially and ethnically diverse children 1 to 3 years of age (Greenwood, Carta, Walker, Hughes, & Weathers, 2006). The *ECI* measures total communicative production regardless of the language spoken and, therefore, does not require separate scores based on the use of different languages. Thus, the *ECI* is appropriate for both English- and Spanish-speaking children with psychometric properties reflective of samples of children speaking English, Spanish, and English and Spanish combined (Greenwood, Buzhardt, Walker, McCune, & Howard, 2013; Greenwood et al., 2006; Greenwood, Walker, & Buzhardt, 2010). The *ECI* total communication score is highly correlated with the expressive subscale of the *Preschool Language Scale-3* (Zimmerman, Steiner, & Pond, 1992; $r = .72$, $p < .001$) and maternal report of children's language abilities ($r = .51$, $p < .001$). Split-half and alternative forms reliability for the *ECI* total communication score are also high ($r = .80$ and .72, $p < .001$, respectively; Luze et al., 2001). Inter-observer agreement of 90% has been achieved for an Early Head Start sample (Greenwood & Walker, 2010) with strong total communication inter-rater reliability between two Early Head Start sites assessing 6-to 36-month-old children ($r = .94$ and .96, respectively; Greenwood, Buzhardt, Walker, McCune, & Howard, 2013). It is also a user-friendly language assessment for early childhood practitioners with Early Head Start home visitors successfully trained to administer the *ECI* in previous research (Greenwood, Buzhardt, Walker, Waylon, & Anderson, 2011).

Parenting behaviors. The *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (*PICCOLO*; Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009; see Appendix E) was used to assess the behavior of

mothers during child interaction. The *PICCOLO* is a direct assessment of 29 observable, developmentally supported parenting behaviors for children ages 1 to 3 years of age. These observable behaviors are divided among four broad sub-scales: (a) affection; (b) responsiveness; (c) encouragement; and (d) teaching. Seven to eight unique behaviors are observed and rated within each of these four sub-scales on a scale of 0 (i.e., absent), 1 (i.e., barely present), or 2 (i.e., clearly present). The *PICCOLO* can be used with both English- and Spanish-speaking children and families.

PICCOLO administration was completed by trained home visitors during regularly scheduled home visits. Home visitors video recorded a 10-minute semi-structured play interaction between the mother and child using the family's preferred language. Video recorded interactions were coded by trained research assistants at Utah State University as part of the larger, federally funded research project. Spanish speaking members of the Utah State University research team scored the videos completed by families in Spanish. The Utah State University research team was blind to the conditions to which participants were assigned and to the participants' performance on other measures. Each *PICCOLO* scorer progressed through the following training sequence: (a) read literature on content and purpose of *PICCOLO* (3 hours); (b) watched and discussed 5 10-minute videos coded with consensus by experts (3 hours); (c) watched and coded 3 to 5 additional 10-minute videos to establish reliability (2-4 hours); (d) attended meetings to discuss scoring questions and reliability (1 hour weekly; Roggman, Cook, Innocenti, Norman, & Christiansen, 2013).

Item level ratings were summed to create four sub-scale scores (i.e., affection, responsiveness, encouragement, and teaching) as well as a total *PICCOLO* score to

indicate overall prevalence and quality of positive parenting behaviors. The total *PICCOLO* score was included as a meaningful mediating variable because the current literature fails to assess the role of parenting behaviors as a comprehensive construct within a single study. Total affection, responsiveness, and encouragement scores range from 0 to 14 with total teaching scores ranging from 0 to 16. Total *PICCOLO* score ranges from 0 to 58. Higher scores indicate more developmentally supportive parenting behaviors. For the purposes of this investigation, the four sub-scale scores and the total *PICCOLO* scale will be used as continuous variables of parenting behavior. Intraclass correlation coefficients (ICCs; Field, 2005; Shrout & Fleiss, 1979) were calculated to assess inter-rater reliability of *PICCOLO* ratings. Correlation coefficients ranging from .60 to .74 are considered good with coefficients of .75 to 1.00 considered excellent (Cicchetti, 1994). Twenty-three percent of *PICCOLO* videos were randomly assigned to an additional rater for reliability scoring. Interrater reliability was excellent for all four *PICCOLO* domains (ICC = .76 - .91) as well as for the Total *PICCOLO* score (ICC = .92; see Table 5).

The *PICCOLO* domains were developed through a systematic literature review on parenting behaviors critical to child development. The literature was grouped into four domains and rated by practitioners in infant-toddler/early childhood program for content validity. Over 4,500 videos of low-income, ethnically diverse families generated from the Early Head Start Research and Evaluation Project were used to develop the reliability and validity of the measure. The three primary ethnic groups in the initial validation sample were European-American, African-American, and Latino-American (Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009; Roggman, Cook, Innocenti,

Norman, & Christiansen, 2013). Thus, the *PICCOLO* is standardized for use with low-income, racially and ethnically diverse parents of young children such as those participating in the proposed study.

In addition to being evidence-based, the *PICCOLO* has good psychometric properties for this target population. Inter-rater reliability on over 2,300 video observations of Early Head Start, racially and ethnically-diverse families yielded an average correlation of $r = .77$ ($p < .001$) between pairs of observers. On the same sample of children, internal consistency reliability averaged an alpha of .78 across all four domains with alpha of .78 for the affection domain, .75 for the responsiveness domain, .77 for the encouragement domain, and .80 for the teaching domain. Each domain score and the *PICCOLO* total score significantly predict language and pre-literacy outcomes at age 3 and 5 years. When assessed at 36 months, each domain predicted receptive language at 5 years old as assessed by the *Peabody Picture Vocabulary Test-III* (*PPVT-III*; Dunn & Dunn, 1997; $r = .22$ - $.27$, $p < .05$) and letter word identification as assessed by the Woodcock Johnson Letter Word subtest (Woodcock & Johnson, 1989; $r = .16$ - $.22$, $p < .05$). Total *PICCOLO* scores at 36 months also predicted receptive language ($r = .25$, $p < .05$) and emergent literacy skills ($r = .24$, $p < .05$) at 5 years (Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009). Each domain of the *PICCOLO* has criterion validity with other similar constructs of observable parenting behavior (Affection with positive regard, $r = .59$, $p < .001$; Responsiveness with sensitivity, $r = .56$, $p < .001$, Encouragement with overall supportiveness, $r = .47$, $p < .001$; Teaching with cognitive stimulation, $r = .56$, $p < .001$; Brady-Smith, Fauth, & Brooks-Gunn, 2005).

Demographic form. Mothers completed a demographic form following consent for participation to collect information on descriptive characteristics of the mother and child (see Appendices J and K). Specific demographic factors were identified as potential control variables based on research suggesting an association with children's expressive language development. Children's age was selected due to the impact of maturation on language development (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007). In addition, children's gender is often controlled for in evaluations of language development with mixed findings of significance (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Pan, Rowe, Singer, & Snow, 2005). Large scale investigations of the impact of Early Head Start on home language use and language development revealed programmatic effects (Love et al., 2002; Love, Chazan-Cohen, Raikes, & Brooks-Gunn, 2013; Raikes, Green, Atwater, Kisker, Constantine, & Chazen-Cohen, 2006), thus duration of enrollment in EHS was also assessed for potential influence on expressive language. Lastly, expressive language delays are a common symptom of many disabilities, such as intellectual disability and autism spectrum disorder (Hawa & Spanoudis, 2014; Rescorla, 2011). Because EHS serves students with disabilities, this variable was also identified as a potential influence on the outcome variable of expressive language.

Procedures

Little Talks description. The measures utilized in the proposed research investigation were collected in a larger, federally funded research project entitled, "Little Talks." The primary objective of Little Talks is to develop and evaluate implementation supports to enable home visitors to effectively deliver a 24-session, evidence-based

literacy program to low-income, racially and ethnically diverse families through routine Early Head Start home visits. Little Talks consists of two randomized control trials (i.e., RCTs) with the first starting in December of 2013 and ending in June of 2014. The second RCT began in November of 2014 and is still ongoing. Both RCTs were comprised of an intervention and control group. As a result of the RCT design of the Little Talks project, home visitors were selected for inclusion in either the intervention or control group by matching key demographic variables (i.e., language and training experience). Baseline data from the control and intervention groups for both RCTs were combined for use in the current research investigation. The first RCT involved 8 Home visitors (i.e., 4 intervention and 4 control) and their respective, consenting families (n = 39). The second RCT involve 8 additional home visitors (i.e., 4 intervention and 4 control) with their respective, consenting families (n = 28) for a total of 67 participating families in the current study.

Recruitment. Home visitors were systematically stratified according to language spoken and years of experience. Random assignment to either the intervention or control group was based on stratification in order to equate groups by these key demographic variables. Following this process, the primary investigator of Little Talks and administrators from CSC/EHS introduced the home visitors to the research project and obtain their written consent to participate. Through training described below, home visitors were tasked with introducing the Little Talks program to their respective families during routine home visits. Home visitors had the discretion to describe Little Talks using verbal scripts, parent-targeted flyers, or individualized dialogue. This flexibility allowed home visitors to cater recruitment to individual families. Interested families

then completed an intervention or comparison group consent form (see Appendices F-I) and a demographic form (see Appendices J & K) in their preferred language. Little Talks research assistants prompted home visitors to begin baseline assessments following receipt of the consent and demographic forms.

Training. Home visitors from both RCTs took part in three 2-hour training sessions prior to baseline assessment. The Little Talks research team prepared and presented the training sessions. Relevant to this study, one of the 2-hour sessions reviewed the assessment process and provided specific training in individual assessments administration. The *CES-D* was presented to the home visitors with a description of the measure's purpose, a review of the directions, and a model of how to fill out the form. Home visitors were instructed to utilize the language version of the *CES-D* most appropriate for each of their families. The training session was then taught the purposes of the *ECI* and *PICCOLO* followed by a review and practice of the standard administration procedures, respectively. Home visitors watched video examples of *ECI* and *PICCOLO* administration, followed by opportunities for questions and time to practice administration on Little Talks team members. Specific to the *ECI*, set-up and administration guidelines included: (a) orientation of play activity to elicit engagement; (b) adult play that encourages interaction; (c) follow child's lead; (d) comment on child and adult's actions; and (e) ask minimal questions to elicit language. *PICCOLO* specific training included an explanation, video example, and practice of a semi-structured play activity. This activity prompted the mother/child pair to interact as they normally would as they progressed through three bags of unique play activities. The home visitors were

instructed to introduce the play activity and encourage families to start with the first bag and progress to additional bags based on the child's level of engagement.

The final component of the assessment training included an explanation of the video recorder. A digital video recorder with a telescoping tripod was used to record the administration of the *ECI* and *PICCOLO* during home visits. Written instructions were reviewed during the training and were included in each camera bag to ensure proper camera operation during assessments. During training, each home visitor was paired with a trainer to practice setting up and taking down the camera. Home visitors instructed to contact the Little Talks research team following video assessment administration to collect memory cards.

Assessment administration. Following the three 2-hour training series, the home visitors completed the baseline assessments during regularly scheduled home visits. Because the assessments were incorporated into a standard 2-hour Early Head Start home visit, assessment administration was allowed to span two visits. A recommended order for assessments was to complete the paper forms followed by video assessments. However, home visitors were given the ability to adjust the assessment order to accommodate children's schedules and home visiting activities. The home visitor completed the *PICCOLO* and the *ECI* with each family. For the *PICCOLO*, the home visitors were given a script to provide uniform instructions to each family. The *PICCOLO* required the mother and the child to sit together and play as they normally would in their preferred language with a bag of three distinct play objects. The home visitors asked each family to begin their play with the first play object which was a story book. Families then transitioned at their own discretion to the additional two play

activities (i.e., pretend play cooking set and an interactive puzzle). The home visitors video recorded this 10-minute play interaction. For the *ECI*, the home visitors also set up the camera in order to record the home visitor and the child. The home visitors followed the integrity checklist to ensure standardization of test administration. This included aspects of set-up and administration of the play material in a standardized manner as described previously in the *training* section. The *CES-D* is a self-report measure available in either English or Spanish that could be completed independently by the family or with assistance from the home visitor. The home visitor described the assessment as a tool to measure maternal mood and experiences over the past week. If concerns with maternal literacy levels were a concern, the home visitor read the questions aloud and marked the mothers' answers.

Following completion of all baseline assessments with their respective families, the home visitors returned the completed *CES-D* and memory card with the *ECI* and *PICCOLO* recordings to the Lehigh University research team. The *CES-D* and *ECI* materials were scored by the primary investigator and members of the Little Talks research team at Lehigh University. The limited number of personnel on the Lehigh University research team made it impractical for those scoring the *CES-D* and *ECI* to be completely blind to the conditions to which participants were assigned and to the participants' performance on other measures. However, *CES-D* and *ECI* scorers were not readily knowledgeable about participant performance on other measures, unless the scorers independently sought out this information. All *ECI* recordings completed in Spanish were scored by one of two Spanish-speaking research assistants on the Little Talks research team. The language version of the *CES-D* did not impact scoring;

therefore any team member was able to enter these data. CES-D data was entered with 100% reliability according to a data entry reliability check on 31% of the sample. The *PICCOLO* video recordings were sent to Utah State University and were scored by the research team of the co-investigator of the Little Talks project. *PICCOLO* recordings completed in Spanish were coded by the Spanish-speaking members of the Utah State University research team. The Utah State University research team was blind to the conditions to which participants were assigned and to the participants' performance on other measures.

Research assistants monitored data collection to ensure accuracy. As memory cards were submitted, videos were reviewed and verified against the standardized assessment procedures taught during training. Any administration concerns were addressed through positive, corrective feedback during routine, weekly meetings between research assistants and home visitors. Additionally, research assistants emailed and called home visitors routinely to address concerns or questions with assessments.

Data Analysis

For the current investigation, the baseline data from the first and second RCTs were combined to create a within-subjects, single-group design. This design allows for the identification of relationships between the independent variables of maternal depression and parenting interactions and the dependent variable of children's expressive language. The inherent nested design within the research data (i.e., mother-child pairs nested within Home visitors) warrants the use of Hierarchical Linear Modeling (HLM; Hedeker & Gibbons, 2006; Raudenbush & Bryk, 2002) to account for the potential effect of individual home visitor characteristics on the groups of families they serve. However,

due to a small sample size that would compromise power, HLM was not a viable form of data analysis.

Preliminary descriptive analyses were conducted to calculate relevant demographic statistics related to mothers, children, and home visitors. Additional descriptive statistics were calculated for the independent, mediating, and dependent variables. Intraclass correlation coefficients were generated to assess the degree of agreement between raters on the *PICCOLO* and *ECI*. Relationships between variables were explored using Pearson product moment correlation analysis. The first research question was addressed in this analysis by determining the extent to which level of maternal depressive symptoms was correlated with children's expressive language and communicative behaviors. This analytic method produces a product-moment correlation coefficient (Pearson's *r*) that indicates the strength or magnitude of the relationship between these two variables assessed using r^2 using a one-tailed test. The significance of all correlations were indicated by ($p < .05$); significantly greater than 0.

Mediation analysis using ordinary least squres regression was run in PROCESS (Hayes, 2013) to evaluate the indirect effect of maternal depression on children's expressive language through the mediating variables of parenitng behaviors. Due to a limited sample size, five separate mediation analyses were generated to test the distinct mediating effects of affection, responsiveness, encouragmeent, teaching, and overall parenting behaivor. For each mediation analysis, unstandardized regression coefficients (*B*), standard errors, 95% bias corrected confidence intervals using bootstrapping procedures, and *p*-values were generated for the total, direct and two indirect effects. Pearson product-moment correlation coefficients were also generated to assess

covariance of relevant demographic variables (i.e., children's age, children's disability status, EHS enrollment duration) with the outcome variable of expressive language. Those variables that significantly correlate with the outcome variable ($p < .05$) were controlled for in separate, follow-up mediation analysis. Inferential statistics were compared between mediation analyses with and without controlling variables to assess impact of covariate inclusion.

PROCESS is a computational tool for assessing mediation and other path-based analyses that has several superior features compared to the popular Causal Steps Strategy proposed by Baron and Kenny (1986). PROCESS supports the use of bootsrapping procedures. Bootstrapping entails taking the original sample and resampling with replacements thousands of times to empirically generate the sampling distributions of the indirect effect and other statistics of interest. After arranging the resampled values in order form highest to lowest, the 2.5^{th} and 97.5^{th} percentiles represent the upper and lower bounds of a 95% confidence interval of the indirect effect. This process more accurately reflects the irregularity of sampling distrubutions compared to the Causal Steps Strategy assumption of normal sampling distributions (Preacher & Hayes, 2008). Bootstrapping is also recommended over the Causal Steps Approach due to higher power and reduced Type I error rates (MacKinnon, Lockwood, & Williams, 2004). In addition, the required first step of the Causal Steps Stretegy to show a significant total effect of the predictor on the outcome variable is widely considered unnecessary for mediation to exist (Cerin & Mackinnon, 2009; MacKinnon, 2008; Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010). In contrast, PROCESS does not require a direct effect between

predictor and outcome and instead places emphasis on understanding indirect effects (Hayes, 2013).

Chapter IV: Results

Statistical assumptions and descriptive statistics are reviewed for the *Center for Epidemiological Studies Depression Scale* (*CES-D*; Radloff, 1977), *Early Communication Indicators (ECI) for Infants and Toddlers* (Luze et al., 2001), and *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (*PICCOLO*; Roggman, Cook, Innocenti, Norman, Christiansen, & Anderson, 2009) sub-scale and total scores. Following descriptive statistics, the inferential statistics for research question one is reviewed (i.e., the correlation between maternal depression and children's expressive language) follow by the inferential statistics for research question two (i.e., the mediating role of parenting behaviors for the relationship between maternal depression and children's expressive language).

Descriptive statistics

Statistical assumptions were checked for each measure. First, skewness and kurtosis, histograms, and probability plots were examined for all three measures to evaluate distribution normality. Skewness and kurtosis values between ±2 are considered within the acceptable range to suggest a normal distribution of data (Lomax, 2001). Table 6 provides descriptive statistics and skewness and kurtosis values for the *CES-D*, the *ECI*, and the four *PICCOLO* sub-scales and total scores. As reflected in Table 6, skewness and kurtosis values fell within the acceptable range across all measures. All histograms reflected a normal distribution with probability plots closely aligned with a straight line (Stevens, 2009).

A descriptive analysis of the *CES-D*, the primary independent variable, indicated that 25.4% (n = 17) of the total sample of 67 mothers earned a total score equal to or

greater than 16 out of 40, suggesting a lower risk of clinically significant levels of depressive symptoms than would be expected for this sample. On average, children were younger when their mothers experienced higher levels of depression than when their mothers experiencing low levels of depressive symptoms (M = 15.82, SD = 9.57; M = 17.42, SD = 9.27, respectively). Within the sample data, Total *CES-D* scores ranged from 0 to 40 (M = 12.63, SD = 10.70). One-tailed Pearson correlations indicated that the Total *CES-D* scores were not significantly related to any of the potential mediator variables, including the levels of the sub-scale scores measured by the *PICCOLO*— affection, responsiveness, encouragement, teaching, or to the total *PICCOLO* scores (r = -.04 - .17, p = .080 - .439). Similarly, Pearson correlation indicated no significant relation between the Total *CES-D* scores and the outcome— *ECI* weighted total communication, r = .07, p = .279, one-tailed.

ECI weighted total communication scores ranged from 0 to 168 (M = 43.57, SD = 41.06). Seventy percent of all *ECI* administrations were completed in English. All the remaining *ECIs* were completed in Spanish with one completed in both English and Spanish. Table 7 shows Pearson correlation coefficients reflecting the relationship between the continuous variable of *ECI* weighted total communication and all predictor variables. No significant relationships exist between the *ECI* weighted total communication scores and maternal depression symptoms, affection, responsiveness, encouragement, and Total *PICCOLO* scores (r = -.03 - .20, p = .057 - .410, one-tailed). *ECI* weighted total communication scores were positively associated with teaching behaviors (r = .34, p = .003, one-tailed).

Affection, responsiveness, and encouragement sub-scale scores can range from 0 to 14. Teaching behaviors can range from 0 to 16. The range of scores for each *PICCOLO* parenting sub-scales was restricted (i.e., ranges 7-13) with the broadest range of parenting abilities reflected within the Encouragement and Teaching domains (Ranges: 12 & 13, respectively).

Research Question 1

Correlation analysis. Pearson (product-moment) correlation coefficient was computed to assess the relationship between total scores ratings for maternal depression symptoms and children's expressive language ability. Total scores for maternal depression symptoms were not significantly correlated with children's expressive language abilities (r = .07, p = .279, one-tailed). This result suggests that only .53% of the variance in children's expressive language scores are accounted for by maternal ratings of depression symptoms (r^2 = .0053). Although a statistically significant relationship is not found between the dependent variable of maternal depression and the outcome variable of children's expressive language, this direct relationship is neither a necessary nor sufficient condition of causality required to test mediation (Bollen, 1989; Rucker, Preacher, Tormala, & Petty, 2011). Therefore, five simple or separate mediation analyses were completed, one for each potential mediator, due to the limited total sample size.

Research Question 2

Statistical assumptions. Statistical assumptions for regression analyses were explored prior to generating inferential statistics through mediation analysis. First, all variables were continuous types with expressive language scores not bound by a

restricted range. The *CES-D* total scores were restricted with a range of 0 to 40. *PICCOLO* sub-scale ranges (i.e., Affection and Responsiveness) and the Total score were restricted compared to the normative sample. Second, residuals were assessed for normality and homoscedasticity using skewness and kurtosis, histograms, scatterplots, and probability plots. The histograms of residuals for all measures followed a relatively normal curve with probability plots showing data close to a straight line (Stevens, 2009). Skewness and kurtosis values for all variable residuals satisfied criteria by falling within the acceptable range of +2 (Lomax, 2001). Homoscedasticity of residuals based on the scatterplot of predicted versus standardized residuals indicated a random scattering of residual points for all variables except *CES-D* (see Figure 1). The *CES-D* approximated a fanning effect with residuals closer to zero for smaller *CES-D* scores and more spread out for larger *CES-D* scores. Scatterplots between predictor and outcomes variables revealed weak, albeit present linear relationships.

Covariates. Correlation coefficients were also computed to determine if the key demographic variables described in the methods section significantly correlated with the dependent variable, and thus should be controlled for in the mediation analyses. Table 8 summarizes the correlation coefficients between potential covariates and all measures. Pearson correlation coefficient indicated that children's age was significantly related to children's expressive language ability ($r = .70$, $p < .001$, one-tailed). Pearson correlation coefficient indicated that home visiting duration is also significantly related to children's expressive language ($r = .58$, $p < .001$, one-tailed). Child age accounted for 47% ($r^2 = .47$) of the variance in language ability and the amount of time enrolled in home visiting accounted for 34% ($r^2 = .34$). Point-biserial correlation coefficients were calculated for

the child gender and disability status (i.e., yes or no) variables for the same purpose. Neither variable significantly relate to expressive language abilities (r_{pb} = .09, p = .24, one-tailed; r_{pb} = -.06, p = .31, one-tailed, respectively). Thus, both child age and home visiting duration variables were controlled for in the tests of mediation. Due to statistical power limitations associated with a small sample size, control variables were explored separately in the five mediation analyses to assess significant changes in findings. This exploration was executed by running follow-up simple mediation analyses for each of the five mediators with the addition of child age and home visiting duration as control variables. The results of the mediation analyses were compared with and without the control variables to assess meaningful changes in inferential statistics.

Mediation analyses. Tables 9 – 22 report regression coefficients, *p*-values, and 95% bias corrected confidence intervals for the five simple mediation analyses testing the second research question as well as follow up mediation analyses controlling for children's age and EHS enrollment duration. Level of maternal depressive symptoms did not relate to the amount of engagement in affectionate parenting behaviors (a = 0.003, p = .859). Affectionate parenting behavior was not significantly related to children's expressive language scores (b = -.70, p = .825). A 95% bias-corrected bootstrapped confidence interval for the indirect effect of maternal depression (ab) using 5,000 bootstrap samples was -.1390 to .0969, meaning that it is unlikely that the indirect effect is significantly different from zero. There was also no evidence that maternal depression is associated with children's expressive language scores independent of the effect of affectionate parenting (c` = 0.28, p = .573).

Level of maternal depressive symptoms also did not relate to the amount of engagement in responsive parenting behaviors (a = 0.008, p = .827). Responsive parenting behavior was not significantly associated with children's expressive language abilities (b = 1.57, p = .470). A 95% bias-corrected bootstrapped confidence interval of the indirect effect of maternal depression (*ab*) using 5,000 bootstrap samples was -.1079 to .2998, suggesting that it is unlikely that the indirect effect is significantly different from zero. Also, there was no evidence that maternal depression is associated with children's expressive language scores independent of the effect of responsive parenting (c` = 0.27, p = .618).

Level of maternal depressive symptoms also did not relate to the amount of engagement in encouraging parenting behaviors (a = 0.05, p = .099). Encouraging parenting behavior was not significantly associated with children's expressive language abilities (b = 1.54, p = .467). A 95% bias-corrected bootstrapped confidence interval of the indirect effect of maternal depression (*ab*) using 5,000 bootstrap samples was -.0898 to .4356, suggesting that the indirect effect is not different from zero. Additionally, there was no evidence that maternal depression is related to children's expressive language scores independent of the influence of encouraging parenting (c` = 0.20, p = .684).

Level of maternal depressive symptoms also did not relate to the amount of teaching parenting behaviors (a = -0.01, p = .705). However, teaching parenting behaviors was significantly associated with children's expressive language abilities (b = 4.49, p = .002). This significant relationship suggests that when holding maternal depressive levels constant, a 1-unit change in teaching behavior will result in a 4.49 unit increase in children's expressive language scores on the *ECI*. A 95% bias-corrected

bootstrapped confidence interval for the indirect effect of maternal depression (*ab*) using 5,000 bootstrap samples was -.3661 to .2449, indicating that it is unlikely that the indirect effect is statistically different from zero. Additionally, there was no evidence that maternal depression was related to children's expressive language scores independent of the influence of teaching parenting behaviors (c` = 0.34, p = .457).

The final mediation analyses explored the potential mediating effect of the Total *PICCOLO* score on the relationship between maternal depression and children's expressive language. Consistent with results from the sub-scales of the *PICCOLO*, level of maternal depressive symptoms also did not relate to the amount of engagement in overall developmentally supportive parenting behaviors (a = 0.05, p = .565). Total *PICCOLO* scores were also not significantly associated with children's expressive language abilities (b = 0.93, p = .139). A 95% bias-corrected bootstrapped confidence interval for the indirect effect of maternal depression (*ab*) using 5,000 bootstrap samples was -.0709 to .3739, suggesting that it is unlikely that the indirect effect is statistically different from zero. Additionally, there was no evidence that maternal depression related to children's expressive language scores independent of the influence of the Total *PICCOLO* score (c` = 0.23, p = .644).

Additional simple mediation analyses were conducted in parallel to test outcome changes following the inclusion of children's age and home visiting duration as covariates. Covariate inclusion did not change the statistically non-significant findings in the analyses testing mediation of affection, responsiveness, encouragement, and total developmental parenting behaviors. Inclusion of children's age and home visiting duration negated the positive association between teaching parenting behaviors and

children's expressive language scores (b = -.15, p = .916; b = 1.77, p = .219; respectively).

Chapter V: Discussion

Young children's expressive language development is critically important due to its direct influence on pre-reading skills (i.e., decoding and phonological awareness) and indirect, foundational relationship with school-age reading success (Dickinson, Golinkoff, & Hirsh-Pasek, 2010; Duff, Reen, Plunkett, & Nation, 2015; National Early Literacy Panel, 2008). Children's language development is highly dependent on the most proximal social interactions within their first learning environment; mother-child interactions within the home (Baldwin & Meyer, 2007; Gonzalez, Rivera, Davis, & Taylor, 2010). More specifically, children's expressive language will likely flourish when mothers engage in affectionate, responsive, encouraging, and teaching parenting behaviors (Roggman, Boyce, & Innocenti, 2008). With depressive symptoms compromising a mother's ability to engage in healthy parenting practices that build language (Kiernan & Huerta, 2008; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; McFadden & Tamis-LaMonda, 2013; Zajicek-Farber, 2010), the current study aimed to add to the literature by further exploring the specific relationships between maternal depression, specific parenting practices, and children's expressive language abilities for low-income, racially and ethnically diverse mother-child pairs.

The first research question attempted to replicate findings that showed a significant, negative relationship between maternal depressive symptoms and children's expressive language. However, the present study found no relationship between these variables when children were, on average, 17 months of age (r = .07; p =.56). This finding is perplexing because the majority of research on this topic supports the relationship between higher levels of maternal depressive symptoms and significantly

lower expressive language scores in children (Kaplan et al., 2014; Pan, Rowe, Singer, & Snow, 2005; Quevedo et al., 2012; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber, 2010). In addition, extensive research shows that depression functionally impairs a mother's ability to engage in reciprocal conversation and provide a cognitively stimulating experiences (Feldman, 2007; McLearn, Minkovitz, Strobino, Marks, & Hou, 2006; Zajicek-Farber, 2010); both of which are critical dimensions of a supportive language learning environment for young children (Hoff, 2006; Roseberry, Hirsch-Pasek, Parish-Morris, & Golinkoff, 2009). Because the debilitating effect of this disorder occurs at such a high rate among low-income, ethnically and racially diverse mothers of young children (Alegria et al., 2007; National Center for Health Statistics, 2012), the non-significant findings of the present study should not be misinterpreted to mean that maternal depression is no longer a concern within a mother-child dyad. Instead, the non-significant results must be considered within the context of a highly specific, unique sample.

First, the sample size may have affected the ability to sample enough participants to capture a true representation of the population. Although 67 participants were enough to minimize Type II error with 80% confidence, the sample was too small to generate a sizable proportion of mothers experiencing depressive symptoms at a clinically significant level. Only 17 mothers scored above the 16-point cutoff on the *Center for Epidemiologic Studies Depression Scale* (*CES-D*; Radloff, 1977; $M = 12.63$; $SD = 12.70$), equating to 25% of the total sample experiencing high levels of depressive symptoms. Having such a small proportion of mothers self-identifying with high levels of depressive symptoms is lower than what would be expected based on levels of

depressive symptoms reported in the literature. Within studies investigating depression in racially and ethnically diverse samples of Early Head Start mothers, mean *CES-D* total scores range from 13.93 to 20.30 with a range of 39% to 57% of total EHS mothers scoring above the 16-point cutoff (Chazen-Cohen et al., 2007; Malik et al., 2007; Pan, Rowe, Singer, & Snow, 2005; Whittaker, Harden, See, Meisch, & Westbrook, 2011). Thus, the specific sample of mothers in the current investigation reported *CES-D* total scores that are, on average, lower than what would be expected for low-income mothers enrolled in EHS. Also, the proportion of mothers experiencing clinically significant levels of depressive symptoms is much lower than what was expected for this sample. Such a low level of depressive symptoms within this sample may have limited the ability to detect statistically significant relationships between clinical levels of depression and the mediating and dependent variables.

Second, children of mothers experiencing depressive symptoms were notably younger than children's average age in the entire sample. Children's average age was 17.42 months for the entire sample, whereas children with mothers experiencing high levels of depression had a slightly younger average age (M = 15.82; SD = 9.57). In fact, nearly half of the children with mothers experiencing high levels of depression were 13 months old or younger. As children's repertoire of expressive language abilities are less robust by 13 months than during the second and third years of life, (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007), it is unlikely that the influence of maternal depressive symptoms were fully realized on this current sample. Following a 10-minute semi-structured play activity between a mother and child, Pan and colleagues (2005) found that children produced 22 different words at 14 months, 95 words at 24 months,

and 122 word at 36 months. The number of different words produced during a direct observation of language substantially increased as children aged. When considering the influence of maternal mental health, depression was negatively associated with a .02 word difference in children's expressive language per month squared, suggesting that as children age, maternal depression was associated with a larger gap in children's expressive language. When dividing children by age ranges, a negative association existed between maternal depression and children's expressive language when children were 18 to 23 months, but not when they were 12 to 17 months (Horowitz et al., 2003). Additionally, research identifying a negative relationship between maternal depression and children's expressive language tend to assess children's language at an older age than the current sample; between 18 and 36 months (Horowitz et al., 2003; NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Wang & Dix, 2013; Zajicek-Farber, 2010). Thus, productive language abilities at the point of assessment were likely too limited to detect meaningful differences.

Descriptive analyses provided compelling evidence corroborating with the need for varied language abilities to detect meaningful associations with maternal depression. Analysis of homoscedasticity of residuals between maternal depression scores and children's expressive language showed a fanning effect (see Figure 1). A fanning effect indicates that residuals (i.e., variances) are close to 0 for small values of maternal depression and are more spread out for larger values of maternal depression (Field, 2009). Thus, a linear relationship between maternal depression and expressive language is less reflective of the true relationship between these variables when maternal depression scores are high. It is possible that high levels of depressive symptoms were

not able to impact children's expressive language in a consistent, predictable way due to the children's young age. Without a substantial repertoire of expressive language abilities due to age, there was not enough variability within the data to observe language gaps.

Although research suggests that low-income families experience higher levels of depressive symptoms than those from more economically advantaged families (Goodman & Brand, 2009; Knitzer, 2007), the current sample of racially and ethnically diverse mothers reflected a unique demographic that could have influenced the findings. The majority of participating mothers were first generation immigrants to the United States (i.e., 49.3% born outside of the United States) with 69% of participating children identified as Latino/a. Acculturation to the customs and practices of the United States is a valid consideration for this sample because of the additional stress acculturation could have placed on the participating mothers. Acculturation stress can predict depression through the mediating variable of active coping skills (Driscoll & Torres, 2013). Therefore, it was anticipated that the current sample would self-report more depressive symptoms due to the predominance of first generation status. Contrary to this hypothesis, this sample of low-income, ethnically and racially diverse mothers report an overall lower level of depressive symptoms than what would be expected based on previous research. Compared to the 25% of mothers at-risk for depression in the current sample, the percentage of Early Head Start parents self-reporting clinically significant levels of depressive symptoms in the literature range from 39% to 57% when assessed using the *CES-D* (Chazen-Cohen et al., 2007; Malik et al., 2007; Pan, Rowe, Singer, & Snow, 2005; Whittaker, Harden, See, Meisch, & Westbrook, 2011). Community samples of low-income, racially and ethnically diverse mothers served through home visiting

programs demonstrate a similar percentage range of mothers with depression (i.e., 38% to 61%; Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010; Easterbrooks et al., 2013).

One explanation for the relatively low levels of depressive symptoms in the current sample is that active participation in Early Head Start's home visiting program taught them active coping skills to mediate the relationship between acculturation stress and depression. This explanation is plausible because of the negative predictive relationship between EHS home visiting engagement and mothers' depressive symptoms (Raikes, Green, Atwater, Kisker, Constantine, & Chazen-Cohen, 2006). When mothers were identified as consistently, highly involved in EHS home visiting throughout enrollment, they were half as likely to self-report clinically significant levels of depression symptoms when children were 36 months of age.

Another explanation for the non-significant association between level of maternal depression and children's language outcome is that although mothers may be experiencing depression, the extensive duration of EHS home visiting enrollment (i.e., 10 month average) provided several benefits to the mother-child dyad capable of counteracting the effects of depression on the family system. Extensive enrollment in a parent-child intervention program increases social supports and access to community resources to strengthen the family system. Mothers in the current sample did not need to face life challenges alone; instead CSC/EHS provided each mother-child dyad with a consistent social support in the form of a home visitor. Home visitors are also trained to link mothers and their children to support services and resources within the community. It is likely that extended EHS enrollment increased mothers' social support networks to

help encourage and support mothers in their everyday experiences. Therefore, mothers may have rated themselves lower on depressive symptoms because they perceived an increased social support network through enrollment in EHS. Even when levels of maternal depression were high, the social support network and connection to community services and agencies may have reduced the impact of high levels of maternal depression on children's language development.

The present research investigation also did not support the second hypothesis that maternal depression would influence children's expressive language abilities through the mechanism of parenting behaviors. Specifically, affectionate, responsive, encouraging, teaching, and overall parenting practices did not act as mediating variables between maternal depression and children's expressive language. Although these parenting behaviors were never assessed as mediating variables using the *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (i.e., *PICCOLO*; Roggman et al., 2009) observational tool, an array of positive parenting practices have been shown to mediate the relationship between maternal depression and children's language (NICHD, 1999; Paulson, Keefe, & Leiferman, 2009; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Zajicek-Farber, 2010). Two observational tools (i.e., *HOME* and a generated tool) and two parent report measures (i.e., two generated tools) identified five latent variables of parenting behaviors acting as mediators to the relationship between depression and children's expressive language: (a) maternal responsiveness; (b) opportunity to learn; (c) participation in literacy oriented stimulation activities; (d) maternal sensitivity; and (e) parent-to-child reading.

Several points of inquiry are warranted due to such contrasting results between the current study and the body of research supporting mediation by parenting behaviors. First, this is the initial investigation using the *PICCOLO* as an assessment tool within this literature base. The *PICCOLO* was selected as a strong assessment tool due to its psychometric validity, strong theoretical foundation, racially and ethnically diverse normative sample, and structured observational format (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Despite the strengths, a limitation was observed within the ranges of sub-scale and total parenting behavior scores. In an assessment of 2,048 racially and ethnically diverse Early Head Start families, Lori Roggman and colleagues (2013) reported the following sub-scale and total score ranges when children were 14 months of age: (a) Affection: Minimum = 1.17, Maximum = 14.00; (b) Responsiveness: Minimum = 0.00, Maximum = 14.00; (c) Encouragement: Minimum = 1.00, Maximum = 14; (d) Teaching: Minimum = 0.00, Maximum = 16; (e) *PICCOLO* total: Minimum = 7.48, Maximum = 58.00. Table 6 summarizes the ranges of sub-scale and total *PICCOLO* scores in the current investigation, with every range restricted compared to this larger sample. Thus, present parenting practices were more negatively skewed than what would be expected for this population. Although this may reflect parenting strength within the current sample, the restricted range of parenting practices provides insufficient variability within the data to accurately assess the association between parenting practices and expressive language.

An explanation for the negative skew in parenting behaviors is the influence of extended enrollment in EHS. Mother-child dyads were enrolled in EHS for an average of 10.5 months prior to the language assessment. Participants spent nearly a year engaging

in CSC/EHS's home visiting program that emphasizes child, parent, and parenting development. The duration of time spent in an EHS home visiting program is predictive of support for language and literacy activities (Raikes, Green, Atwater, Kisker, Constantine, & Chazen-Cohen, 2006). Because assessment timing allowed for variable and often extensive enrollment duration, EHS's home visiting program had ample time to positively impact both parent and child outcomes. The positive correlations between EHS enrollment duration and *Early Communication Indicator (ECI) for Infants and Toddlers* total scores ($r = .58$, $p < .001$, one-tailed), Responsive, Encouraging, Teaching, and Total *PICCOLO* scores ($r = .21$ - $.39$, $p = .001$ - $.045$, one tailed; see Table 8) provide evidence of EHS's effectiveness. Additionally, racial and ethnic minority families benefit the most from EHS programing. Families identifying as Latino/a and African American have been most receptive and responsive to the programing delivered by EHS (Raikes et al., 2006; Vogel, Xue, Moiduddin, Carlson, & Kisker, 2010). Thus, the current sample of primarily Latina families may have been highly receptive to the training provided by EHS to improve parenting practices. Participating mothers were likely positively affected by the well-established, home based intervention aimed at improving mother-child interactions.

Considerations regarding the outcome variable are also warranted as plausible explanations for non-significant findings. Children's expressive language was directly assessed by trained home visitors in children's natural home environments using the *ECI* (Luze et al., 2001). Overall administration integrity was 84.33%, which is above the 80% administration adherence level suggested by the assessment developers (Carta, Greenwood, Walker, & Buzhardt, 2010; Greenwood, Buzhardt, Walker, McCune, &

Howard, 2013). Of all the aspects of administration, setting up the materials prior to starting the assessment was the most commonly missed step in the administration process, resulting in set-up taking place during the designated 6-minute assessment period. It is possible that the true variability within the expressive language scores may not have been fully captured due to set-up taking away from assessment time. The introduction of novel items and individuals during test administration within the home may have caused children to react to the salience of assessment. Cameras and, at times, a Little Talks Research Assistant were used within the natural home environment to assess language. By making the assessment process obvious and novel, children may have expressed language differently than what would be produced during natural conditions.

Another possible impact on the current non-significant mediation findings is the pattern of expressive language variability captured in the current sample compared to the *ECI* normative sample. An observed delay in expressive language can occur at a rate of 13.5% in children ages 18 to 23 months (Horowitz et al., 2003), with children experiencing economic hardship at a greater risk for delays in expressive language than their same age economically advantaged peers (Fernald, Marchman, & Weisleder, 2013). Whereas the rate of expressive language production within the normative sample takes on exponential growth as children age each month (Greenwood, Walker, & Buzhardt, 2010), the current sample of economically disadvantaged children performed below the mean on certain months. As reflected in Figure 2, on average, children 21 to 26 months expressed language at a rate 50% below benchmark scores for their age compared to younger and older children that produced age equivalent expressive language. The restricted variability in expressive language scores between 21 and 26 months further supports the

explanation that gaps in expressive language scores cannot be observed in this sample until the third year of life. To further strengthen this argument, it is in the latter portion of a child's second year of life when maternal depression begins to realize the most negative impact on children's expressive language (NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005). Figure 2 demonstrates the difference in language abilities between the current and the normative sample. If the current sample of children produced substantially less language during the critical period when children turn 2 years old, than the potential impact of maternal depression on language through parenting will not be detected. Therefore, a restricted range of language abilities in the second year of life may limit the ability to detect influences of parenting practices on language outcomes.

Specific dimensions of the *PICCOLO* assessment may have accounted for non-significant mediation analyses. The use of the *PICCOLO* offers many strengths and additions to the current literature on parent mediation to the relationship between maternal depression and language outcomes. Although a strength-based assessment of positive, proactive engagement in developmentally supportive parenting practices, the *PICCOLO* did not capture a range of parenting practices. The ranges of sub-scale and total parenting practices were negatively skewed compared to normed data generated from parents of similar racial, ethnic, and socioeconomic backgrounds (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Restricted ranges of parenting practices provide insufficient variability within the data to accurately assess the association between parenting practices, levels of maternal depression, and expressive language.

An additional implication of using the *PICCOLO* is that the strengths-based design of the observational tool does not assess mothers' engagement in negative,

detrimental parenting practices. The strengths-based focus of the *PICCOLO* is an important consideration when interpreting the mediation findings, because maternal depression has a larger effect on negative parenting practices than on positive parenting behaviors (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). For example, mothers with depressive symptoms are more likely to engage in child criticisms while being more intrusive and controlling during play (Field et al., 2005; Gravener, Rogosch, Oshri, Narayn, Cicchetti, & Toth, 2012; Kelley & Jennings, 2003; McFadden & Tamis-LaMonda, 2013). The impact of level of maternal depression on negative parenting behaviors is relevant to the current investigation, because both harsh and developmentally supportive parenting practices can substantially influence children's language development (Nozadi et al, 2013; Pungello, Iruka, Dotterer, Mills-Koonce, & Reznick, 2009; Whittaker et al., 2011). Unfortunately, the *PICCOLO* is not designed to assess the levels of negative parenting practices that may be utilized in the current sample of mother-child dyads. Therefore, the non-significant mediation findings of the current investigation may be attributed to the assessment of positive parenting behaviors that have less of an association with level of maternal depression than negative behaviors.

Additionally, mothers can engage in multiple dimensions of parenting behavior simultaneously, such as smiling warmly to a child while supporting independent play (Roggman, Boyce, & Innocenti, 2008) as well as exhibiting aggravation while concurrently nurturing the child (McGroder, 2000). Person-oriented approaches to understanding shared patterns of parenting behaviors highlight that developmentally supportive and negative parenting practices are not necessarily mutually exclusive (Cook, Roggman, & D'zatko, 2012). Yet, negative parenting decreases as a function of

increased use of supportive parenting practices (Paschall & Mastergeorge, 2014). The current investigation cannot provide information on the extent to which developmentally supportive parenting behaviors are associated with the absence of, or decrease in, negative regard, intrusiveness, or punitive discipline. Thus, the current assessment may have overlooked the role of negative parenting behaviors that could be undermining the development of children's expressive language development.

Although the five simple mediation analyses did not identify parenting behavior as the mechanism through which maternal depression influences children's expressive language, teaching behaviors did significantly relate to language ability ($B = 4.49$, $p = .002$). Of all the developmentally supported parenting practices targeted in this investigation, teaching behaviors most closely reflect the parenting practices critical to language development. According to the *PICCOLO*, the operational definition of teaching behaviors includes shared conversations and play, cognitive stimulation, explanations, and questions (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Embedded within this definition are two distinct aspects of teaching behavior: communication that elicits reciprocal responses and engagement in specific types of activities that are cognitively stimulating. Simply hearing spoken language is not enough for expressive language development (Hirsh-Pasek & Golinkoff, 2012). Instead, children's expressive language abilities will be more advanced in quality and quantity when maternal lexical input is more diverse and varied (Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010) as well as when these advanced lexical input takes place in the context of a reciprocal dialogue between a mother and child (Roseberry, Hirsh-Pasek, Parish-Morris, & Golinkoff, 2009; Roseberry, 2010; Zimmerman et al.,

2009). Mothers can engage in an elaboration discourse style that provides and requests new information from their child to maintain a reciprocal dialogue (Fivush et al., 2006; Schick & Melzi, 2010). With a strong focus on elaborative behaviors within the unique items of the *PICCOLO* teaching sub-scale (i.e., explains reasons, labels objects, talks about characteristics of objects, asks children for information), the current findings contribute to the literature base supporting the relationship between elaborative, reciprocal dialogue and children's expressive language development. This finding should not be over interpreted due to the non-significant relationship found after the covariates of EHS enrollment duration and children's age were accounted for in the model. Such findings suggest that although teaching behaviors may be contributing to children's language growth, more of the variance in language is accounted for by natural maturation and extended support from the EHS program.

The current investigation has several strengths and provides valuable additions to the few investigation of the mediating role of parenting to the association between maternal depression and children's expressive language. The use of the *PICCOLO* and *ECI* as assessment tools adds to the limited research that utilized direct assessment to measure parenting practices and expressive language (Haabrekke, Siqveland, Smith, Wentzel-Larsen, Walhovd, & Moe, 2014; NICHD, 1999; Stein, Malmberg, Sylva, Barnes, & Leach, 2008). Direct assessment of parenting practices is a methodological strength because it reduces measurement bias caused by a mother's over- or under-estimations of actual parenting practices. Inaccuracies can occur when self-reporting behavior because mothers may rate themselves as they want to be perceived. Mother's may also not have an accurate awareness of the types of behaviors they engage in on a

daily basis with their child. The specificity of developmentally supportive parenting behaviors may be unfamiliar to mothers; therefore self-rating these behaviors may not accurately reflect their natural occurrences. An additional strength of using the *PICCOLO* assessment tool is that structured observations of parenting behaviors are shown to be the strongest predictor of children's outcomes compared to indirect assessments such as rating scales and structured interviews (Zaslow et al, 2006). This is also true for the sub-scales and total *PICCOLO* scores which are all associated with a range of developmental outcomes, including children's expressive language (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Similarly, direct assessment of children's expressive language through the *ECI* may most accurately reflect natural language production without bias from mothers' retrospective reporting. The semi-structured format of the *ECI* combines the benefit of standardization within a structured language assessment with a broader, more naturalistic assessment of a child's true language ability through language samples (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007). Assessment within the child's home increased the authenticity of language production by creating a testing environment that was both familiar and natural for language production. In prior studies, EHS home visitors have been successfully trained to administer the *ECI* (Greenwood, Buzhardt, Walker, Waylon, & Anderson, 2011). Thus, to further reduce child reactivity to assessment, EHS home visitors were trained to administer the *ECI*.

Psychometric validity and reliability of the direct assessment measures were also strengths within the current investigation. Intraclass correlation coefficients (ICCs; Shrout & Fleiss, 1979) were calculated to assess inter-rater reliability of *PICCOLO* and *ECI* ratings. Correlation coefficients ranging from .60 to .74 are considered good with

coefficients of .75 to 1.00 considered excellent (Cicchetti, 1994). Interrater reliability was excellent for all four *PICCOLO* domains (ICC = .76 - .91) as well as for the Total *PICCOLO* score (ICC = .92; see Table 5). In addition, interrater reliability for the *ECI* total communication score was excellent (ICC = .97). The content validity of the *PICCOLO* compared to the assessments used in mediation studies of parenting behaviors highlight the psychometric strength of the current investigation. The latent construct of parenting behavior has been defined in seven distinct ways: (a) maternal responsiveness; (b) opportunity to learn; (c) stimulation and home environment; (d) participation in literacy oriented stimulation activities; (e) maternal sensitivity; (f) parent-to-child reading; and (g) maternal intrusiveness. Both within and between research studies, the operational definitions of each behavior are distinct despite similar names. For example, maternal sensitivity is operationalized as nondistress, positive regard, and limited intrusiveness at one set of assessment points and as a supportive presence, respect for autonomy, and limited hostility at another time point (NICHD, 1999). Similarly, maternal responsiveness was assessed by Stein and colleagues (2008) as maternal warmth, enthusiasm, detachment, and emotional and verbal responsiveness at a 10-month assessment and pride, warmth, affection, sensitivity to distress, stimulation of cognitive development, and intrusiveness at 36 months. The inconsistencies within the observable definitions of parenting behaviors make comparisons and generalization of findings nearly impossible. The *PICCOLO* operationalizes the discrete classes of parenting behaviors demonstrated in the literature to support children's development.

Lastly, the use of Ordinary Least Squares regression analyses using the PROCESS computational tool allowed for the use of bootstrapping to improve Type I

error inflation. Bootstrapping is a resampling procedure that generates empirically derived representations of the sampling distribution of the indirect effect. Bootstrapping through PROCCESS allows for the construction of 95% bias-corrected confidence intervals to provide additional inferential data to support conclusions about indirect effects. Bias-corrected bootstrap intervals are recommended over Normal Theory Approaches to computing statistical inferences, because bootstrapping has higher power to detect indirect effects and sustain control over Type I error rates (Mackinnon et al., 2002; 2004; Preacher & Hayes, 2008).

It is necessary to explicitly acknowledge areas for improvement within this study. A highly specific sample was targeted in the current study to explore the protective role of parenting within a racially and ethnically diverse sample of low-income mothers and their young children. Despite the contributions to the literature as well as to educators and interventionists working with this population, the narrow sample limits external validity. Future research could expand the scope of participants to a heterogeneous racial and ethnic sample, or to families of varying socioeconomic statuses if generalization is a priority. Although sample size was sufficient to meet statistical power of .80 for simple mediation analyses, the sample of 67 was too small to use more powerful analytic tools. A sample size of at least 200 would enable the use of Structural Equation Modeling, which is a more powerful analytical program recommended for mediation analyses due to the ability to directly assess measurement error and co-vary residuals (Preacher & Hayes, 2008). A nested design is inherent within this sample, with a level of mother-child pairs nested within a level of home visitors. A larger sample size would enable the use of Hierarchical Linear Modeling to account for variability introduced by time and key home

visitor variables (i.e., employment duration, training, personality characteristics) on children's language (Hedeker & Gibbons, 2006; Raudenbush & Bryk, 2002). Future research should also assess a larger sample of mother-child dyads to have a more accurate reflection of the subgroup of mothers experiencing depression. With only 17 mothers scoring above the 16 point threshold on the *CES-D,* it is unlikely that the scores were robust enough to capture true variability within the population. The majority of children with mothers experiencing high levels of maternal depression were younger than 13 months of age, which suggests that the impact of maternal depressive symptoms might not be fully realized in this sample. With a larger group of mother-child dyads, a closer approximation of the true population can be achieved to better assess the influences of maternal depression and parenting behaviors on children's language.

The *CES-D* is an epidemiological screener that closely aligns with the symptoms of Major Depressive Disorder outlined in the *Diagnostic and Statistical Manual of Mental Disorders- Fifth Edition* (*DSM-V*; American Psychiatric Association, 2013). A possible explanation for the non-significant relationship between level of maternal depressive symptoms, parenting behavior, and children's expressive language is that an assessment of depressive symptoms alone does not reflect how the construct of depression actually impairs the functioning of primarily low-income, Latina mothers of young children. Several specific feelings can arise when experiencing depression as a mother. For example, being overwhelmed by parenting responsibilities can lead to senses of guilt, irrational thinking, and anger that permeate daily mother-child interactions. In addition, mothers can emotionally distance themselves from their children in an attempt to avoid or counteract these negative feelings (Beck, 1996). Focus groups specific to the

experience of depression for pregnant Latina woman revealed that experiences with maternal depression was closely related to perceptions of social support with family and friends coupled with the belief that coping and recovering from depression should occur independently (Hayden, Connelly, Baker-Ericzen, Hazen, & Horwitz, 2013). This is an intriguing finding considering that Hispanic adults perceive lack of social support, feeling disconnected from others, and lacking emotional support as a leading cause for depression (Cabassa, Lester, & Zayas, 2007). Mother with limited financial resources also experience the daily stress and tensions of sufficiently supporting their child's basic needs, which can manifest in the form of hostility, frustration, and even resentment toward a child. Taken together, the current investigation assessed symptoms of depression in mothers but not the specific emotional experiences, perceptions of social supports, and conceptualizations of coping that could be effecting their daily interactions with their children. Future research should expand the scope of depression assessment to include additional dimensions of depression as it relates to the experiences of low-income, primarily Hispanic mothers of young children.

Another consideration is that the current investigation is a snapshot of the relationship between maternal depression, mother-child interactions, and children's expressive language. A negative relationship is more often found between children's language and maternal depression when depressive symptoms are more severe and extend for longer periods of time (Brennan et al.,, 2000; NICHD, 1999; Pan, Rowe, Singer, & Snow, 2005). Level of maternal depressive symptoms are also more likely to impact negative parenting behaviors than positive parenting practices (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Additionally, language development is highly correlated

with children's age, reflecting greater variability and growth over time (Huttenlocher, Waterfall, Vasilyeva, Venea, & Hedges, 2010). Lastly, parenting practices change over time, often adapting to match the developmental needs of children (Roggman, Boyce, & Innocenti, 2008). However, it is exposure to stable, high quality parenting interactions that predicts the greatest language comprehension and production from infancy to preschool age (Rodriguez & Tamis-LaMonda, 2011; Schmitt, Simpson, & Friend, 2011). Thus, trends in maternal depression, mother-child interactions, and expressive language should be used to explore the relationship between variables to capture growth and variability. Exploration of mediation by negative parenting practices would also expand understanding of maternal depression's influences on children's expressive language through parenting practices.

In addition, the *PICCOLO* and *ECI* consist of single, brief observations to assess broad abilities of parenting and children's expressive language. These ten and six minute observations, respectively, also had variability in assessment standardization due to inconsistent support from research assistants during administration and variable assessment sequences. Thus, future research could improve control over assessment standardization while extending the observational windows. Consistent support from research assistants for all participants as well as a standardized assessment order would reduce additional variance introduced into the regression models. The current study could also be improved by lengthening the observational window for the *PICCOLO* and *ECI* and conducting repeated assessments over a few days. Such a change would allow for a more representative sampling of behaviors and language to more accurately reflect the constructs being assessed.

The primary purpose of exploring the current research questions was to help explain the pathways leading to children's language development with the goal of informing the design of preventative interventions. Home visiting is a service delivery model that can positively impact child development and parenting outcomes (Love et al., 2005; Sweet & Appelbaum, 2004). More specifically, programming through a home visiting model has supported children's language development and also improves mother's levels of depression (Raikes, Green, Atwater, Kisker, Constantine, & Chazan-Cohen, 2006; Vallotton, Harewood, Ayoub, Mastergeorge, & Brophy-Herb, 2012). With knowledge from this research study, home visiting intervention programs should emphasize parent involvement in interactive dialogue with their child as well as engagement in cognitively stimulating activities. However, it is important to place this recommendation within the context of extensive literature supporting an array of parenting behaviors linked to child outcomes. Developers of home visiting interventions should not over interpret the single significant relationship in this current investigation to mean that parenting interventions should exclusively focus on improving the single parenting construct of teaching. The constellation of parenting behaviors (i.e., affection, responsiveness, encouragement, and teaching) assessed by the *PICCOLO* are all linked to improvements in the major developmental competencies of communication, attachment, and social-emotional development (Roggman, Boyce, & Innocenti, 2008). Additionally, all four parenting domains were significantly related to each other in both the normative and current sample, suggesting that growth in one parenting domain can influence growth in another (Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). Since parents tend to have personal strengths and areas for growth amongst the four developmentally

supportive parenting behaviors, a strong home visiting intervention should target improvements in teaching behaviors by integrating direct instruction in affectionate, responsive, and encouraging behaviors. Such a multifaceted intervention could use individual parenting strengths to increase intervention engagement and success while also positively influencing a broader scope of child competence including communication, social-emotional and attachment development.

The *PICCOLO* is an invaluable assessment and progress monitoring tool for future interventions aimed at increasing teaching parenting behaviors. The *PICCOLO* was developed for the purpose of improving parenting interventions by identifying areas of strength and growth for individual parents. Home visitors and intervention developers can utilize the *PICCOLO* to assess intervention effectiveness as well as monitor the progress of parenting behaviors across domains. To avoid overemphasis on only the teaching dimension of parenting, repeated *PICCOLO* assessments over the span of a parenting intervention can highlight the areas of imbalance between parenting behaviors. Thus, the *PICCOLO* is a strong progress monitoring and performance feedback tool for home visitors to help build parent teaching behaviors within a context of developing affection, responsiveness, and encouragement.

In line with the collaborative, partnership created between Lehigh University and Community Services for Children/Early Head Start, the results of this investigation will be shared with CSC/EHS. The goal of communicating these findings is two-fold: to create a dialogue about maternal depression among EHS families and to evaluate the current plan to support effected families. First, administration, home visitor, and family perceptions of maternal depression within CSC/EHS is not well known to the primary

investigator. Communicating that one-quarter of sampled mothers demonstrated clinically-significant rates of depressive symptoms is likely unknown to CSC/EHS staff. Thus an open dialogue would be the first step to understanding the current mental health needs, perceptions, and stigmas. Through a participatory action research model (Hitchcock et al., 2006), future applied research can focus on the development and execution of an assessment process and support plan for CSC/EHS families to address mental health needs and the related impacts on parenting practices.

Practical applications emphasize the need for assessment, monitoring, and support of both children and mothers. First, professionals within the field of early childhood should screen for and regularly monitor level of maternal depressive symptoms and expressive language onset and development. Because maternal depression can restrict the positive outcomes of home visiting (Easterbrooks et al., 2013), screening for maternal depression is critically important for supporting child development and addressing mothers' needs. Maternal depression experienced as early as 3 months after childbirth can negatively impact children's future language development at 36 months of age (Stein, Malmberg, Sylva, Barnes, & Leach, 2008). Also, severe and chronic depression has the most negative impact on child development and language (Brennan et al., 2000; Claessens, Engel, & Curran, 2015; NICHD, 1999), emphasizing the need to assess for maternal depression over time. Thus, it is recommended that maternal depression screenings occur every 6 months starting at birth and extending through the first three years of a child's life. The predictive value of expressive language to school readiness, reading, and academic success makes screening and assessment of language critical in the early years. Because a child's expressive language repertoire needs to be

robust enough to detect meaningful variability from average language development, it is recommended that language assessments take place at one year of age and are repeated over the first four to five years of life. Early childhood supervisors and administrators should also have a clear, progressive screening, assessment, and referral process to support the mental health needs of mothers and language development of children. Such a service delivery model can proactively support maternal mental health and children's expressive language while placing emphasis on teaching behaviors.

Table 1

Research Studies Assessing Mediation by Parenting Behaviors

Study	SES	Ethnicity	Assessments			Definitions of Parenting Behaviors
			Language	Depression	Parenting	
Piteo, Yelland, & Makrides (2012)	Not Reported	Australian Sample	Bayley Scales of Infant and Toddler Development-III: Language sub-scale (Bayley, 2006) -Direct Assessment -18 months	Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987) -Parent Report -6 weeks & 6 months	Home Screening Questionnaire (Frankenburg & Coons, 1986) -Parent Report -18 months	Stimulation and Home Environment -parental involvement -organization of the physical environment -provision of appropriate play materials -variety in daily activities -at least 10 easily accessible books in the home -play actively with the child every day -weekly outings to places like the supermarket -the father being involved in daily care -reading/showing pictures at least five times/week -using fewer than three different babysitters/day care centers during the past 3 months -taking child to the doctor/pediatrician for well child care visits as appropriate

Stein, Malmberg, Sylva, Barnes, & Leach (2008)	Mixed	England Sample	Reynell Developmental Language Scale (Reynell, 1990) -Direct assessment -36 months	Edinburgh Postnatal Depression Scale -Parent Report -3 & 10 months General Health Questionnaire (Goldberg, 1982) -Parent Report -36 months	Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell 1988) -Direct Assessment -10 & 36 months Caregiver Interaction Scale (CIS; Arnett, 1989) -Direct Assessment -10 months Observation Rating Scale of the Environment (ORCE; NICHD 1996) -Direct Assessment -36 months	Maternal Responsiveness (10 months) -2 CIS sub-scales: Positive Relationship & lack of Detachment -HOME sub-scale: emotional/verbal responsiveness Opportunities or Learning (10 months) -HOME sub-scales: Organization of the Physical & Temporal Environment, Provision of Appropriate Play Materials, & Opportunities for Variety in Daily Stimulation ---------- Maternal Responsiveness (36 months) -HOME sub-scales: Pride, Warmth, & Affection -ORCE and opportunities for learning HLE Opportunities for learning: (36 months) -ORCE: Global construct of sensitivity/responsiveness to distress/nondistress; intrusiveness/over control; detachment/disengagement; cognitive stimulation; positive/negative regard -Parent report of children's engagement in cognitively stimulating activities derived from EPPE home interview (Melhuish et al. 2008)

Zajicek-Farber (2010)	Low	53% Latino 47% African American	MacArthur Communicative Development Inventories-Short Form (CDI-SF; Fenson et al., 2000) -Parent-Report -16-18 months	Edinburgh Postnatal Depression Scale -Parent Report -16-18 months	Created for study purposes -Parent Report -16-18 months	Literacy Oriented Stimulation Activities -Direct literacy oriented activities (i.e., singing songs, sharing books) -Literacy enrichment activities (i.e., taking child for walks, holding child while doing chores)
NICHD Early Child Care Research Network (1999)	Mixed	6% Latino 11% African American 5% Other	Reynell Developmental Language Scale (Reynell, 1990) -Direct Assessment -36 months	Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) -Parent Report -1, 6, 15, 24, and 36 months	Created for study purposes -Direct Assessment -6, 15, 24, and 36 months	Maternal Sensitivity (6, 15, 24 months) -Sensitivity to nondistress, positive regard, and intrusiveness ---------- Maternal Sensitivity (36 months) -Supportive presence, respect for autonomy, hostility
Paulson, Keefe, & Leiferman (2009)	Mixed	17% Latino 6% African American 14% Asian/ Pacific Islander 11% Other	MacArthur Communicative Development Inventories (50 item subset; Fenson et al., 1994) -Parent Report -9 & 24 months	Center for Epidemiological Studies Depression Scale-Short Form (CES-D-SF; Ross, Mirowsky, & Huber, 1983) -Parent Report -9 months	Created for study purposes -Parent Report -9 & 24 months	Parent-to-Child Reading -Frequency of read in 1 week

Haabrekke et al. (2014)	Not Reported	Norwegian Sample	Mullen Scales of Early Learning Expressive Language Sub-Scale (MSEL; Mullen, 1995) -Direct Assessment -24 months	Edinburgh Postnatal Depression Scale -Parent Report 3 months	Parent–Child Early Relational Assessment (PCERA; Clark, 1999) -Direct Assessment -12 months	Maternal Intrusiveness and Lack of Sensitivity -Intrusiveness -Inconsistency and unpredictability -Lack of structuring/facilitating interaction -Mother's verbalizations -Anxious mood -Quality of physical contact -Insensitivity and unresponsiveness to cues -Rigidity

Note. Direct Assessement = Any assessment that directly observes and rates behaviors. Parent report = Any assessment relying on retrospective reporting from the parent. Months recorded within the language, depression, and parenting assessments reflect the child's age at time of assessment.

Table 2

Caregiver Demographics

Caregiver Demographics (%)	Total Sample (N = 67)
Relationship to Child	
Mother	100.0
Primary Home Language	
English	50.7
Spanish	32.8
English & Spanish	11.9
Other	4.6
Birth Country	
U.S.	50.7
Dominican Republic	14.9
Puerto Rico	14.9
Mexico	9.0
Nicaragua	3.0
Other	7.5
Education Level	
< 9th Grade	6.0
Some High School	19.4
High School	26.9
GED	1.5
HS + Some College	35.8
GED + Some College	1.5
4- Year Degree	9.0
Employment[a]	
Full Time	17.9
Part Time	22.4
Unemployed	58.2
Marital Status	
Married	31.3
Never Married	50.7
Separated/Divorced	13.4
Common-Law	4.5
Maternal Depression	

Present (CES-D ≥ 16)	25.4
Absent (CES-D < 16)	74.6
Range	0.0 - 40.0
Age in Years (*M*, *SD*)	27.8 (6.3)
Range	17.0 - 46.0

[a]*n* = 66.

Table 3

Child Demographics

Child Demographics (%)	Total Sample (N = 67)
Gender	
Female	61.2
Male	38.8
Race/Ethnicity	
Spanish/Hispanic/Latino	68.7
Multi-Racial	13.5
Black/African American	7.5
White	6.0
Other	4.5
Special Needs	
Yes	7.5
No	92.5
Age in Months (*M, SD*)	17.4 (9.3)
Range	1.0 - 34.0
EHS Enrollment in Months (M, SD)	10.49 (9.26)
Range	0.0 - 31.0

Table 4

Home Visitor Demographics

Home visitor Demographics (%)	Total Sample (N = 16)
Gender	
Female	100.0
Race/Ethnicity	
Spanish/Hispanic/Latino	50.0
White	37.5
Black/African American	6.3
Multi-Racial	6.3
Native Language	
English	68.8
Spanish	31.3
Bilingual	43.8
Education	
4 Year College	87.5
Masters Degree	6.3
CDA[a]	6.3
Age in Years (*M, SD*)	33.7 (10.9)
Range	23.0 - 56.0
EHS Employment in Years (M, SD)	3.4(5.1)
Range	0.0 - 19.0

[a]CDA = Child Development Associate.

Table 5

Intraclass Correlation Coefficients for PICCOLO and ECI Interrater Reliability

	Rating 1	Rating 2	
Measure	M(SD)	M(SD)	ICC
PICCOLO			
Affection	11.63 (1.78)	10.88 (1.96)	.77*
Responsiveness	10.81 (2.14)	10.88 (2.31)	.87**
Encouragement	9.81 (3.43)	9.38 (3.01)	.84**
Teaching	9.06 (2.35)	8.38 (2.90)	.91**
Total PICCOLO	41.31 (7.95)	39.50 (7.80)	.92**
ECI			
Total Communication	41.14 (27.93)	36.43 (24.01)	.97**

Note. ICC = intraclass correlation coefficient
*$p < .05$. ** $p < .001$

Table 6

Descriptive Statistics for Predictor and Outcome Variables

	M(SD)	Range	Min.	Max.	Skewness	Kurtosis
CES-D	12.63(10.70)	40.00	0.00	40.00	1.10	0.31
ECI	43.57(41.06)	168.00	0.00	168.00	1.06	0.54
PICCOLO						
Affection	11.43(1.75)	7.00	7.00	14.00	-0.35	-0.60
Responsiveness	10.22(2.49)	9.00	5.00	14.00	-0.19	-0.98
Encouragement	9.10(3.16)	12.00	2.00	14.00	-0.49	-0.69
Teaching	9.09(3.12)	13.00	2.00	15.00	-0.06	-0.39
Total Parenting	39.85(8.45)	35.00	20.00	55.00	-0.23	-0.79

Note. CES-D = Center for Epidemiologic Studies Depression Scale (Independent Variable); ECI = Early Communication Indicator (Dependent Variable); PICCOLO = Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (Mediating Variables).

Table 7

Pearson Product Moment Bivariate Correlations among Predictor and Outcome Measure

Measures	CES-D	ECI	Affect.	Respons.	Encour.	Teach.	Total
1. CES-D	--						
2. ECI	.07	--					
3. Affection	.02	-.03	--				
4. Responsiveness	.03	.10	.42**	--			
5. Encouragement	.17	.13	.43**	.58**	--		
6. Teaching	-.04	.34*	.43**	.51**	.63**	--	
7. Total PICCOLO	.06	.20	.65**	.78**	.86**	.85**	--

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Independent Variable); ECI = Early Communication Indicator weighted total score (Dependent Variable); Affection, Responsiveness, Encouragmeent, and Teaching total scores= Sub-scales of PICCOLO (Mediating Variables); Total PICCOLO = Parenting Interactions with Children: Checklist of Observations Linked to Outcomes total score (Mediating Variable). All correlation analyses run as one-tailed tests.
*p < 05. ** p <.001

Table 8

Pearson Product Moment and Point-Biserial Bivariate Correlations between Covariates and Mediator and Outcome Variables

	Mediator and Outcome Variables					
Covariates	ECI	Affect.	Respons.	Encour.	Teach.	Total
Child Age	.69**	.07	.24*	.32*	.50**	.39**
EHS Duration	.58**	.12	.21*	.22*	.39**	.31*
Child Gender	.09	.25*	.17	.15	.18	.23
Disability Status	-.06	.07	.03	-.05	-.03	.01

Note. Pearsons product moment bivariate correlations used to calculate associations between the continuous variables of child age and EHS duration and the mediator and outcome variables. Point-biserial bivariate correlations used to calculate associations between the dichotomous variables of child gender and disability status and the mediator and outcomes variables. One-tailed tests were used to assess the relationship between ECI weighted total scores and covariates. Two-tailed tests were used to assess relationship between parenting behaviors and covariates. ECI = Early Communication Indicator weighted total score; Affect. = Affection total score; Respons. = Responsiveness total score; Encour. = Encouragement total score; Teach. = Teaching total score; Total = Total PICCOLO score.
*p < .05. ** p <.001

Table 9

Coefficients of the Direct and Indirect Effects of Mediation by Affectionate Parenting Behaviors

		Consequent								
		AFFECT (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
CES-D (X)	*a*	0.00	0.02	.86	-0.03 to 0.04	*c'*	0.28	0.50	.57	-0.71 to 1.27
AFFECT. (M)		—	—	—	—	*b*	-0.70	3.14	.82	-6.96 to 5.57
Constant	i_1	11.40	0.34	<.001	10.71 to 12.08	i_2	47.98	39.81	.23	-31.55 to 127.51
		$R^2 = 0.00$					$R^2 = 0.01$			
		$F(1, 65) = .03$, $p = .86$					$F(2, 64) = 0.24$, $p = .78$			

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Affect. = Affection sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator). **p* < .05. ** *p* <.001

Table 10

Coefficients of the Direct and Indirect Effects of Mediation by Affectionate Parenting Behaviors Controlling for Child Age

		Consequent								
		AFFECT. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
Child Age (control)		0.01	0.02	.56	-0.03 to 0.06		3.12**	0.40	<.001	2.33 to 3.92
CES-D (X)	*a*	0.00	0.02	.84	-0.04 to 0.04	*c'*	0.50	0.34	.15	-0.19 to 1.18
AFFECT. (M)		—	—	—	—	*b*	-1.91	2.10	.37	-6.10 to 2.29
Constant	i_1	11.14**	0.55	.00	10.05 to 12.23	i_2	4.73	25.13	.85	-45.48 to 54.94
		R^2 = .01					R^2 = .50**			
		$F(2, 64) = 0.19$, $p = .83$					$F(3, 63) = 20.81$, $p < .001$			

Note. Child age in months at time of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Affect. = Affection sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 11

Coefficients of the Direct and Indirect Effects of Mediation by Affectionate Parenting Behaviors Controlling for EHS Enrollment Duration

		Consequent								
		AFFECT. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
EHS Enroll. (control)		0.02	0.02	.33	-0.02 to 0.07		2.56**	0.43	<.001	1.70 to 3.41
CES-D (X)	*a*	0.01	0.02	.79	-0.04 to 0.05	*c'*	0.56	0.39	.16	-0.22 to 1.33
AFFECT. (M)		—	—	—	—	*b*	-2.41	2.37	.31	-7.14 to 2.33
Constant	i_1	11.14**	0.43	.00	10.28 to 11.99	i_2	37.22	27.62	.18	-17.96 to 92.41
		R^2 = .01					R^2 = .37**			
		$F(2, 64) = 0.48$, $p = .62$					$F(3, 63) = 12.09$, $p < .001$			

Note. EHS Enroll. = Enrollment in EHS in months as point of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Affect. = Affection sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 12

Coefficients of the Direct and Indirect Effects of Mediation by Responsive Parenting Behaviors

		Consequent								
		RESPONS. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
CES-D (X)	*a*	0.01	0.03	.83	-0.06 to 0.08	*c'*	0.27	0.53	.62	-0.80 to 1.33
RESPONS. (M)		—	—	—	—	*b*	1.57	2.16	.47	-2.75 to 5.89
Constant	i_1	10.13**	0.52	<.001	9.09 to 11.16	i_2	24.13	23.47	.31	-22.76 to 71.02
		$R^2 = 0.00$					$R^2 = 0.01$			
		$F(1, 65) = 0.05$, $p = .83$					$F(2, 64) = 0.40$, $p = .67$			

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Respons. = Responsiveness sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator). *$p < .05$. ** $p < .001$

Table 13

Coefficients of the Direct and Indirect Effects of Mediation by Responsive Parenting Behaviors Controlling for Child Age

		Consequent								
		RESPONS. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
Child Age (control)		0.06*	0.03	.05	0.00 to 0.13		3.18**	0.41	<.001	2.36 to 3.99
CES-D (X)	*a*	0.01	0.03	.68	-0.04 to 0.07	*c'*	0.50	0.34	.15	-0.19 to 1.18
RESPONS. (M)		—	—	—	—	*b*	-1.24	1.52	.42	-4.28 to 1.79
Constant	i_1	8.95**	0.76	.00	7.44 to 10.47	i_2	-5.39	16.42	.74	-38.20 to 27.41
		R^2 = .06					R^2 = .50**			
		$F(2, 64) = 1.97$, $p = .15$					$F(3, 63) = 20.71$, $p < .001$			

Note. Child age in months at time of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Respons. = Responsiveness sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 14

Coefficients of the Direct and Indirect Effects of Mediation by Responsive Parenting Behaviors Controlling for EHS Enrollment Duration

		Consequent								
		RESPONS. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
EHS Enroll. (control)		0.05	0.03	.08	-0.01 to 0.12		2.53**	0.44	<.001	1.66 to 3.41
CES-D (X)	*a*	0.01	0.03	.64	-0.04 to 0.07	*c'*	0.55	0.39	.16	-0.23 to 1.33
RESPONS. (M)		—	—	—	—	*b*	-0.54	1.71	.75	-3.95 to 2.87
Constant	i_1	9.48**	0.60	.00	8.29 to 10.67	i_2	15.54	18.12	.39	-20.68 to 51.75
		R^2 = .05					R^2 = .36**			
		$F(2, 64) = 1.57$, $p = .22$					$F(3, 63) = 11.61$, $p < .001$			

Note. EHS Enroll. = Enrollment in EHS in months as point of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Respons.. = Responsiveness sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 15

Coefficients of the Direct and Indirect Effects of Mediation by Encouraging Parenting Behaviors

		Consequent								
		ENCOUR. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
CES-D (X)	*a*	0.05	0.03	.10	-0.01 to 0.11	*c'*	0.20	0.49	.68	-0.78 to 1.18
ENCOUR. (M)		—	—	—	—	*b*	1.54	2.10	.47	-2.66 to 5.73
Constant	i_1	8.46**	0.59	<.001	7.29 to 9.62	i_2	27.05	21.80	.22	-16.50 to 70.60
		$R^2 = 0.03$					$R^2 = 0.02$			
		$F(1, 65) = 2.80$, $p = .10$					$F(2, 64) = 0.32$, $p = .72$			

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Encour. = Encouragement sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 16

Coefficients of the Direct and Indirect Effects of Mediation by Encouraging Parenting Behaviors Controlling for Child Age

		Consequent								
		ENCOUR. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
Child Age (control)		0.11*	0.04	.01	0.03 to 0.19		3.30**	0.42	<.001	2.46 to 4.13
CES-D (X)	*a*	0.06	0.03	.09	-0.01 to 0.13	*c'*	0.59	0.35	.09	-0.10 to 1.29
ENCOUR. (M)		—	—	—	—	*b*	-1.77	1.24	.16	-4.24 to 0.71
Constant	i_1	6.38**	0.92	.00	4.54 to 8.21	i_2	-5.26	12.06	.66	-29.35 to 18.83
		R^2 = .14*					R^2 = .51**			
		$F(2, 64) = 5.24$, $p = .01$					$F(3, 63) = 21.60$, $p < .001$			

Note. Child age in months at time of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Encour. = Encouraging sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 17

Coefficients of the Direct and Indirect Effects of Mediation by Encouraging Parenting Behaviors Controlling for EHS Enrollment Duration

		Consequent								
		ENCOUR. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
EHS Enroll. (control)		0.08*	0.04	.05	0.00 to 0.16		2.53**	0.44	<.001	1.65 to 3.42
CES-D (X)	*a*	0.06	0.04	.10	-0.01 to 0.13	*c'*	0.57	0.40	.16	-0.23 to 1.36
ENCOUR. (M)		—	—	—	—	*b*	-0.38	1.37	.78	-3.12 to 3.37
Constant	i_1	7.53**	0.74	.00	6.05 to 9.02	i_2	13.28	13.18	.32	-13.07 to 39.62
		R^2 = .09*					R^2 = .36**			
		$F(2, 64) = 3.06$, $p = .05$					$F(3, 63) = 11.60$, $p < .001$			

Note. EHS Enroll. = Enrollment in EHS in months as point of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Encour. = Encouragement sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 18

Coefficients of the Direct and Indirect Effects of Mediation by Teaching Parenting Behaviors

		Consequent								
		TEACH. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
CES-D (X)	*a*	-0.01	0.03	.71	-0.08 to 0.05	*c'*	0.34	0.45	.46	-0.56 to 1.24
TEACH. (M)		-	-	-		*b*	4.50*	1.42	.002	1.66 to 7.33
Constant	i_1	9.25**	0.57	<.001	8.11 to 10.40	i_2	-1.54	16.17	.92	-33.84 to 30.75
		$R^2 = 0.00$					$R^2 = 0.12$*			
		$F(1, 65) = 0.15$, $p = .71$					$F(2, 64) = 5.01$, $p = .01$			

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Teach. = Teaching sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 19

Coefficients of the Direct and Indirect Effects of Mediation by Teaching Parenting Behaviors Controlling for Child Age

		Consequent							
		TEACH. (M)				ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI	Coeff.	*SE*	*p*	95% CI
Child Age (control)		0.17**	0.04	<..001	0.10 to 0.24	3.12**	0.46	<.001	2.20 to 4.04
CES-D (X)	*a*	0.00	0.03	.96	-0.06 to 0.06	*c'* 0.49	0.35	.16	-0.20 to 1.18
TEACH. (M)		—	—	—	—	*b* -.15	1.37	.92	-2.88 to 2.59
Constant	i_1	6.17**	0.84	.00	4.48 to 7.85	i_2 -15.63	12.52	.22	-40.66 to 9.40
		R^2 = .25**				R^2 = .49**			
		$F(2, 64) = 10.81$, p <.001				$F(3, 63) = 20.28$, p <.001			

Note. Child age in months at time of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Teach. = Teaching sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*p < .05. ** p <.001

Table 20

Coefficients of the Direct and Indirect Effects of Mediation by Teaching Parenting Behaviors Controlling for EHS Enrollment Duration

		Consequent								
		TEACH. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
EHS Enroll. (control)		0.12**	0.04	<.001	0.05 to 0.20		2.29**	0.46	<.001	1.37 to 3.20
CES-D (X)	*a*	0.00	0.03	1.00	-0.07 to 0.07	*c'*	0.54	0.39	.16	-0.23 to 1.31
TEACH. (M)		__	__	__	__	*b*	1.77	1.43	.22	-1.08 to 4.62
Constant	i_1	7.80**	0.71	.00	6.39 to 9.21	i_2	-3.37	13.74	.81	-30.83 to 24.09
		R^2 = .15*					R^2 = .37**			
		$F(2, 64) = 5.56$, $p = .01$					$F(3, 63) = 12.36$, $p < .001$			

Note. EHS Enroll. = Enrollment in EHS in months as point of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Teach. = Teaching sub-scale score of PICCOLO. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 21

Coefficients of the Direct and Indirect Effects of Mediation by Total PICCOLO Scores

		Consequent								
		TOT. PIC. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
CES-D (X)	*a*	0.05	0.09	.56	-0.12 to 0.22	*c'*	0.23	0.50	.64	-0.77 to 1.24
TOT. PIC. (M)		-	-	-		*b*	0.93	0.62	.14	-0.31 to 2.17
Constant	i_1	39.23**	1.60	<.001	36.02 to 42.43	i_2	3.60	27.93	.90	-52.19 to 59.39
			$R^2 = 0.00$					$R^2 = 0.04$		
			$F(1, 65) = 0.34$, $p = .56$					$F(2, 64) = 1.13$, $p = .33$		

Note. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Tot. PIC. = Total PICCOLO score. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

Table 22

Coefficients of the Direct and Indirect Effects of Mediation by Total PICCOLO Scores Controlling for Child Age

		Consequent							
		TOT. PIC. (M)				ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI	Coeff.	*SE*	*p*	95% CI
Child Age (control)		0.36**	0.10	<.001	0.15 to 0.57	3.27**	0.43	<.001	2.41 to 4.13
CES-D (X)	*a*	0.07	0.09	.42	-0.11 to 0.25	*c'* 0.52	0.34	.13	-0.16 to 1.21
TOT.PIC. (M)		—	—	—	—	*b* -0.49	0.47	.30	-1.43 to 0.46
Constant	i_1	32.64**	2.43	.00	27.79 to 37.49	i_2 -0.58	17.94	.97	-36.43 to 35.27
		R^2 = .16**				R^2 = .50**			
		$F(2, 64) = 6.07$, p <.001				$F(3, 63) = 20.97$, p <.001			

Note. Child age in months at time of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Tot. Pic. = PICCOLO weighted total score. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*p < .05. ** p <.001

Table 23

Coefficients of the Direct and Indirect Effects of Mediation by PICCOLO Total Score Controlling for EHS Enrollment Duration

		Consequent								
		TOT. PIC. (M)					ECI (Y)			
Antecedent		Coeff.	*SE*	*p*	95% CI		Coeff.	*SE*	*p*	95% CI
EHS Enroll. (control)		0.28*	0.10	.01	0.07 to 0.48		2.50**	0.45	<.001	1.60 to 3.40
CES-D (X)	*a*	0.08	0.09	.41	-0.11 to 0.27	*c'*	0.54	0.39	.17	-0.24 to 1.33
TOT.PIC. (M)		—	—	—	—	*b*	0.01	0.52	.98	-1.03 to 1.05
Constant	i_1	35.95**	1.96	.00	32.02 to 39.87	i_2	10.01	20.39	.63	-30.74 to 5.75
		R^2 = .11*					R^2 = .36**			
		$F(2, 64) = 3.76$, $p = .03$					$F(3, 63) = 11.56$, $p < .001$			

Note. EHS Enroll. = Enrollment in EHS in months as point of expressive language assessment. CES-D = Center for Epidemiologic Studies Depression Scale total score (Maternal Depression Indicator). Tot. Pic. = PICCOLO weighted total score. ECI = Early Communication Indicator weighted total score (Children's Expressive Language Indicator).
*$p < .05$. ** $p < .001$

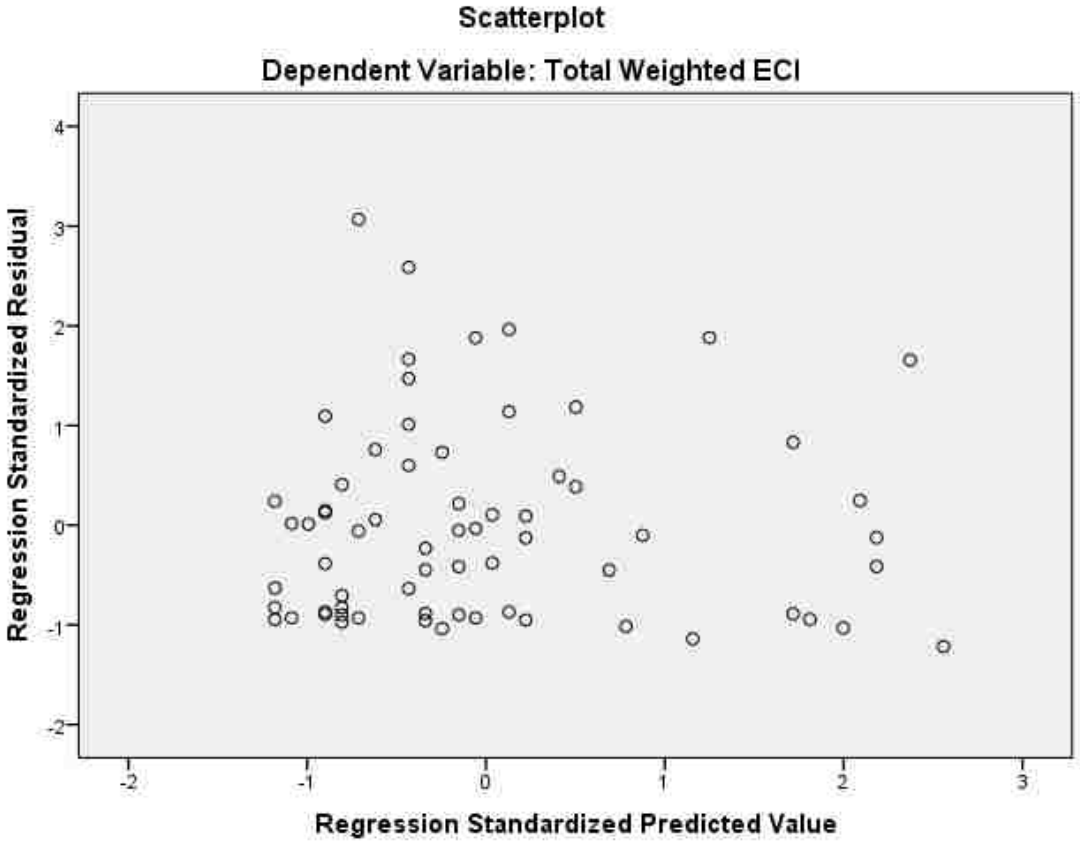

Figure 1. Scatterplot of standardized residuals against standardized predicted values for the *Center for Epidemiologic Studies Depression Scale* (i.e., *CES-D*; independent variable) and *Early Communication Indicator* (i.e., *ECI*; dependent variable).

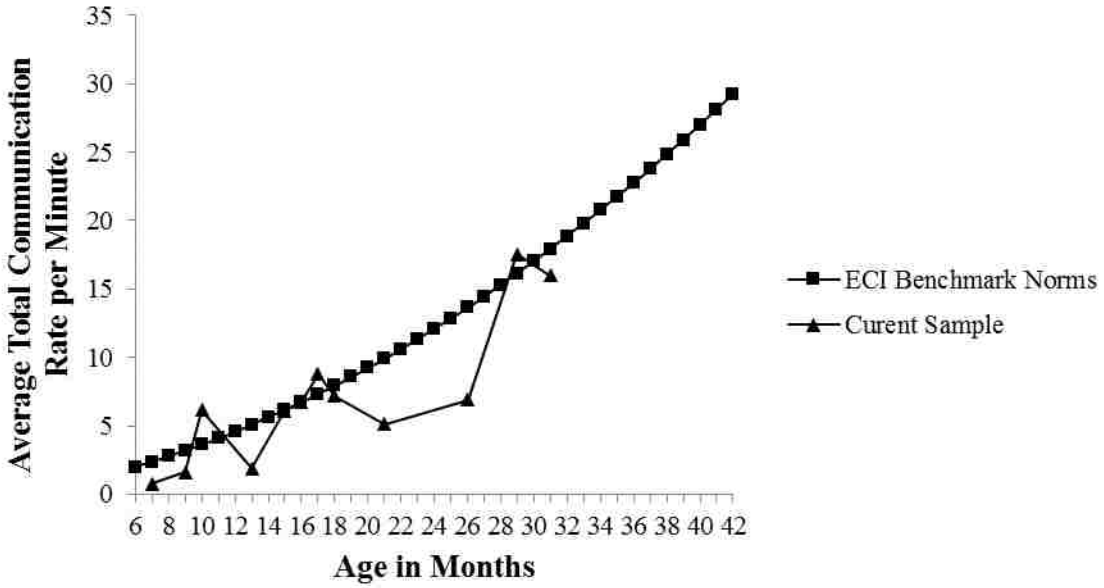

Figure 2. Average total communication rates per minute by child age in months as assessed by *the Early Communication Indicator* (*ECI*). Solid, square data points reflect *ECI* benchmark norms generated by assessment developer (Greenwood, Walker, & Buzhardt, 2010). Solid, triangle data points represent average total communication rates from the current sample for months with at least 3 children in that age group. Not every month on the X axis has a data point for the current sample. The lines connecting data points from the current sample are added for asthetic purposes and do not reflect communication rates between data points.

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Appendix A

Center for Epidemiologic Studies Depression Scale (CES-D)/English Form

Child's Name: _____ Your Name: _____
Your Relationship to Child: _____ Date: _____ CDP: _____

Center for Epidemiologic Studies Depression Scale (CES-D), NIMH
Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐

1

Please complete the second page!

CES-D, continued

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people dislike me.	☐	☐	☐	☐
20. I could not get "going."	☐	☐	☐	☐

Appendix B

Center for Epidemiologic Studies Depression Scale (CES-D)/Spanish Form

Nombre del niño: _____ Su nombre: _____
Su relacion con el niño: _____ _ Fecha: _____ CDP: _____

CES-D

Instrucciones. *Le voy a leer unas frases que describen como usted se podría haber sentido. Por favor dígame con que frecuencia se ha sentido de esta manera durante la semana pasada: raramente o ninguna vez; alguna o pocas veces: ocasionalmente o una buen parte del tiempo; o la mayor parte o todo el tiempo.*

	Durante la semana pasada			
	Raramente o ninguna vez (Menos de un día)	Alguna o poca vez (1-2 dias)	Ocasional-mente o una buena parte del tiempo (3-4 dias)	La mayor parte o todo el tiempo (5-7 dias)
1. Le molestaron cosas que usualmente no le molestan.	☐	☐	☐	☐
2. No se sentía con ganas de comer; tenía mal apetito.	☐	☐	☐	☐
3. Sentía que no podía quitarse de encima la tristeza aun con la ayuda de su familia o amigos.	☐	☐	☐	☐
4. Sentía que Ud. era tan buena como cualquier otra persona.	☐	☐	☐	☐
5. Tenía dificultad en mantener su mente en lo que estaba haciendo.	☐	☐	☐	☐
6. Se sentía deprimida.	☐	☐	☐	☐
7. Sentía que todo lo que hacía era un esfuerzo.	☐	☐	☐	☐
8. Se sentía optimista sobre el futuro.	☐	☐	☐	☐
9. Pensó que su vida había sido un fracaso.	☐	☐	☐	☐
10. Se sentía con miedo.	☐	☐	☐	☐
11. Su sueño era inquieto.	☐	☐	☐	☐
12. Estaba contenta.	☐	☐	☐	☐
13. Habló menos de lo usual.	☐	☐	☐	☐
14. Se sintió sola.	☐	☐	☐	☐

1

Favor de completar la segunda página!

CES-D, continuado

	Durante la semana pasada			
	Raramente o ninguna vez (Menos de un día)	Alguna o poca vez (1-2 dias)	Ocasional-mente o una buena parte del tiempo (3-4 dias)	La mayor parte o todo el tiempo (5-7 dias)
15. La gente no era amistosa.	☐	☐	☐	☐
16. Disfrutó de la vida.	☐	☐	☐	☐
17. Pasó ratos llorando.	☐	☐	☐	☐
18. Se sintió triste.	☐	☐	☐	☐
19. Sentía que no le caía bien a la gente.	☐	☐	☐	☐
20. No tenía ganas de hacer nada.	☐	☐	☐	☐

Appendix C

Early Communication Indicator (ECI) Administration Checklist

ECI Administration Checklist

LUID _____ **Assessment point** _____

Setting up the ECI administration situation

1.	Adult play partner sets up the House or Barn prior to session.	Yes	No
2.	The toys inside have been arranged to attract child's attention.	Yes	No
3.	Barn or House is set up so it is facing the child and accessible.	Yes	No
4.	Adult and child are positioned so they can see and reach toys.	Yes	No
5.	Adult and child can have eye contact.	Yes	No
6.	Child is positioned appropriately for his/her developmental level (head, neck, and feet supported as needed).	Yes	No
7.	Session is timed.	Yes	No

ECI assessment administration

8.	Adult play partner follows child's lead in play situation.	Yes	No
9.	Adult play partner comments about what the child is doing.	Yes	No
10.	Adult play partner describes what he/she is doing.	Yes	No
11.	Adult play partner interacts in non-directive, friendly manner.	Yes	No
12.	Adult play partner uses questions sparingly.	Yes	No

Administration Accuracy [(Total Number of Steps Completed Correctly/12)*100] = ____

Notes:

Appendix D

Early Communication Indicator (ECI) Scoring Sheet

Early Communication Indicator (ECI)

Child Name or #:_____ Assessment Date_____ (MM/DD/YYYY)

Assessment Duration:____ ____
Min Sec

Form: House or Barn Condition Change (see list below):_____

Primary Coder:_____ Assessor:_____

Location (Circle One): Home Center Other (explain in Notes)

Language of Administration: _____

If Reliability, Reliability Coder's Name: _____

Notes: _____

	Gestures	Vocalizations	Single Words	Multiple Words
Begin 0:00 Sec.	G	V	W	M
1:00 Sec.	G	V	W	M
2:00 Sec.	G	V	W	M
3:00 Sec.	G	V	W	M
4:00 Sec.	G	V	W	M
5 :00 Sec.	G	V	W	M
6 min. End Total	G	V	W	M

Condition List

ABA/TEACH
Child Psychiatrist
Interpreter
Language Intervention Toolkit
Medical Intervention (e.g., Tubes
Mental Health Consultant
Milieu or Incidental Teaching
MOD Recommendations
None
Other
Primary Care Provider
Registered Nurse
Responsive Interaction
Social Worker
Speech/Language Therapist

Rev 07/2009

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Appendix E

Parenting Interactions with Children: Checklist of Observations Linked to Outcomes

(PICCOLO)

ID # _____ (Name _____) Child's birthdate: __/__/___ Today's date: __/__/___
mm/dd/yy mm/dd/yy

PICCOLO

Parenting Interactions with Children:
Checklist of Observations Linked to Outcomes

INSTRUCTIONS: Look closely to see behaviors in a quiet parent. Frequency is more important than complexity, but complexity often includes several examples.

SCORING: **0 – "Absent"** - no behavior observed
1 – "Barely" - brief, minor, or emerging behavior
2 – "Clearly" - definite, strong, or frequent behavior

Affection **Warmth, physical closeness, and positive expressions toward child**					
#	**Parent . . .**	**Observation Guidelines**	**Absent**	**Barely**	**Clearly**
1	**speaks in a warm tone of voice**	Parent's voice is positive in tone, and may show enthusiasm or tenderness. A parent who speaks little but very warmly should be coded highly.	**0**	**1**	**2**
2	**smiles at child**	Parent directs smiles toward child, but they do not need to be looking at each other when smile occurs. Includes small smiles.	**0**	**1**	**2**
3	**praises child**	Parent says something positive about child characteristics or about what child is doing. A "thank you" can be coded as praise.	**0**	**1**	**2**
4	**is physically close to child**	Parent is within easy arm's reach of child, comfortably able to soothe or help. Consider context: expect more closeness for book reading than for playing house.	**0**	**1**	**2**
5	**uses positive expressions with child**	Parent says positive things, or uses words like "honey," "kiddo," or an affectionate nickname. NOTE: emphasis on verbal expressions	**0**	**1**	**2**
6	**is engaged in interacting with child**	Parent is actively involved together *with* child, not just with activities or with another adult.	**0**	**1**	**2**
7	**shows emotional warmth**	Parent shows enjoyment, fondness, or other positive emotion about the child and directed to child. NOTE: includes verbal but emphasis on nonverbal	**0**	**1**	**2**
Comments:			***Affection*** total =		

ID # _____ (Name _____) Child's birthdate: __/__/___ Today's date: __/__/___
mm/dd/yy mm/dd/yy

PICCOLO

Responsiveness **Responding to child's cues, emotions, words, interests, and behaviors**					
#	**Parent . . .**	**Observation Guidelines**	**Absent**	**Barely**	**Clearly**
1	**pays attention to what child is doing**	Parent looks at and reacts to what child is doing by making comments, showing interest, helping, **or** otherwise attending to child's actions.	**0**	**1**	**2**
2	**changes pace or activity to meet child's interests or needs**	Parent tries a new activity or speeds up or slows down an activity in response to where child looks, what child reaches for, what child says, or emotions child shows.	**0**	**1**	**2**
3	**is flexible about child's change of activities or interests**	Parent accepts a child's choice of a new activity or toy **or** shows agreeableness about the change or about child playing in unusual ways with or without toys.	**0**	**1**	**2**
4	**follows what child is trying to do**	Parent both responds to **and** gets involved with child's activities.	**0**	**1**	**2**
5	**responds to child's emotions**	Parent reacts to child's positive or negative feelings by showing understanding or acceptance, suggesting a solution, re-engaging the child, labeling or describing the feeling, showing a similar feeling, or providing sympathy for negative feelings.	**0**	**1**	**2**
6	**looks at child when child talks or makes sounds**	When child makes sounds, parent clearly looks at child's face or (if eyes or child's face are not visible) parent's position and head movement face toward child.	**0**	**1**	**2**
7	**replies to child's words or sounds**	Parent repeats what child says or sounds child makes, talks about what child says or could be saying, **or** answers child's questions.	**0**	**1**	**2**
Comments:			***Responsiveness*** total =		

PICCOLO

Encouragement **Active support of exploration, effort, skills, initiative, curiosity, creativity, and play**					
#	**Parent . . .**	**Observation Guidelines**	**Absent**	**Barely**	**Clearly**
1	**waits for child's response after making a suggestion**	Parent pauses after saying something the child could do **and** waits for child to answer or do something, whether child actually responds or not.	**0**	**1**	**2**
2	**encourages child to handle toys**	Parent offers toys or says positive things when child shows obvious interest in toys. (Does not include preventing children from mouthing toys.)	**0**	**1**	**2**
3	**supports child in making choices**	Parent allows child to choose activity or toy **and** gets involved with activity or toy child chooses.	**0**	**1**	**2**
4	**supports child in doing things on his/her own**	Parent shows enthusiasm for things child tries to do without help, lets child choose how things are done, **and** lets child try to do things before offering help or suggestions. Parent can be engaged in activities child does "on his/her own".	**0**	**1**	**2**
5	**verbally encourages child's efforts**	Parent shows verbal enthusiasm, offers positive comments, **or** makes suggestions about child's activity.	**0**	**1**	**2**
6	**offers suggestions to help child**	Parent gives hints or makes comments to make things **easier** for child without interfering with child's play.	**0**	**1**	**2**
7	**shows enthusiasm about what child is doing**	Parent makes positive statements, claps hands, or shows other clear positive response to what child is *doing*, including quiet enthusiasm such as patting child, nodding, smiling, or asking child questions about activities.	**0**	**1**	**2**
Comments:			***Encouragement*** total =		

PICCOLO

Teaching **Shared conversation and play, cognitive stimulation, explanations, and questions**					
#	**Parent . . .**	**Observation Guidelines**	**Absent**	**Barely**	**Clearly**
1	**explains reasons for something to child**	Parent says something that could answer a "why" question, whether child asks a question or not.	**0**	**1**	**2**
2	**suggests activities to extend what child is doing**	Parent says something child could do to add to what child is already doing, but does not interrupt child's interests, actions, or play.	**0**	**1**	**2**
3	**repeats or expands child's words or sounds**	Parent says the same words or makes the same sounds the child makes **or** repeats what child says while adding something that adds to the idea.	**0**	**1**	**2**
4	**labels objects or actions for child**	Parent names what child is doing, playing with, or looking at.	**0**	**1**	**2**
5	**engages in pretend play with child**	Parent plays make believe in any way – for example, by "eating" pretend food.	**0**	**1**	**2**
6	**does activities in a sequence of steps**	Parent demonstrates or describes the order of steps or does an activity in a way that a definite order of steps is clear even if parent does not say exactly what the steps are. Book reading counts **only** if parent makes the steps explicit by exaggerating or explaining the steps while reading.	**0**	**1**	**2**
7	**talks to child about characteristics of objects**	Parent uses words or phrases that describe features such as color, shape, texture, movement, function, or other characteristics.	**0**	**1**	**2**
8	**asks child for information**	Parent asks any kind of question or says, "tell me," "show me," or other command that requires a yes/no response, short answer, or longer answer—whether or not child replies. Does not include questions to direct attention ("see?") or suggest activities ("wanna open the bag?").	**0**	**1**	**2**
Comments:			***Teaching*** total =		

Appendix F

Family Informed Consent: Intervention Group of Larger Study/English Form

Little Talks

Parents & children talking, reading, and having fun together!

A new program created in partnership with Community Services for Children, Inc., Early Head Start, Lehigh University, Children's Hospital of Philadelphia, and Utah State University

October 2014

Dear Early Head Start Parent/Guardian:

I am working with your Early Head Start program to introduce the *Little Talks* program. This program guides parents in sharing books and talking with their infants and toddlers. It is being developed with Dr. Lori Roggman from Utah State University, and Dr. Tom Power from Children's Hospital of Philadelphia (CHOP).

I will supervise members of the Little Talks team, who will be teaching your home visitor about Little Talks. Your home visitor will be able to guide you in using Little Talks with your child. Your home visitor will receive training and supervision in providing Little Talks. She will provide 30-minute Little Talks lessons during 24 home visits.

The Early Head Start staff and I would like to see if including Little Talks in home visiting will benefit you and your child. We believe that Little Talks will give parents ideas for how to talk to and teach their infants and toddlers. We also believe that children will gain strong language skills. This will help them learn to read and get ready for school. We expect that parents will experience greater confidence in parenting and that they will become more involved in learning activities with their children. We expect parents to have these benefits, even if they are experiencing sadness and stress.

We would like to see if Little Talks is helpful for you and your child. We are asking for your permission to assess your child. We would like to video tape parts of home visits. We would also like for you to complete parenting surveys. We would do the assessments four times during the 24-session Little Talks program. Here is how we will do the assessments:

> Your home visitor will play with your child in a way that encourages communication skills. These skills include talking, babbling, and pointing. She will video record her play with your child. The Little Talks team will watch the tapes and note how your child communicates.
>
> To look at the ways in which you teach and interact with your child, your home visitor will video tape you and your child together for about 10 minutes. These videos will be watched by members of the Little Talks team. They will note the different ways in which you interact with and teach your child.

We will also ask you to complete surveys about the ways in which you are involved in your child's learning activities at home and how you feel about your parenting skills. Additionally, we will ask you to complete surveys about your child's vocabulary. We will also ask you to complete surveys about feelings of sadness and stress. We ask these questions to find out more about how parents' feelings relate to results of the Little Talks program.

Your home visitor will also ask you about the books in your home. She will ask about what you like or do not like about the books you read with your child. This will let us know what books are most liked by families and children.

For each of the four assessments, we will provide $30 to thank you for your time. During the 24-session Little Talks program, you could receive $120 for completing all assessments.

We would also like to see if Little Talks improves Early Head Start home visiting. Four times during the 24-session Little Talks program, your home visitor will video record the Little Talks lesson and other discussions about your child's growth and development. These videos will be watched by the Little Talks team. The team will note the ways in which your home visitor teaches you Little Talks. In addition, portions of the videos may be used during our supervision with your home visitor to enhance home visiting services. The video recordings will always be stored securely at Lehigh University and video recordings will be destroyed at the end of this program's evaluation. Lastly, we will review your home visitors' notes about Little Talks and child development or parenting goals. We will note the number of home visits you have completed. We will also note how long your child has been enrolled in Early Head Start.

All of the information described above will be confidential, except as specified by law (e.g., report of harm to yourself or others). Any identifying information on the forms will be removed. Videos will be destroyed at the end of this program's evaluation. Only members of the Little Talks team will have access to your information. We will not share your personal responses to the parenting surveys with the Early Head Start program. We will share information about your child's communication skills with the program staff. This will help improve home visiting services. We will also share portions of the videos with your home visitor and her supervisor to improve home visiting services. We will write reports based on information collected for the whole program. You will not be personally identified.

Your participation in this study is voluntary. You may stop your participation at any time without risking your relationship with Community Services for Children, Inc. or Lehigh University. We don't feel that your participation in the assessments presents serious risks to you or your child.

If at any time, you have concerns or questions about the assessments you can talk to your home visitor. You may also contact me at 610-758-5656 or phm3@lehigh.edu. You may also contact Susan Disidore in the Office of Research at Lehigh University at 610-758- 3020.

To participate, please sign this form below. You will receive a copy of this letter.

Thank you for considering my invitation to participate in our evaluation of Little Talks.

Sincerely,
Patti Manz, Ph.D.
Associate Professor at Lehigh University and Director of Little Talks

I would like to participate in the evaluation of Little Talks. I understand that I will complete 4 assessments during the 24-session program. As part of the assessments, my home visitor will video record four Little Talks lessons. She will also record her play with my child and times when I am together with my child. I understand that the information I provide on parenting surveys, my child's language assessments, and the video tapes will be shared among the Little Talks team. That team includes Drs. Manz, Roggman, and Power. I also understand that my child's language assessments and video tapes may be shared with my home visitor during her supervision. I feel that the activities of this study were fully explained to me. I had the opportunity to ask questions.

_____

Printed name

_____

Signature

_____

Relationship to Early Head Start child

Appendix G

Family Informed Consent: Intervention Group of Larger Study/Spanish Form

Pequeñas Conversaciones

¡Padres y niños hablando, leyendo y divirtiendo juntos!

Un nuevo programa creado en colaboración con Community Services for Children, Inc., Early Head Start, Lehigh University, Children's Hospital of Philadelphia, y Utah State University

Octubre 2014

Querido Early Head Start Padre/Guardián:

Estoy trabajando con su programa de Early Head Start para introducir el programa *Pequeñas Conversaciones*. Este programa guía a los padres en compartir libros y hablar con sus bebes y niños pequeños. Este programa se está desarrollando con Dra. Lori Roggman de Utah State University, y Dr. Tom Power del Children's Hospital of Philadelphia (CHOP).

Voy a supervisar miembros del equipo de Pequeñas Conversaciones, que estarán enseñado a su visitante domiciliario sobre Pequeñas Conversaciones. Su visitante domiciliario va a ser capaz de guiarle en el uso de Pequeñas Conversaciones con su hijo. Su visitante domiciliario recibirá entrenamiento y supervisión para proporcionar Pequeñas Conversaciones. Ella proporcionará lecciones de 30 minutos de Pequeñas Conversaciones durante las visitas domiciliarias durante 24 visitas a domicilio.

Los empleados de Early Head Start y yo nos gustaría ver si incluyendo Pequeñas Conversaciones en visitas domiciliarias le beneficiará a usted y su niño. Creemos que Pequeñas Conversaciones dará ideas a los padres sobre cómo hablar y enseñar a sus bebés y niños pequeños. También creemos que niños ganarán fuertes habilidades de lenguaje. Esto les ayudarán a aprender a leer y prepararse para la escuela. Esperamos que los padres experimentaran más confianza en la crianza de sus hijos y que ellos participen más en las actividades de aprendizaje con sus hijos. Esperamos que los padres tengan estos beneficios, aún si están experimentando tristeza y estrés.

Nos gustaría ver si Pequeñas Conversaciones es útil para usted y su niño. Estamos pidiendo su permiso para evaluar a su niño. Queremos grabar en vídeo partes de las visitas a domicilio. También queremos que usted completan cuestionarios sobre la paternidad. Hareamos las evaluaciones en cuatro ocasiones durante el programa de 24 sesiones de Pequeñas Conversaciones. Así es como vamos a realizar las evaluaciones:

> Su visitadora domiciliaria jugará con su hijo de una manera que anima a las habilidades de comunicación. Estas habilidades incluyen hablando, balbuceando y señalando. Ella se grabará

en vídeo su juego con su hijo. El equipo de Pequeñas Conversaciones mirará las cintas. Nosotros notarámos cómo se comunica su hijo.

Para mirar las maneras en que usted enseña y se relaciona con su hijo, su visitadora domiciliaria grabará en vídeo usted y su hijo juntos por unos 10 minutos. Estos vídeos serán mirados por miembros del equipo de Pequeñas Conversaciones Notarámos las diferentes maneras en que usted interactúa y enseña a su hijo.

También le pediremos que usted llene cuestionarios sobre las maneras en que usted está involucrado en las actividades de aprendizaje de su hijo en casa y cómo se siente sobre sus habiliadades como padre. Le pediremos que llene cuestionarios sobre el vocabulario de su hijo. También le pediremos que llene cuestionarios sobre sentimientos de tristeza y estrés.

Su visitadora domiciliaria también le preguntará sobre los libros en su casa. Ella le preguntará lo que le gusta o no le gusta de los libros que lee con su hijo. Esto nos permitirá saber que libros les gusta más a las familias y los niños.

Para cada una de las cuatro evaluaciones, le proporcionaremos $30 para darle las gracias por su tiempo. Podría recibir $120 para completar todas las evaluaciones.

También, nos gustaría ver si Pequeñas Conversaciones mejora los servicios de visitas domiciliarias de Early Head Start. Cuatro veces durante el programa de 24 sesiones de Pequeñas Conversaciones, su visitadora domiciliaria grabará vídeo de la lección de Pequeñas Conversaciones y otras discusiones sobre el crecimiento y desarrollo de su hijo. Estos vídeos serán mirados por el equipo de Pequeñas Conversaciones. El equipo notará las maneras en que la visitadora domiciliaria le enseña Pequeñas Conversaciones. Además, partes de los vídeos se pueden usar durante nuestra supervisión con su visitadora domiciliaria para mejorar los servicios de visitas domiciliarias. Las cintas de vídeo siempre se guardarán en forma segura en Lehigh University. Por último, vamos a examinar las notas de sus visitadoras domiciliarias sobre Pequeñas Conversaciones y los objetivos de desarrollo o paternidad. Notaremos el número de visitas domiciliarias que usted haya completado. También notaremos el tiempo que su hijo ha sido inscrito en Early Head Start.

Toda la información descrita anteriormente será confidencial, excepto según lo especificado por la ley (por ejemplo, informe de daño a sí mismo o a otros). Cualquier información de identificación en los formularios será eliminado. Las cintas de vídeo serán destruido al final de la evaluación de este programa. Solo miembros del equipo de la universidad tendrán acceso a su información. No compartiremos sus respuestas personales a los cuestionarios de los padres con el programa de Early Head Start. Compartiremos información sobre las habilidades de comunicación de su hijo con los empleados del programa . Esto mejorará los servicios de visitas domiciliarias. También, compartiremos partes de los vídeos con su visitadora domiciliaria y su supervisor para mejorar los servicios de visitas domiciliarias. Escribiremos informes basados en la información recogida durante todo el programa. Usted no será identificado personalmente.

Su participación en este estudio es voluntaria. Puede dejar de participar en cualquier momento sin poner en peligro su relación con Community Services for Children, Inc. o Lehigh University. No creemos que su participación en las evaluaciones presente graves riesgos para usted o su niño.

Si en algún momento, usted tiene preocupaciones o preguntas sobre las evaluaciones, puede hablar con su visitadora domiciliaria. Puede ponerse en contacto conmigo al 610-758-5656 o phm3@lehigh.edu. También puede ponerse en contacto con Susan Disidore en la Oficina de Investigación de Lehigh University en 610-758- 3020.

Para participar, por favor firme este siguiente formulario. Usted recibirá una copia de esta carta.

Gracias por considerar mi invitación a participar en nuestra evaluación de Pequeñas Conversaciones.

Sinceramente,
Patti Manz, Ph.D.
Profesor Asociado en Lehigh University y Director de Pequeñas Conversaciones

---

Me gustaría participar en la evaluación de Pequeñas Conversaciones. Entiendo que completaré 4 evaluaciones durante el programa de 24 sesiones. Como parte de las evaluaciones, mi visitadora domiciliaria se grabará en video cuatro lecciones de Pequeñas Conversaciones. También ella grabará en vídeo su juego con mi hijo y momentos en que estoy junto con mi hijo. Entiendo que la información que proporciono en los cuestionarios, evaluaciones del lenguaje de mi hijo, y las cintas de vídeo serán compartida entre el equipo Pequeñas Conversaciones. El equipo incluye a los Dres. Manz, Roggman, y Power. También entiendo que las evaluaciones del lenguaje de mi hijo y cintas de vídeo pueden ser compartidos con mi visitadora domiciliaria durante su supervisión. Siento que las actividades de este estudio fueron completamente explicadas. Tuve la oportunidad de hacer preguntas.

_____
Nombre escrito

_____
Firma

_____
Relación con el niño de Early Head Start

Appendix H

Family Informed Consent: Comparison Group of Larger Study/English Form

Building Children's Language Skills:
A Partnership with the Little Talks Program
of Lehigh University

October 2014

Dear Early Head Start Parent/Guardian:

I am working with your Early Head Start program to look at ways that home visitors can best support families and their children. Early Head Start and I will also introduce a new program, called Little Talks, to Early Head Start families. I am asking you to participate in a program evaluation, before you begin Little Talks. This is for us to measure how the program helps children grow in their language and communication. The Little Talks team includes Dr. Tom Power from Children's Hospital of Philadelphia and Dr. Lori Roggman from Utah State University.

I am asking for your permission to assess your child and to video record parts of home visits. I am also asking you to complete surveys about parenting. The assessments will be done four times across 24 home visits. Here is how the assessments will be done:

Your home visitor will play with your child in a way that encourages communication skills. These skills include talking, babbling, and pointing. She will video record her play with your child. The Little Talks team will watch the tapes. We will note how your child communicates.

To look at the ways in which you teach and interact with your child, your home visitor will video tape you and your child together for about 10 minutes. These videos will be watched by members of the Little Talks team. We will note the different ways in which you interact with and teach your child.

We will also ask you to complete surveys about how you are involved in your child's learning activities at home and how you feel about your parenting skills. We will ask you to complete surveys about your child's vocabulary. We will also ask you to complete surveys about feelings of sadness and stress. We ask these questions to find out more about how parents' feelings relate to home visiting and interactions with children.

Four times over 24 home visits, your home visitor will video record a time when the two of you are talking about your child's development. These videos will be watched by the by the University team. They will note the ways in which your home visitor teaches you about children's development. The video recordings will always be stored securely at Lehigh University. Last, we will review your home visitors' notes about the child development or parenting goals discussed in home visits. We will note the number of home visits you have completed and how long your child has been enrolled in Early Head Start.

For each of the four assessments, we will provide $30 to thank you for your time. You could receive $120 for completing all assessments.

All of the information described above will be confidential, except as specified by law (e.g., report of harm to yourself or others). Any identifying information on the forms will be removed. Videos will be destroyed at the end of this program's evaluation. Only members of the University team will have access to your information. We will not share your personal responses to the parenting questions with the Early Head Start. We may share information about your child's communication skills with the program staff to improve home visiting services. We may also share portions of the videos with your home visitor and her supervisor to improve home visiting services. We will write reports based on information collected for the whole program. You will not be personally identified.

Your participation in this study is voluntary. You may stop participating at any time without putting your relationship with Community Services for Children, Inc. or Lehigh University at risk. We don't feel that your participation in the assessments presents serious risks to you or your child.

If at any time, you have concerns or questions about the assessments you can talk to your home visitor. You can contact me at 610-758-5656 or phm3@lehigh.edu. You may also contact Susan Disidore in the Office of Research at Lehigh University at 610-758- 3020.

To participate, please sign this form below. You will receive a copy of this letter.

Thank you for considering my invitation to participate in our evaluation.

Sincerely,
Patti Manz, Ph.D.
Associate Professor at Lehigh University and Director of Little Talks

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I would like to participate in the evaluation. I understand that I will complete 4 assessments across 24 home visits. As part of the assessments, my home visitor will video record four child development lessons. She will record her play with my child. She will also record times when I am together with my child. I understand that the information I provide on parenting surveys, my child's language assessments, and the video tapes will be shared among the University team. The team includes Drs. Manz, Roggman, and Power. I

feel that the activities of this study were fully explained to me. I felt I had the opportunity to ask questions.

_____
Printed name

_____
Signature

_____
Relationship to Early Head Start child

Appendix I

Family Informed Consent: Comparison Group of Larger Study/Spanish Form

Construcción de las habilidades de comunicación y lenguaje de los niños:
Una colaboración con el programa de Pequeñas Conversaciones de Lehigh University

Octubre 2014

Querido Early Head Start Padre/Guardián:

Estoy trabajando con su programa de Early Head Start para buscar las maneras de que las visitadoras domiciliarias pueden mejor apoyar a las familias y sus hijos. Early Head Start y yo introduciremos un nuevo programa, "Pequeñas Conversaciones", a las familias de Early Head Start. Le pido su participación en una evaluación del programa, antes de empezar Pequeñas Conversaciones. Esto es para que midamos cómo el programa ayuda a los niños a mejorar su lenguaje y la comunicación. Por favor, sepan que el equipo de Pequeñas Conversaciones incluye al Dr. Tom Power del Children's Hospital of Philadelphia (CHOP) y la Dra. Lori Roggman de Utah State University.

Estoy pidiendo su permiso para evaluar a su niño, grabar en vídeo partes de las visitas a domicilio y que usted completará cuestionarios sobre la paternidad. Haríamos las evaluaciones en cuatro ocasiones durante 24 visitas a domicilio. Aquí es cómo vamos a hacer las evaluaciones:

Su visitadora domiciliaria jugará con su hijo de una manera que anima a las habilidades de comunicación. Estas habilidades incluyen hablando, balbuceando y señalando. Ella se grabará en vídeo su juego con su hijo. El equipo de Pequeñas Conversaciones mirará las cintas. Nosotros notarámos cómo se comunica su hijo.

Para mirar las maneras en que usted enseña y se relaciona con su hijo, su visitadora domiciliaria grabará en vídeo usted y su hijo juntos por unos 10 minutos. Estos vídeos serán mirados por miembros del equipo de Pequeñas Conversaciones Notarámos las diferentes maneras en que usted interactúa y enseña a su hijo.

También le pediremos que usted llene cuestionarios sobre las maneras en que usted está involucrado en las actividades de aprendizaje de su hijo en casa y cómo se siente sobre sus habiliadades como padre. Le pediremos que llene cuestionarios

sobre el vocabulario de su hijo. También le pediremos que llene cuestionarios sobre sentimientos de tristeza y estrés.

Cuatro veces durante 24 visitas a domicilio, su visitadora domiciliaria grabará vídeo de un momento en que ustedes están hablando sobre el desarrollo de su hijo. El equipo de la universidad mirará estos vídeos. Ellos notarán las maneras en que la visitadora domiciliaria le enseña del desarrollo de niños. Las cintas de vídeo siempre se guardarán en forma segura en Lehigh University. Por último, vamos a revisar las notas de sus visitadoras domiciliarias sobre el desarrollo del niño o los objetivos de paternidad discutidos en las visitas domiciliarias. Notaremos el número de visitas domiciliarias que used haya completado. También notaremos el tiempo que su hijo ha sido inscrito en Early Head Start.

Para cada una de las cuatro evaluaciones, le proporcionaremos $30 para darle las gracias por su tiempo. Podría recibir $120 para completar todas las evaluaciones.

Toda la información descrita anteriormente será confidencial, excepto según lo especificado por la ley (por ejemplo, informe de daño a sí mismo o a otros). Cualquier información de identificación en los formularios será eliminado. Las cintas de vídeo serán destruido al final de la evaluación de este programa. Solo miembros del equipo de la universidad tendrán acceso a su información. No compartiremos sus respuestas personales a los cuestionarios de los padres con el programa de Early Head Start. Podamos compartir información sobre las habilidades de comunicación de su hijo con los empleados del programa para mejorar los servicios de visitas domiciliarias. También, podamos compartir porciones de los vídeos con su visitadora domiciliaria y su supervisor para mejorar los servicios de visitas domiciliarias. Escribiremos informes basados en la información recogida durante todo el programa. Usted no será identificado personalmente.

Su participación en este estudio es voluntaria. Puede dejar de participar en cualquier momento sin poner en peligro su relación con Community Services for Children, Inc. o Lehigh University. No creemos que su participación en las evaluaciones presente graves riesgos para usted o su niño.

Si en algún momento, usted tiene preocupaciones o preguntas sobre las evaluaciones, puede hablar con su visitadora domiciliaria. Puede ponerse en contacto conmigo al 610-758-5656 o phm3@lehigh.edu. También puede ponerse en contacto con Susan Disidore en la Oficina de Investigación de Lehigh University en 610-758- 3020.

Para participar, por favor firme este siguiente formulario. Usted recibirá una copia de esta carta.

Gracias por considerar mi invitación a participar en nuestra evaluación.

Sinceramente,
Patti Manz, Ph.D.
Profesor Asociado en Lehigh University y Director de Pequeñas Conversaciones

Me gustaría participar en la evaluación. Entiendo que completaré 4 evaluaciones durante 24 visitas a domicilio. Como parte de las evaluaciones, mi visitadora domiciliaria grabará en video cuatro lecciones de Pequeñas Conversaciones. Ella se grabará en vídeo su juego con mi hijo. También, ella grabará momentos en que estoy junto con mi hijo. Entiendo que la información que proporciono en los cuestionarios, evaluaciones del lenguaje de mi hijo, y las cintas de vídeo serán compartidos entre el equipo de la universidad. El equipo incluye a los Dres. Manz, Roggman y Power. Siento que las actividades de este estudio fueron completamente explicadas a mí. Tuve la oportunidad de hacer preguntas.

_____
Nombre escrito

_____
Firma

_____
Relación con el niño de Early Head Start

Appendix J

Family Demographic Form/English Form

Family Demographics Form
*Little Talks ID:*_____

Date:_____

Child Name_____

Parent Name_____

You and Your Child

- **Your relationship to child** ☐ Mother ☐ Father ☐ Grandparent ☐ Other relative ☐ Foster parent
- **Your gender** ☐ Male ☐ Female
- **Your birth date**: ___ / ____ / ___
- **Are you the child's primary caregiver?** ☐ Yes ☐ No
- **Do you live with the child?** ☐ Yes ☐ No
- **Number of years lived in the United States?** _____
- **If you were not born in the United States, in what country were you born?** _____
- **Your employment outside the home:** ☐ Full-time ☐ Part time ☐ Not employed
- **Your marital status:** ☐ Married ☐ Never married ☐ Separated/Divorced ☐ Widowed ☐ Common law marriage
- **Amount of schooling that you completed:** ☐ Less than 9th grade ☐ Some high school, didn't finish ☐ Received GED ☐ High School Graduate ☐ High school + some college or trade school ☐ Four-year college degree ☐ College +
- **Your native language:** ☐ English ☐ Spanish ☐ Haitian-Creole ☐ Russian ☐ Arabic ☐ Polish ☐ Cambodian ☐ Vietnamese ☐ Laotian ☐ Other _____
- **Child's gender** ☐ Male ☐ Female
- **Child's birth date**: ___ / ____ / ___
- **Child's ethnicity:** ☐ Spanish/Hispanic/Latino ☐ Black/African-American ☐ White ☐Asian ☐ N. American Indian or Alaskan Native ☐ Other:_____
- **If you identify as a certain nationality (e.g. Dominican, Haitian, etc.), please specify:**

_____

Next Page Please!

Family Demographics Form
*Little Talks ID:*_____

- **Child's native language:** ☐ English ☐ Spanish ☐ Haitian-Creole ☐ Russian ☐ Arabic ☐ Polish ☐ Cambodian ☐ Vietnamese ☐ Laotian ☐ Other _____
- **Does child participate in any other education or child care program?** ☐ Yes ☐ No
  - **If yes, please list the name of the program:** _____
- **Has the child been diagnosed with special needs?** ☐ Yes ☐ No
  - **If yes:** ☐ Speech and language impairment ☐ Developmental delay ☐ Vision impairment ☐ Hearing impairment ☐ Chronic health impairment ☐ Other _____
- **What language do you speak most often at the home?** ☐ English ☐ Spanish ☐ Haitian-Creole ☐ Russian ☐ Arabic ☐ Polish ☐ Cambodian ☐ Vietnamese ☐ Laotian ☐ Other _____

Appendix K

Family Demographic Form/Spanish Form

Family Demographics Form
*Little Talks ID:*_____

Fecha:_____

Nombre del niño:_____

Nombre del padre: _____

Usted y Su Niño

- **Su relación al niño** ☐ Madre ☐ Padre ☐ Abuelo/Abuela ☐ Otro pariente ☐ Padre de crianza
- **Su sexo** ☐ Masculino ☐ Femenino
- **Su fecha de nacimiento**: ___ / ____ / ___
- **¿Ud. es el cuidador principal del niño?** ☐ Sí ☐ No

  ¿Ud. vive con el niño? ☐ Sí ☐ No
- **¿Cuántos años Ud. vive en los Estados Unidos?** _____
- **Si usted no nació en los Estados Unidos, ¿en qué país nació?**_____
- **Su empleo fuera el hogar :** ☐ De jornada completa ☐ De media jornada ☐ No empleado
- **Su estado civil:** ☐ Casado ☐ Nunca casado ☐ Aparado/divorciado ☐ Viudo ☐ Unión de hecho
- **Cantidad de educación que Ud. completó:** ☐ Menos de noveno grado ☐ Algunos de secundaria, no terminé ☐ Recibí Desarrollo Educativo General (El GED) ☐ Graduado de escuela secundaria ☐ Escuela secundaria + algunos de universidad o escuela vocacional ☐ Titulo universitario de 4 anos ☐ Universidad +
- **Su lengua materna:** ☐ Inglés ☐ Español ☐ Criollo-haitiano ☐ Ruso ☐ Árabe ☐ Polaco ☐ Camboyano ☐ Vietnamita ☐ Laosiano ☐ Otra: _____
- **Sexo del niño** ☐ Masculino ☐ Femenino
- **Fecha de nacimiento del niño**: ___ / ____ / ___
- **Raza del niño:** ☐ Español/Hispano/Latino ☐ Moreno/Afroamericano ☐ Blanco ☐Asiático ☐ Indo norteamericano o nativo de Alaska ☐ Otra:_____
- **Si Ud. Se identifica como una determinada nacionalidad (por ejemplo, Dominicano, Haitiano, etc), por favor especifique:** _____

¡La próxima pagina por favor!

Family Demographics Form
*Little Talks ID:*_____

- **Lengua materna del niño:** ☐ Inglés ☐ Español ☐ Criollo-haitiano ☐ Ruso
  ☐ Árabe ☐ Polaco ☐ Camboyano ☐ Vietnamita ☐ Laosiano ☐ Otra: _____
- **¿El niño participa en cualquier otro programa de educación o programa de cuidado?** ☐ Sí ☐ No
  - **En caso afirmativo, indique el nombre del programa por favor:** _____
- **¿El niño ha sido diagnosticado con necesidades especiales?** ☐ Sí ☐ No
  - **En caso afirmativo:** ☐ Impedimento del habla y lenguaje ☐ Retraso en el desarrollo
    ☐ La discapacidad visual ☐ La discapacidad auditiva
    ☐ Impedimento de la salud crónico ☐ Otra _____
- **¿Qué lengua habla con más frecuencia en el hogar:** ☐ Inglés ☐ Español ☐ Criollo-haitiano ☐ Ruso
  ☐ Árabe ☐ Polaco ☐ Camboyano ☐ Vietnamita ☐ Laosiano ☐ Otra: _____

Amanda Gernhart
alc210@lehigh.edu

EDUCATION

Lehigh University, Bethlehem, PA Anticipated September 2015
Ph.D. in School Psychology
(GPA: 4.0)

Dissertation: Level of Maternal Depressive Symptoms and Children's Expressive Language: Examining Mediation by Parenting Interactions

Lehigh University, Bethlehem, PA May 2012
M.Ed. in Human Development
(GPA: 4.0)

Cornell University, Ithaca, NY May 2009
B.A. in Psychology; Concentration in Education
(GPA: 4.02)

CERTIFICATES

Educational Specialist I-School Psychologist: Active

AWARDS/HONORS

Lehigh University Presidential Fellowship (2010 - 2011)
Phi Beta Kappa Society, Member (2008 - Present)
Golden Key International Honor Society, Member (2009 - Present)
Psi Chi, National Honor Society in Psychology, Member (2008 - Present)
Cornell University's Dean's List, all eight semesters

PROFESSIONAL AFFILIATIONS

National Association of School Psychologists, Student Affiliate (2011 - Present)
American Psychological Association, Division 16,
Student Affiliate (2012 – Present)
American Psychological Association, Student Affiliate (2012 - Present)

WORK EXPERIENCE

Pre-doctoral Intern
Carbon Lehigh Intermediate Unit-21, Schnecksville, PA August 2014-Present
Supervisor: Mark Simon, Ph.D.

- Provide individual and group counseling to elementary, middle, and high school students with behavioral and mental health disorders
- Participate in multi-disciplinary team meetings with psychologists, psychiatrist, social workers, and mental health workers to support students in partial hospitalization programs

- Conduct psychoeducational evaluations and functional behavior assessments for students with low-incidence disabilities
- Provide parent and teacher behavioral consultation to address individual and classroom-wide behaviors

Therapeutic Staff Support February 2011-August 2014
Colonial Intermediate Unit-20, Easton, PA
*Supervisor: Ken Smith, L.P.C., B.C.B.*A
- Provide individualized, one-on-one services to clients with behavioral health needs
- Implement behavioral interventions to meet client specific behavioral goals and objectives
- Collaborate with Behavioral Specialist Consultants, families, and educational staff to increase skill transition and generalization of interventions

Group Facilitator February 2011-May 2011
CareerLinking Academy Project Teamwork
Pennsylvania CareerLink Lehigh Valley, Allentown, PA/Colonial Intermediate Unit-20, Easton, PA
Supervisor: Ron Prator, Ph.D.
- Implement 11 week teambuilding and career preparation curriculum for 7 high school students in an emotional support classroom
- Utilize online career awareness inventory to cater individual career exploration and development to each student
- Instruct group on career building skills such as how to complete a resume, job application, job interview, and personal budget
- Assist in organizing and implementing job shadowing and field trips to local businesses

Intensive Case Manager July 2009 – August 2010
Elwyn Behavioral Health Services, Allentown, PA
Supervisor: Laura Sweitzer, M.A.
- Coordinate community, medical, and mental health services for 20 adults with mental health diagnoses
- Develop individualized, measurable service plan goals and objects for clients to increase independence
- Refer and link clients to community resources
- Provide support and coordinate services for clients in mental crisis

Therapeutic Camp Counselor June 2008 – August 2008
Child and Adolescent Services: Summer Partial Hospitalization Program
Tri-County Human Services Center, Carbondale, PA
Supervisor: Amy Duffy, M.S.W.
- Create seven week curriculum integrating art, music, group and individual therapy

- Facilitate activities while providing therapeutic intervention to twelve youth ages ten to fourteen with behavioral and emotional disorders
- Evaluate daily youth progress toward personal objectives and goals

Youth Worker Assistant February 2008 – May 2009
Community and Career Exploration and Apprenticeship Program
The Learning Web, Ithaca, NY
Director: Dale Schumacher

- Organize tours, volunteer, and apprenticeship opportunities for at-risk youth within the community
- Prepare job skills curriculum and co-facilitate weekly group meetings for apprenticed youth
- Interpret The Ansell-Casey Life Skills Assessment results to identify appropriate life skills intervention programs
- Co-facilitate an after school community service group for middle school students

RESEARCH EXPERIENCE

Research Assistant – Project Little Talks September 2013 – August 2014
Lehigh University, Bethlehem, PA
Principal Investigator: Patricia Manz, Ph.D.

- Train Early Head Start Home-Visitors to implement an empirically-based storybook-sharing program
- Assist in development of a 24 week literacy curriculum based on pilot data from FIG project to be implemented with Early Head Start families by home-visitors
- Train home-visitors on literacy curriculum, goal settings, and assessment procedures
- Recruit families for participation and prepare curriculum materials including assessments, literacy handouts, and the electronic recording system
- Supervise home-visitors to support implementation of the curriculum, goal-setting, and weekly action steps

Research Assistant – Project Peak **S**eptember 2012 – August 2013
Lehigh University, Bethlehem, PA
Principal Investigators: George DuPaul, Ph.D. and Lee Kern, Ph.D.

- Promote parent engagement with ADHD Pre-Kindergarteners
- Revise and implement an education program for parents of preschool age children with/at-risk for Attention Deficit/Hyperactivity Disorder from a 20 session to 10 session program
- Present content of a 20 session program to Community Development Team to generate themes for inclusion in the revised program
- Co-created 10 education sessions covering an introduction to ADHD, general behavior management strategies, identification of behavior function, specific behavior strategies based on function, and school readiness

- Facilitated the 10 week education program with 6 families

Research Assistant – Project Faculty
Innovation Grant (FIG) **S**eptember 2011 – August 2012
Lehigh University, Bethlehem, PA
Principal Investigator: Patricia Manz, Ph.D.

- Adapt empirically supported dialogic reading strategies for use with low-income, ethnically diverse families enrolled in Early Head Start
- Co-create intervention materials including home-visit observation form, reflection logs, and curriculum handouts
- Taught two cycles of the eight week culturally relevant dialogic reading program to a total of six Early Head Start families
- Used problem identification interviewing and problem solving to develop weekly strategies to overcome barriers to sharing books

Project Coordinator and Research Assistant –
Project Children Able and Ready for September 2010 – August 2012
Early Success (CARES)
Lehigh University, Bethlehem, PA
Principal Investigator: Patricia Manz, Ph.D.

- Work collaboratively with Lehigh University researchers and the Parent Child Home Program in Philadelphia to evaluate child outcomes associated with a home-visiting program for low income, ethnically diverse families and children
- Conduct data management tasks such as organizing data files, entering data, and conducting Inter Observer Agreement as it related to longitudinal child oral language outcomes
- Conceptualize research questions and compose manuscript and presentations with collected data

Research Assistant –
Community Voices Research Project January 2009 – May 2009
Cornell University, Ithaca, NY
Supervisor: Sofia Villenas, Ph.D.

- Conduct semi-structured qualitative interviews with community members about issues of educational equity in the Ithaca City School District
- Transcribe interviews and code for themes of equity
- Compose and present a presentation highlighting themes of inequity

Research Assistant June 2007 – May 2009
Eleanor J. Gibson Laboratory of Developmental Psychology
Cornell University, Ithaca, NY
Supervisor: Michael Goldstein, Ph.D.

- Code infants' verbal, behavioral, and emotional responses to unique social cues in language acquisition

- Manipulate social cues while being the experimenter during novel object/label language learning tasks
- Operate audio and visual equipment to record infants during experimental sessions
- Read and discuss the current literature on infant language development and acquisition at weekly laboratory meetings
- Recruit subjects through letters, phone calls, and brochures

CLINICAL EXPERIENCE

Pediatric School Psychology Trainee September 2012 – June 2014
Pediatric Pulmonary, Cystic Fibrosis, and Sleep Disorder Center
Lehigh Valley Hospital, Allentown, PA
Supervisor: Patricia Manz, Ph.D.

- Work within a multidisciplinary team of physicians, nurses, nurse practitioners, social workers, nutritionists, gastroenterologist, and respiratory therapists to provide comprehensive care to patients
- Interview and consult with families and patients diagnosed with various conditions including Cystic Fibrosis, Asthma, various sleep and respiratory disorders.
- Provide knowledge on education rights of students affected by medical conditions.
- Collaborate between medical staff, community members, families, and schools to coordinate holistic care of patients
- Advocate for and assist in the development of Section 504 plans and Individualized Education Plans for patients impacted academically by medical conditions
- Consult with and provide parent management training to families to provide support for behavioral and emotional concerns of children in the home such as medication non-adherence, unhealthy sleep patterns, and emotional dysregulation
- Provide individual counseling based on cognitive behavior therapy to patients afflicted by psychological conditions impacting health and academic performance

School Psychologist Trainee September 2013 – June 2014
Bethlehem Area School District
Fountain Hill Elementary School, Bethlehem, PA
Supervisor: Michelle Lesinski, M.S.

- Conduct multidisciplinary evaluations of students with academic, behavioral, and mental health concerns
- Administer various cognitive, achievement, behavioral, adaptive, and observational assessments
- Consult with parents and teacher to develop interventions and strategies to support behavioral and emotional concerns in the home and school
- Support families in the evaluation process through open communication and proactive collaboration within the multidisciplinary team

School Psychologist Trainee September 2012 – June 2013
Bethlehem Area School District
Broughal Middle School, Bethlehem, PA
Supervisor: Lidia Cordero, M.S.W., M.Ed., Ed.S.

- Contribute to numerous multidisciplinary psychoeducational evaluations through administration of cognitive, achievement, behavioral, adaptive, and observational assessments
- Conduct two complete psychoeducational evaluations through collaboration with teachers, parents, students, school specialists, and community members
- Facilitate a social skills counseling group for students in the Emotional Support Classroom
- Consult with parents and teacher to develop interventions and strategies to support behavioral and emotional concerns in the home and school

COURSE-BASED PRACTICE EXPERIENCE

Behavioral Assessment Fall 2011
Instructor: Robin Hojnoski, Ph.D.

- Conduct clinical interviews with parent, teacher, and child to evaluate the behavioral concerns of a kindergarten student
- Administer broad and narrow band rating scales to evaluate specific behavior concerns
- Create and use a behavioral observation system to assess behaviors within the context of the classroom
- Develop empirically based intervention strategies to support behavior concerns

Consultation Procedures Fall 2011
Instructor: Patricia Manz, Ph.D.

- Conduct conjoint behavioral consultation with a parent and teacher of a preschool age African American male enrolled in Head Start
- Developed multicomponent intervention to target noncompliant behaviors
- Evaluated feasibility, acceptability, and effectives of the intervention using various data collection techniques

Assessment & Intervention in Educational Consultation Spring 2012
Instructor: Edward Shapiro, Ph.D.

- Complete interviews, observations, and direct observations to understand the academic needs of second grade student in the areas of reading, math, spelling, and writing
- Administer, score, and interpret curriculum based assessment measures in reading, math, spelling, and writing
- Design and implement a reading intervention to target reading fluency concerns
- Conduct progress monitoring toward short and long term oral reading fluency goals

Assessment of Intelligence Spring 2011
Instructor: Kevin Kelly, Ph.D.

- Gain knowledge of standards of intelligence and achievement assessment selection and administration
- Administer the WISC-IV, WIAT-III, WAIS-IV, UNIT, & WJ-III
- Interpret assessment scores and conduct intelligence/achievement discrepancy analysis

PEDIATRIC SPECIALIZATION COURSEWORK

Comprehensive School Health Programs Fall 2013
Instructor: Edward Shapiro, Ph.D.

- Gain extensive knowledge on the comprehensive nature of child development and the need for multidisciplinary, multi-systemic prevention and intervention programs to target various health needs
- Present a three hour lecture on injury prevention research and empirically supported strategies and interventions
- Compile resources on injury prevention for use of pediatric school psychology professionals

Health/Pediatric Psychology Fall 2012
Instructor: Stacy Martin, Ph.D.

- Gain knowledge and understanding of pediatric medical condition and practice designing academic, behavioral, and psychological interventions for students with health conditions
- Challenge personal biases by reflecting on cultural considerations when providing psychological services to students with medical conditions from linguistically and culturally diverse backgrounds
- Present a three hour lecture on the impact of Sickle Cell Anemia and Juvenile Rheumatoid Arthritis on academic, behavioral, and emotional outcomes with discussion of school based support strategies

PUBLICATIONS

Manz, P. H., **Gernhart, A. L.,** Bracaliello, C. B., Presimone, V. J., & Eisenberg, R. A. (2014). Preliminary development of parent involvement in early learning scale for low-income families enrolled in a child-development-focused home visiting program. *Journal of Early Intervention,* 36, 171-191. doi: 10.1177/1053815115573077.

Manz, P. H., Bracaliello, C. B., Pressimone, V. J., Eisenberg, R. A., **Curry, A. L**., Fu, Q., & Zuniga, C. (2015). Toddler's expressive vocabulary outcomes after one year of Parent-Child Home Program services. *Early Child Development and Care*.

Manz, P. H. Eisenberg, R. A., **Gernhart, A. L**., Faison, J., Laracy, S., Ridgard, T., & Pinho, T. (2015). *A collaborative inquiry process with Early Head Start to develop parent-child storybook sharing intervention*. Manuscript in preparation.

PRESENTATIONS

Bracaliello, C. B., **Curry, A**., Manz, P. H., Eisenberg, R., Muser, K., & Pressimone, V. J. (2012, February). The Family Involvement Questionnaire – Toddler version: Partnering with home visiting program families and staff. In S. S. Leff (Chair), *Developing measures in urban settings through participatory action research*. A symposium presentation at the annual convention of the National Association of School Psychologists, Philadelphia, PA.

Clarke, B., Pressimone, V., Eisenberg, R., & **Gernhart, A.,** (2013, February). Home-visiting as a moderator between risk of maternal depression and child language outcomes: A preliminary investigation. In S. Sheridan & P. Manz (Chairs), *Responding to the Affordable Care Act: Advancing evidence-based home visiting.* Symposium conducted at the meeting of the National Association of School Psychology, Seattle, WA.

DuPaul, G., Kern, L., Drogan, R., **Gernhart, A.,** Buck, K., & Cayless-Patsches, S. (2014, February). *Parent education for ADHD preschoolers: Treatment development process and outcomes*. Paper presented at the meeting of the National Association of School Psychology, Washington, DC.

Eisenberg, R., **Gernhart, A.,** Manz, P., Laracy, S., Faison, J., Pinho, T., & Ridgard, T. (February, 2013). *Culturally relevant book talk: Dialogic reading feasibility and acceptability.* Poster presented at the meeting of the National Association of School Psychology, Seattle, WA.

Eisenberg, R., Manz, P., Manzo, J., **Gernhart, A**., Faison, J., Ridgard, T., & Whitenaker, J. (2014, February). *Home visiting for school readiness: Parent Growth in storybook talk.* Poster presented at the meeting of the National Association of School Psychology, Washington, DC.

Gernhart, A. L. (2012, June). *A review of home-based interventions targeting mothers with depression and their children: Developing a theoretical model.* Paper presented at the meeting of the Cross University Collaborative Mentoring Conference, Newark, DE.

Gernhart, A. L., Manz, P. H., & Wallace, L. (2015, February). *Maternal depression, child language, and the role of parenting.* Poster accepted for presentation at the meeting of the National Association of School Psychology, Orlando, FL.

Manz, P. H., Eisenberg, R. A., & **Curry, A.** (2012, June). *Toward effective practices in dialogic reading with Hispanic Early Head Start caregivers and*

children. Poster presented at Head Start's 11th National Research Conference, Washington, D.C.