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JOINT ATTENTION BEHAVIORS IN 14-MONTH-OLD TODDLERS OF LOW-INCOME FAMILIES

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Tiffany L. Martoccio

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JOINT ATTENTION BEHAVIORS IN 14-MONTH-OLD TODDLERS OF LOW-INCOME FAMILIES

By

Tiffany L. Martoccio

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ABSTRACT

JOINT ATTENTION BEHAVIORS IN 14-MOTH-OLD TODDLERS OF LOW-INCOME FAMILIES

By

Tiffany L. Martoccio

The purposes of this study were to examine the relationship between: 1) parent-child interactions and 14 month-old children's joint attention behaviors; 2) joint attention behaviors at 14 months and cognitive outcomes at ages 24 and 36 months; and 3) joint attention behaviors at 14 months and expressive language at 24 months. A secondary analysis of data from the "local" Michigan component of the Early Head Start Research and Evaluation (EHSRE) Project/ Pathways Project was completed. Participants (n = 139 parent-child dyads) reflected a low-income, Early Head Start eligible sample. Hierarchical multiple regression analyses revealed that the quality of parent-child interactions predicted 14 month joint attention. While joint attention did not significantly account for variance in predicting cognitive abilities, it did significantly predict later expressive language at 36 months. Results suggest the role of early parent-child interaction in children's early joint attention as well as the importance of early to late language development in toddlers. This study highlights the potential role Early Head Start programs and other child development programs have in promoting early development of non-verbal cues, specific to joint attention behaviors.

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CHAPTER ONE: INTRODUCTION

Preverbal children use eye gaze and pointing to communicate with others. Specifically, children learn to use eye contact to obtain information about another person's goal-directed behavior (Morgan, Maybery, & Durkin, 2003). These simple gestures begin to develop between 8- and 9-months of age to direct or to respond to others' attention (Carpenter et al., 1998).

Raver (1996) defines coordinated joint attention as the "non-verbal or protoverbal conversation between parent and child on a shared topic, such as an object or toy" (p. 227). Joint attention is a nonverbal social-communicative milestone in an infant's developmental trajectory (Mundy & Newell, 2007; Olafsen et al., 2006; Schertz & Odom, 2004), and is an important foundation in later language and cognitive skills (Hustedt & Raver, 2002). Researchers investigate joint attention behaviors through "parents' and infants' social interchanges while both partners jointly attend to, and play with, objects" (Raver, 1996, p. 227). Infant affective sharing and social referencing are patterns of this triadic attention of self, another person, and an outside object or event (Striano et al., 2007). Current research indicates that infants develop intersubjectivity or coordinated joint attention, through which they begin to realize that others have different intentions and they must change behaviors to coordinate intentions between self and others (Mundy & Newell, 2007; Trevarthen & Aitken, 2001).

Statement of the Problem

Many researchers have examined joint attention as it relates to infants' cognitive and language development (Sheinkopf et al., 2004). However, research focusing on this relationship in the context of low-income families is lacking. Living in poverty serves as

a risk factor for delays in children's cognitive and language outcomes (Hustedt & Raver, 2002). Parental interactions play an important role in children's developmental trajectory; however, that parent-child interactions in low-income families are often less positive. Research suggests that responsive interactions between parents and children in low-income families serve as a buffer against the risks that may develop from living in poverty (Hustedt & Raver, 2002; Chase-Lansdale & Brooks-Gunn, 1995; Duncan, Brooks-Gunn, & Klebanov, 1994; Huston, McLoyd, & Garcia Coll, 1994). "High levels of joint attention and reciprocity are associated with global ratings of maternal sensitivity in low-income mother-infant dyads" (Hustedt & Raver, 2002, p. 114). Researchers also found increased levels of joint attention to longitudinally predict improved cognitive outcomes among high at-risk infants (Hustedt & Raver, 2002; Raver & Leadbeater, 1995; Garner, Landry, & Richardson, 1991).

Rationale for the Proposed Research

The purposes of this study are to examine low-income families' positive parent-child interactions and how it contributes to their 14-month-old toddlers' initiating joint attention behaviors, and to examine initiating joint attention behaviors as a predictor of cognitive and language outcomes at ages 24 and 36 months. From low-income families, high risk infants may begin to demonstrate more simplistic joint attention skills by 9 months, such as responding to parent-child interactions. However, joint attention behaviors that require higher mental processes, such as initiating a shared experience with another person, may develop a little later than 9 months (Morgan, Maybery, & Durkin, 2003). This assumption that joint attention behaviors involve mental processes comes from the Theory of Mind Hypothesis (Morgan, Maybery, & Durkin, 2003). The

theory of mind hypothesis is a metarepresentation where mental states play a causal role in behavior. Joint attention behaviors are fundamental to the development of higher mental processes because in order to interact between self, other, and object the understanding of mental state must be present. Theory of mind enables children to develop their social-cognitive competencies, such as understanding attention or intention in others that is one of the important foundations for joint attention behaviors to occur (Morgan, Maybery, & Durkin, 2003). The rationale for this study is because low-income children often experience poorer quality parent-infant interactions. Poor quality interactions lead to less optimal development including joint attention. Joint attention is key to later development and reflects higher level mental processes. We need to know whether parenting contributes to early joint attention in infants from low-income families because this information is critical to understanding pathways to healthy development. We also need to understand what we do not know about these pathways for high risk families.

Gibson and Rader (1979) once said that attention should be considered as intentional perception. Infants use eye gaze and pointing to direct others attention to a mutual focus. Children must be engaged in interaction with their parent or others to demonstrate these occurrences. Poverty contributes to many of the risk factors of low quality parent-child interactions. Toddlers from low income families who are in highly engaged during parent-child interactions can effectively attain joint attention through initiation of reciprocal bids with their mothers, for example, showing an object to a parent then having the parent look at what their child is showing them (Raver, 1996). Children in low-income families are at risk for later developments due to their economic hardship

(Raver, 1996). Among lower income parent-toddler dyads, parental sensitivity and encouragement may play an especially important role in children's behaviors. This process may include parental sensitivity promoting engagement, then engagement promoting joint attention, which later leads to joint attention promoting development. Mediation models of the relations between environmental stress, parents' caregiving, and child outcomes demonstrate how parent-child interaction can serve as a protective factor for children's social development living in poverty (Huston et al., 1994; Raver, 1996). Research shows that positive parent-child interactions (Schertz & Odom, 2007) with their child increases children's coordinated joint attention behaviors that later impacts language (Markus et al., 2000; Toth, Munson, & Meltzoff, 2006) and cognitive abilities (Charman et al., 2000; Mundy, Sigman, & Kasari, 1994; Tomasello, 1995). Since the 1990s, researchers from different theoretical perspectives have studied joint attention. Social cognition and language acquisition theories are associated with joint attention skills (Baldwin, 1995; Carpenter et al., 1998; Claussen et al., 2002; Corkum & Moore, 1998; Morales, Mundy, & Rojas, 1998; Mundy & Neal, 2001; Sigman & Ruskin, 1999; Ulvund & Smith, 1996). The current study focuses its hypotheses around these two theories.

Conceptual Model

The conceptual model of the current study is developed around the previously explained theories and a model by Schertz and Odom (2007) called the Parent-Mediated Developmental Model. The Parent-Mediated Developmental Model is based on the premise that when parents are highly engaged with their children, joint attention behaviors begin to develop through parent-child interactions, which allows for later

language and cognitive abilities to emerge. This model hypothesizes that joint attention abilities are important for children to communicate and socially interact with others (Schertz & Odom, 2007).

Figure 1.1 illustrates how toddler's joint attention is developed through parent and child engagements and is a precursor for language and cognitive abilities in low-income families adopted from the Parent-Mediated Developmental Model (Schertz & Odom, 2007). This figure includes the specific variables, parent and child interactions, joint attention, cognitive development, and expressive language used in the current study. The variables used in this model are explained in Table 1 to demonstrate how they are conceptually and operationally defined in this study.

Figure 1.1: Conceptual Model

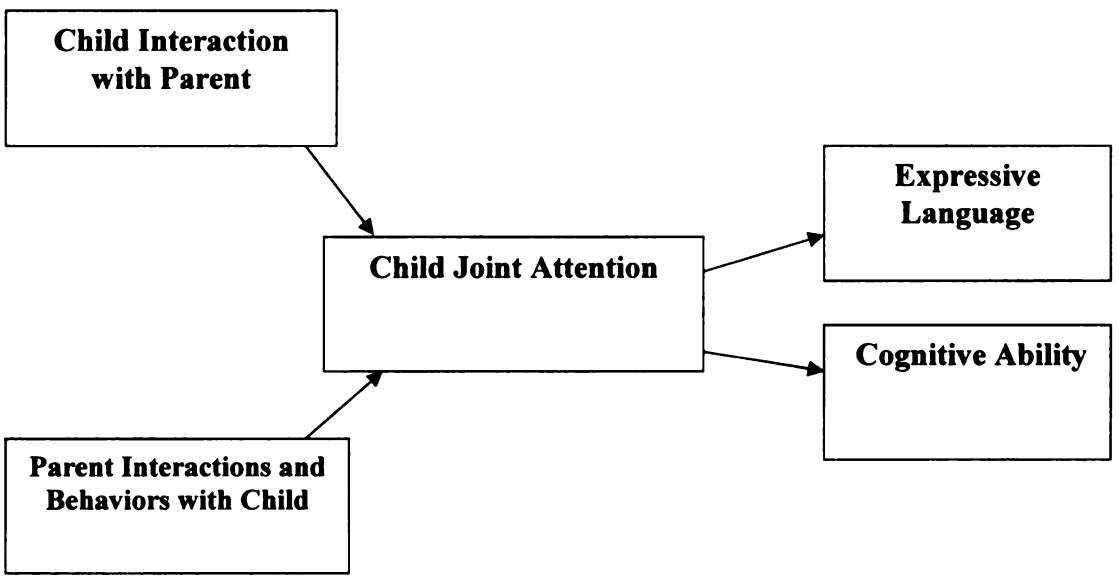

Table 1

Conceptual and Operational Definitions for the Study Variables

Variable	Conceptual Definition	Operational Definition
Joint Attention	Use of gestures and eye contact to direct others' attention to objects (Mundy et al., 2007)	MacArthur Communicative Developmental Inventories: Gestures. Measures when child extends arm to show you something he or she is holding, reaches out and gives you a toy he or she has been holding, and points at something interesting
Child Interaction	Child's extents to show, initiate, and/or maintain interaction with parent, and other social interactions (Brady-Smith, Fauth, & Brooks-Gunn, 2005)	Measures the frequency of looking at the (eye contact) parent to request engagement
Parent Sensitivity	Parenting behaviors characterized by parents' attendance to child's cues (Brady-Smith, Fauth, & Brooks-Gunn, 2005)	Measures parents sensitivity to their child during play interactions, such as acknowledging their child's actions or facilitating engagements
Parent Interaction	Supportive and positive parenting behavior during engagements with child (Sumner & Spietz, 1994)	NCAST: Parent Teaching Behaviors. Measures parents teaching episodes during play with their child
Cognitive Ability	Mental ability (Bayley, 1993)	Bayley's Mental Developmental Inventories. Measures different cognitive skills
Expressive Language	Spoken language (Fenson et al., 2000)	MacArthur Communicative Developmental Inventories: Vocabulary Production. Measures the quantity of spoken words

Research Questions and Hypotheses

The purposes of this study were to examine the following research questions: 1) Do parent and child interactions promote toddler initiating joint attention skills in low-income families; 2) Do toddlers' in low-income families who display more initiating joint attention behaviors at age 14 months demonstrate higher levels of cognitive development at 24 and 36 months of age; and 3) Do toddlers' in low-income families who exhibit more initiating joint attention behaviors at 14 months demonstrate higher levels of expressive language at 24 months of age?

Hypothesis 1:

Toddlers will exhibit more initiating joint attention behaviors at 14 months when their parents have demonstrated higher levels of sensitivity and interactions with their child. Also, higher levels of child interactions will play a role in the increased display of initiating joint attention.

Hypothesis 2:

Toddlers who display more initiating joint attention behaviors by 14 months will demonstrate more optimal cognitive skills at 24 and 36 months as compared to toddlers who exhibit fewer initiating joint attention behaviors at 14 months.

Hypothesis 3:

Toddlers who display more initiating joint attention behaviors by 14 months will demonstrate more advanced expressive language development at 24 as compared to toddlers who exhibit less initiating joint attention behaviors at 14 months.

CHAPTER TWO: REVIEW OF LITERATURE

Research on joint attention did not become widely prevalent until the 1970s. Around this time researchers recognized joint attention as an important area of development in infants, but studies mostly focused on determining when joint attention skills begin to emerge, as opposed to relations to other developmental skills in children (Schertz & Odom, 2004; Bates, 1976; Bates, Camaioni, & Volterra, 1975; Scaife & Bruner, 1975). Researchers also began conducting studies on parent-infant interactions that foster the development of joint attention. Scaife and Bruner (1975) found that infants follow the direction of other people's gazes in the first year of life. The emergence of this body of research raised questions regarding one of psychology's classical cognitive developmental theorists, Jean Piaget, and his notion of egocentrism in infants. Infant egocentrism suggests that infants do not have the mental abilities to understand that others may have different opinions and/or beliefs from their own (Fogel, 2009); however, more current research reveals that infants do begin to understand this concept and display it through focusing their attention on a joint object with another, known as joint attention (Mundy & Newell, 2007; Olafsen et al., 2006; Schertz & Odom, 2004). In the 1980s, researchers further identified joint attention's relevance, not only in typically developing children, but in atypically developing children, and in the 1990s researchers began to study joint attention from different theoretical perspectives, such as cognitive-perceptual, language and social-affective theories (Schertz & Odom, 2004; Loveland & Landry, 1986; Mundy, Sigman, et al., 1986). Today, joint attention continues to be studied by researchers as a major developmental milestone in human infancy. This literature discusses the theoretical background on which this study is founded and provides a more

in-depth look at the definition of joint attention. Parent-child interactions will also be explained in the realm of how they relate to later joint attention.

Theoretical Framework

Tomasello (1995) suggested that joint attention relates to children's understanding of others as intentional agents. This understanding that children grow through their surroundings and mental states is known as social cognitive theory. Researchers have described joint attention as a precursor of theory of mind, which is the ability to attribute beliefs, desires, intentions, and knowledge to oneself and others (Schertz & Odom, 2004). In a recent study, Wellman and colleagues (2008) examined stabilities between infant social attention and later theory of mind, using both a five-item theory of mind scale and a two task false belief (standard assessment for preschoolers' theory of mind) composite to measure later theory of mind abilities (Wellman et al., 2008). Results found that measures of infant's social attention significantly predicted later theory of mind (Wellman et al., 2008).

The social cognition framework can be dated back to the beginning of the 1990s to theorists, such as Simon Baron-Cohen and George Butterworth. First, Baron-Cohen (1995) developed the cognitive mechanisms theory. He believed that four cognitive mechanisms, which are correlated to joint attention, develop in sequence in typically developing infants. These mechanisms were intentionality detector, eye direction detector, shared attention mechanism, and theory of mind mechanism (Baron-Cohen, 1995; Schertz & Odom, 2004). Second, Butterworth (1995) described the stages in infancy of joint visual attention. First, he believed that at 6-months eye gaze emerges. Second, at 12-months infants are able to locate, understand, and point to a target within

their visual field. Finally, at 18-months infants have the ability to locate target outside their visual field. Butterworth's theory was questioned by, Tomasello (1995) because of the oversight of intentionality within his stages (Schertz & Odom, 2007).

Another theoretical framework that this study is focused around is the language acquisition theory. Researchers hypothesized that joint attention is the foundation for later language development (Markus et al., 2000; Toth, Munson, & Meltzoff, 2006). Joint attention encounters provide an interactional environment that supports learning and gaze following (Schertz & Odom, 2007). From this context children can later learn language skills (Carpenter & Tomasello, 2000). Markus and colleagues (2000) state that gaze following behaviors at 6-months predict receptive and expressive language at 18-months. Carpenter and colleagues (1998) theorized that gaze following emerges between 8- and 10- months. Then, between 12- to 15- months infants begin to follow others eye gaze and pointing. Finally, at 14- months imitative actions are exhibited and directing others behaviors through declarative and imperative gestures, such as pointing and reaching (Schertz & Odom, 2007). Smith, Mirenda, and Zaidman-Zait (2007) found that initiating joint attention later predicted expressive vocabulary, which is a basis for hypothesizing that higher levels of joint attention behaviors will predict better language scores.

Joint Attention Behaviors

Joint attention refers to more than two people looking at the same object. It is the ability to synchronize this shared attention to an object with the understanding of the other social partner's intentions of the perceived object. Researchers hypothesize joint attention to be a necessary precursor for cognitive skills, such as social referencing and language acquisition (Striano et al., 2007). Joint attention behaviors fall into two

categories, responses to the proposals of others or spontaneous initiations. For a better understanding of joint attention behaviors both responding to and initiating joint attention are explained in this literature review, but only initiating joint attention behaviors are measured in this study and what will be referred to as just joint attention.

Once joint attention fully develops in children it allows for other developmental milestones to occur, such as language and cognitive abilities. This is not to say that language and cognitive abilities will only occur if joint attention is present, but that joint attention occurs at an early stage setting a foundation for later verbal and mental skills (Toth et al., 2006). Joint attention reflects earlier forms of language and cognitive abilities. When children want to communicate with others prior to acquiring language skills they will point or use eye gaze to focus others attention to an object. Pointing and eye gaze are components of joint attention. Children also learn to understand that others have different intentions than their own, which may also be demonstrated by pointing or eye gaze. Mundy and colleagues (2007) suggest that observations of joint attention behaviors allow researchers to examine the development of mental processes that are necessary for facets of human cognitive development. Communication and cognitive understandings are facets of joint attention in early stages of development.

Responding to joint attention. The first category of joint attention behaviors involves responding to another's request. Responding to joint attention (RJA) behaviors, such as gaze following, typically develop between 8 and 9 months, before the second category of behaviors- initiating joint attention. RJA refers to "infant's ability to follow the direction of the gazes and gestures of others in order to share a common point of reference" (Mundy & Newell, 2007, p. 269). Researchers study RJA behaviors by

pointing or looking at an object to see if the infant looks in the direction of the object. Morales and colleagues (2000) conducted a study to examine infants' responses to joint attention propositions, such as pointing, gaze following, and vocalizing. The main focus of this study was to observe individual differences of RJA behaviors at time points between 6 and 30 months of age to see relations to vocabulary skills in the first two years of the infant's development. Results revealed that measures of RJA at all time points between 6 and 18 months were significantly related to language outcome at 30 months. RJA at 12 months was also significantly related to language outcome at 24 months. On the other hand, later RJA measures at 21 and 24 months were not a significant predictor of language at 30 months.

Initiating joint attention. Initiating joint attention (IJA) begins to develop between 9 and 15 months of age (Siller & Sigman, 2008). IJA involves infants' use of non-verbal cues, such as gestures and eye contact to direct others' attention to objects, events, and/or themselves (Mundy & Newell, 2007). Mundy and Gomes (1998) found that initiating joint attention was the best predictor of expressive language in young children. Strid and colleagues (2006) conducted a study on 26 typically developing children's nonverbal communication at 14 months and cognitive abilities at 50 months. Results demonstrated that initiating joint attention behaviors were positively related to general cognitive performances at 4 years (Strid et al., 2006). Smith, Mirenda, and Zaidman-Zait (2007) measured initiating joint attention behaviors with three gestures items (e.g. extends arm to show you something he/she is holding, reaching out and gives you a toy or some object that he or she is holding, and points with arm and index finger extended at something interesting object or event) from the MacArthur Communicative Developmental

Inventories. They found a significant relation between expressive vocabulary development over the first two years of life and initiating joint attention abilities. More recent studies, found a strong correlation between IJA abilities and the diagnosis of autism spectrum disorder. IJA behaviors are included within the current autism diagnostic and screening instruments, specifically the standard Autism Diagnostic Observation Schedule (ADOS) (Mundy & Burnette, 2005). In Module 1 (youngest children) of the ADOS, both RJA and IJA behaviors are assessed. However, in Module 2, which is designed for developmentally more advanced children, only IJA measures are included (Mundy & Burnette, 2005).

Parent-Child Interactions

Infants gradually acquire the ability to coordinate attention with others when wanting to share something of interest. Dodici and colleagues (2003) suggested that the main element of parent-child engagement is joint attention. Children are more likely to develop novel words when their parent demonstrates joint attention (Dodici et al., 2003). Parents' need to be sensitive, by initiating or acknowledging interactions with their child, to ensure that this shared interest in an object is established by initiating joint coordinated attention with their infants during toy play (Siller & Sigman, 2008). Vaughn and colleagues (2003) found that parent encouragement at 9- months relates positively to the development of initiating joint attention in 12-month-old infants. Siller and Sigman (2002) state that in children with autism there is a correlation between parent synchronization with the child's focus of attention to higher levels of joint attention. During toddlerhood, parents play a major role in the initiation of interactions with their child, both child and parent contributions are significant. This positive parent-child

dyadic interaction leads to toddlers' joint attention behaviors. Children must develop social skills to participate in this interaction and parents need to reciprocate those social gestures by being sensitive and supportive of their children during interactive situations.

Children develop social skills through highly stimulating interactions with others, specifically, parents. From a social cognitive framework, children understand that others mental state is different from their own and, from that, is able to socially engage with others accordingly. When children adequately adjust their thinking to this framework they begin to understand how to communicate their intentions with others. Meltzoff and Brooks (2008) found that through self-experience children develop the understanding of visual perception in others. Therefore, by actively interacting with others, children gain the experience that when someone is looking at them and then to an object their intentions are for the other person to look at what they are looking at or showing them. Social behaviors are contributions by the child during interactions with their parent that elicit joint attention bids. Even though children's level of sociability is important during interactions, parents still must contribute their own engagements to promote their child's joint attention behaviors.

Research suggests that parent sensitivity contributes to children's social development (Eisenberg et al., 2006; Kochanska & Knaack, 2003; Rothbart & Bates, 2006; Spinrad et al., 2007). In this study we look at joint attention and other parent-child interactions that fall within the broader category of social development. During toddlerhood, regulatory behaviors that involve behaviors for social situations are limited, therefore, parents sensitivity rears better regulated children, who are later more socially competent. Research also supports the relation between maternal sensitivity and

children's understanding of the internal world (Ereky-Stevens, 2008). Parent sensitivity is a component that contributes to more positive interactions with their child, thus allowing for more optimal joint attention behaviors.

As noted, both parent and child interactions contribute to more positive interactions that later elicit joint attention. However, less is known in the context of low-income families. Research on at-risk populations, specifically low-income families, found that poverty is a risk factor for infant's later cognitive development (Raver, 1996). Elements of poverty that may contribute to children's development are low parental education, teenage pregnancy, single parent household, parental unemployment, and welfare status. Recently, research on low-income children's development suggests that responsive social engagement between parent and infant serves as a buffer against risks posed by poverty (Hustedt & Raver, 2002; Chase-Lansdale & Brooks-Gunn, 1995). Studies found "in both scaffolding and guided participation, parental competence is clearly marked by sensitivity in providing consistent verbal and nonverbal cues, tailored to the child's developmental level, in order to assist the child in successfully solving a problem" (Hustedt & Raver, 2002, p. 113). Hustedt and Raver (2002) conducted a study on socioeconomically disadvantaged mother-infant dyads, and the relation between scaffolding and levels of joint attention. Results showed that higher levels of constructive verbal strategies initiated by mothers were positively related to joint attention (Hustedt & Raver, 2002).

The existing literature provides sufficient evidence that joint attention behaviors are significant predictors of children's cognitive and language developments. However, little empirical evidence looks at low-income families in the context of joint attention.

Hustedt and Raver (2002) demonstrate how low-income mothers can contribute to their children's joint attention behaviors by instruction during parent-child interactions. The current study focuses on filling in some of those gaps that parent and child interactions are optimal for toddler's joint attention behaviors to occur low-income families.

CHAPTER THREE: METHODOLOGY

Research Design and Methods

This study is a secondary analysis of data from the "local" Michigan component of the National Early Head Start Research and Evaluation (EHSRE) Project/ Pathways Project (Love et al., 2005). The EHSRE study was designed to provide a comprehensive evaluation of the impacts of Early Head Start (EHS) programs on low-income families and their young children. Families who had a family income of below the federal poverty line were eligible to participate in the study. Through random assignment, families were placed in the EHS program (52.5%) or in a comparison group (47.5%). The program group received EHS services, which were designed to generally, focus on child's development and parenting. Families in the comparison group were free to access other available support services. Data collection methods included parent interviews, direct child assessment, and observations of parent-child interactions in the home. Data were collected at children's 14-, 24-, and 36-months birth-related assessment but trained staff. Given the focus of this study on early joint attention behaviors and later outcomes, analysis of parent-child interaction data will include the 14 month time point only.

The EHSRE Project data utilized in this study were collected between 1996 and 2001. Families were enrolled by programs through age 1. Participants resided in counties in the Mid-west, reflecting rural areas and a moderate size city. Data were collected by trained research staff during home-visits. Variables pertinent to the study hypotheses were selected for this study. Data access and confidentiality forms were completed prior to accessing data, and this study, a secondary analysis of the local component of the

EHSRE project, was approved by Michigan State University's Institutional Review Board.

Participants

Data reflected139 parent-child dyads from a total of 196 dyads that enrolled and were eligible for the EHSRE project. Fifty-seven dyads were eliminated due to missing data. Participants were randomly assigned to either a control or treatment group, but for the purpose of this study were analyzed together. This study does not focus on the effectiveness of the treatment, rather on the overall child development. However, due to the nature of this sample the grouping variable is noted and analyzed as a covariate.

At enrollment into the EHSRE project, mothers were a mean age of 23.0 (*SD* = 5.0) years and children were a mean age of 2.2 (*SD* = 4.8) months. Mothers were primarily Caucasian (79.4%), single (47.6%), had no more than a high school education (75.8%), and were unemployed (30.4%). Of these low-income families, yearly gross income median was $8,400 and averaged at $9,407 (*SD* = $5,779). The median was calculated due to extreme outliers among the sample.

Measures

Joint attention. Initiating joint attention, one of the categories of the skills within joint attention, refers to the ability to use direction of gaze and gestures to direct the attention of others to spontaneously share experiences (Mundy et al., 2007). For this study joint attention will be used to demonstrate initiating joint attention skills in toddlers. Children's gestures were assessed at 14-months using the MacArthur Communicative Development Inventories (CDI; Fenson et al., 2000). The CDI as reported by the parent, measures children's prelinguistic and early language development.

These categorical variables, from the CDI, elicited one of these responses: often, sometimes, or not yet and higher scores indicated the presence of more joint attention behaviors. The three joint attention variables were recoded prior to computing the three scores into one composite variable. Originally variables were coded as, (1) often, (2) sometimes, and (3) not yet. By recoding these variables as, (3) often, (2) sometimes, and (1) not yet, the direction of analyses changed, therefore producing accurate positive *beta's* in the outputs. A total mean score was derived from the joint attention items. Higher means indicated a higher number of joint attention gestures. The mean score was 8.71 (*SD* = .66; range between 5 and 9) and used in all of the final analyses. Smith, Mirenda, and Zaidman-Zait (2007) demonstrated that within the child gestures category, items including, *extends arm to show you something he or she is holding*, *reaches out and gives you a toy he or she has been holding*, and *points at something interesting*, represent initiating joint attention abilities. From a principle component analysis, these three variables extracted loadings between .40 and .77. The remaining 9 items within the child gesture subscale include conventional gestures, such as, shaking or nodding their head yes/no, and were excluded in this study.

Child interaction. Child interaction with their mother is an in-home direct observational measure. The purpose of the measure was to assess the extent to which the child interacts with the mother and communicates positive regard and/or positive affect during a semi-structured play interaction at 14-months. Mother and child were given three bags of interesting toys and asked to play with the toys in sequence. No other instructions were given to the mother. This is called the three bag task. This measure was scored on a seven-point scale: (1) indicated a very low engagement and (7) indicated a

very high engagement. Videotapes were all coded by an independent research team, as part of the EHSRE Project protocol. Coder reliability averaged about 90% at 14-months (range of 83-97%) (Brady-Smith, Fauth, & Brooks-Gunn, 2005).

Parent sensitivity. Parental sensitivity was an in-home direct observational measure, assessing the parent's behavior with the child during a structured play task. Similar to the child engagement variable, the parent and child were given three bags of interesting toys and asked to play with the toys in sequence. This play task was videotaped for later coding. Sensitivity includes behaviors such as acknowledgement of the child's affect, vocalizations, and activity; facilitating the child's play; changing the pace of play when the child seems under-stimulated or over-excited; and demonstrating developmentally appropriate expectations of behavior. Scoring was based on a seven-point scale: (1) indicated a very low sensitivity and (7) indicated a very high sensitivity. The mean for this measure was 3.33 (SD = 1.34). Videotapes were all coded by an independent research team. Coder reliability averaged about 90% at 14-months (range of 83-97%) (Brady-Smith, Fauth, & Brooks-Gunn, 2005).

Parent interaction. Maternal interaction during a semi-structured teaching task was measured with the Nursing Child Assessment Teaching Scale (now known as the Parent-Child Interaction-Teaching Scale; Sumner & Spietz, 1994). Mothers were asked to teach their infants or toddlers an age-appropriate skill they have not already acquired. The scale is comprised of four parent behavior subscales (Sensitivity to Cues, Response to Distress, Social-Emotional Growth Fostering and Cognitive Growth Fostering) and two child subscales (Clarity of Cues to the parent and Responsiveness to Caregiver). The NCAST consists of 73 binary-scored items designed to assess mother-child interactions

observed during a teaching episode in the home. Parent total scores of the 50 items from the parent scales were used in this study. Data collectors were trained by a certified instructor and were required to reach a reliability of at least 90% on standardized videotapes to be qualified to score the observation. The parent behaviors total had a good overall reliability of $\alpha = .90$. Each of the parent behavior subscales also had high reliabilities (Sensitivity to Cues: $\alpha = .65$; Response to Distress: $\alpha = .73$; Social-Emotional Growth Fostering: $\alpha = .70$; and Cognitive Growth Fostering: $\alpha = .82$).

Cognitive ability. At the 24 and 36 month time points, children's cognitive abilities were assessed with the Bayley Mental Development Index (MDI) Standard Score of the Bayley Scales of Infant Development – Second Edition (BSID-II) (Bayley, 1993). The MDI assesses several types of abilities: sensory/perceptual acuities, discriminations, and response; acquisition of object constancy; memory learning and problem solving; vocalization and beginning of verbal communication; basis of abstract thinking; habituation; mental mapping; complex language; and mathematical concept formation (Bayley, 1993). The child is assessed on his/her ability to follow simple spoken directions and on his or her spoken vocabulary during the assessment. For example, the child is asked to build a tower of cubes; point to a block and a key; point to objects in pictures when the assessor names them; name three objects in a picture book; match three colors; imitate vertical and horizontal strokes; understand directions that include prepositions; and recall geometric forms. The MDI was normed on a nationally representative sample of children with a range of ages so that raw scores can be converted to standardized scores with a mean of 100 and a standard deviation of 15

(Brady-Smith, Fauth, & Brooks-Gunn, 2005). The test-retest reliability across 24 and 36 months was .68.

Expressive language. Toddler's early expressive language and vocabulary skills were assessed using the MacArthur Communicative Development Inventories (CDI) at 24 months (Fenson et al., 2000). The EHS dataset included the short-form version of the MacArthur Communicative Development Inventories (Fenson et al., 2000) and the sentence complexity subscale. However, this study included vocabulary production only because of the focus on expressive language. Vocabulary Production measures the number of words in the child's spoken vocabulary. Parents are asked whether the child says each of 100 common early spoken words, such as "up," "none," "some," or "does" (Brady-Smith, Fauth, & Brooks-Gunn, 2005). Scores range from 0, if the child is not yet speaking, to 100, if the child has used all of the words in speech. Each item is dichotomously scores (yes/no) and a sum scores is derived.

Covariates. The regression analyses included child age, maternal demographic risk (maternal risk), and program condition as covariates. Child's temperament is also included as a covariate in the first hypothesis. Temperament was included as an additional child sociability variable to see children's display of social behaviors outside of measures specific to child interactions with their parent. Past EHS analyses have always included maternal risk, program condition, and temperament as covariates. They were identified by the consortium as standard covariates. The following describes maternal risk, program condition, and child's temperament in more detail.

Maternal demographic risk. In this study, maternal risk is represented by a composite variable of risk indicators measured at enrollment into the EHSRE project.

Indicators of risk were: low education (mothers who did not complete high school), single parenthood, adolescent parenthood, unemployment, and welfare status. These variables were dummy coded into dichotomous variables (1 = yes or 0 = no) and summed into a composited risk variable. The scale ranges from 0 to 5 with a maximum score of 5, indicating higher cumulative risk, and a minimum score of 0, indicating no risk.

Program condition. The program condition variable is coded as a binary variable. Participants were randomly assigned into the EHS program (1) or into the comparison group (0).

Child temperament. Children's level of temperament was measured with the Sociability subscale of the Emotionality, Activity, Sociability, and Impulsivity (EASI) Temperament Survey (Buss & Plomin, 1984). The complete EASI is a parent self-report measure about his/her child's behavior characteristics in four areas. Sample items on the sociability subscale include, *He/She likes to be with people*, and *He/She is very sociable*. This subscale consists of five items. Respondents had a minimum score of 1 and a maximum score of 5. In the current sample, respondents had a mean score of 4.07 (*SD*=.77).

Data Analysis

Research hypotheses were tested by conducting a series of hierarchal multiple regression analyses. In all models, child age, maternal risk, and program variables were entered in the first step as covariates. With regard to hypothesis 1, better quality parent-child interaction was expected to predict more joint attention behaviors in toddlers; therefore, the regression model was designed to examine parent and child interaction as a predictor of toddler joint attention behaviors at 14 months. Child temperament

(sociability) was included as a covariate in this model. Following entry of the covariates, child's interaction was entered next into this model. Mother's sensitivity during a play task and parent NCAST total interaction behaviors during the semi-structured teaching task with the child were entered in the final step. Joint attention was the dependent variable.

The second and third hypotheses reflected joint attention as the predictor variable and parent-child interaction variables (child interaction, parent sensitivity, and parent NCAST total) as covariates. In the second hypothesis, toddlers with more joint attention behaviors at 14 months were hypothesized to have higher cognitive scores at 24 and 36 months. Bayley MDI scores were entered as the dependent variable and toddler joint attention at 14 months was entered as the independent variable. In the model predicting 36 month cognition, the 24 month Bayley scores were controlled. Finally, the third hypothesis stated that a higher number of joint attention behaviors at 14 months would predict better expressive language scores at 24 months. Thus, after covariates were entered, joint attention was entered in the final step. To provide information beyond the statistical significance, effect sizes (adjusted R^2) were calculated.

Missing Data

Cases were only eliminated if they did not contain information for the joint attention (37 cases eliminated) and/or expressive language (20 cases eliminated) variable. Therefore, all cases used in the data analyses included joint attention and expressive language data; no data imputation was necessary in only those two particular variables. The 57 cases described above were eliminated because they were missing data for two of the primary variables for the study. Also, given that the expressive language came from

the same scale as the joint attention variable, these cases had to be deleted by default. After eliminating those 57 cases, the amount of missing data for this study varied across the other assessments (NCAST parent variable = 8 cases with missing data; parent sensitivity variable = 24 cases with missing data, child interaction variable = 14 cases with missing data; and MDI variables at 24 month = 31 cases with missing data, and at 36 month = 37 cases with missing data) with the exception of the temperament variable that contained all data. The Expectation Maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977) was used for imputing missing values. An EM approach is considered an effective approach when data is missing at random (Musil, Warner, Yobas, & Jones, 2002; Schafer & Graham, 2002). The EM method implements a maximum likelihood (ML) approach to iteratively impute missing values by using expectation (E-step) and maximization (M-step) algorithms (Musil, Warner, Yobas, & Jones, 2002).

CHAPTER 4: RESULTS

Preliminary Analysis

Means, standard deviations, and ranges are displayed in Table 2 to show the scale of each measure in the study. Bivariate correlations were used to analyze relations between predictor and outcome variables, and whether any predictor variables were highly correlated (see Table 3). Correlations among covariates were also calculated to analyze relations between the dependent variables and independent variables with the covariates. Spearman correlations were used for program condition because it was not a continuous variable. As for the other variables, which were all continuous, Pearson correlations were used for analysis.

Table 2

Mean and Standard Deviations among the Study Variables

Measure	*M*	*SD*	*Range (Min.-Max.)*
Joint Attention	8.71	.66	4 (5-9)
Temperament	4.07	.77	4 (1-5)
Child Interaction	3.79	.99	5 (1-6)
Parent Sensitivity	3.33	1.34	6 (1-7)
NCAST parent total	33.86	5.62	27 (15-42)
Cognition 24	83.44	13.90	77 (52-129)
Cognition 36	87.12	9.08	61 (52-113)
Expressive Language 24	43.91	31.07	99.5 (.5-100)

Note. $n = 139$.

Table 3

Intercorrelations among Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Childage	--	-.01	.04	-.02	.02	.03	-.17*	-.25**	.02	.07	-.24**
2. Matrisk		--	-.09	-.18*	.06	-.17*	-.12	-.18*	.03	-.01	.13
3. Program			--	.12	.20*	.20*	.00	.03	.09	.01	.18*
4. Joint Attention				--	.17*	.28*	.30**	.30*	.17*	.18*	.24**
5. Temperament					--	.09	.08	-.09	.08	.08	.19*
6. Child Interaction						--	.28**	.31**	.15	.02	.10
7. Parent Sensitivity							--	.23**	.29**	.26**	.37**
8. NCAST Parent Tot								--	.16	.21*	.21*
9. Cognition 24									--	.57**	.42**
10. Cognition 36										--	.30**
11. Exp Lang 24											--

Note .n = 139.

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

Correlation analysis found no risk for multicollinearity among variables. Associations from the correlation matrix were in the expected directions. Joint attention was significantly related expressive language (r = .24). Joint attention was related to cognitive abilities at both 24 and 36 months, however, r 's, .17 and .18, were very small. Joint attention was also related to parent-child interaction variables, including parent sensitivity (r 's ranging from .17 to .30). This relation demonstrates that parents who interact more with their children tend to have children with more optimal joint attention behaviors. Maternal risk was negatively associated with the quality of parent-child

interactions. Mothers who are at a higher risk for poverty tend to have less positive parent-child interactions. The program variable was correlated to child interaction behaviors with their parent (r = .20) and expressive language scores (r = .18). This means that children's expressive language scores and interactive behaviors with their parent increased when they were in the EHS program condition group. Child's temperament was related to joint attention (r = .17) and expressive language (r = .19), thus, children who tend to generally have a more sociable behavior have higher levels of joint attention and expressive language later on.

For the final analyses, the four covariates were included in the four analyses with the exclusion of temperament in the last three. Even though maternal risk and temperament were the only covariates related to joint attention, they were left in the model because, when removed, effect sizes slightly decreased. This decrease was also similar to when child age and program condition, both not related to joint attention or cognitive abilities were removed. By having some of the covariates uncorrelated to the dependent variables and related to the independent variables there is a risk of removing a systematic effect in the models. However, previous analyses of the EHS data included these covariates. They do hold some effect in the final models of this study, which is why they are included.

Results

Multiple regressions were used to test the study hypotheses and all analyses were performed using SPSS 17.0. Tables 4 to 7 display the results of the models for all dependent variables.

Hypothesis 1. A four-step hierarchical multiple regression analysis was conducted, with toddlers joint attention as the dependent variable, and parent-child interactions and parental sensitivity as the independent variables (see Table 4). The independent variables were measured in two ways: a) a play task, and; b) a semi-structured teaching task. Both contexts represent normal, salient contexts for parent-child interactions in the home. Covariates included child age, maternal risk, program status, and child temperament variables. Results suggested that overall the model was significant, $F(7, 131) = 5.19, p < .001$, and accounted for 18% of the variance in toddlers' joint attention outcomes. With the addition of the parameter variables, child interactions, parent sensitivity, and parent NCAST total, the R^2 change was significant, and the addition of the parent sensitivity and parent NCAST total variables accounted for additional 8% of the variance in joint attention outcomes. Among all predictor variables in the final model, an examination of the regression coefficients indicated that only parent behaviors with their toddler during a play task, $\beta = .23, t(138) = 2.68, p < .01$, and a semi structured toy task, $\beta = .20, t(138) = 2.40, p < .05$, significantly predicted toddlers joint attention behaviors at 14 months.

Table 4

Regression Analysis Predicting 14 month Initiating Joint Attention

Variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.04*	.06*
Child age	-.00	.01	-.03		
Mat Risk	-.10	.05	-.17*		
Program	.22	.11	.17*		
Step 2				.06*	.02*
Child age	-.00	.01	-.03		
Mat Risk	-.10	.05	-.18*		
Program	.18	.11	.13		
Temperament	.13	.07	.16		
Step 3				.10**	.05**
Child age	-.00	.01	-.03		
Mat Risk	-.08	.05	-.15		
Program	.13	.11	.10		
Temperament	.12	.07	.14		
Child Interact	.15	.06	.22**		
Step 4				.18***	.09***
Child age	.01	.01	.06		
Mat Risk	-.06	.05	-.10		
Program	.13	.11	.09		
Temperament	.13	.07	.15		
Child Interact	.07	.06	.10		
Parent Sensitiv	.10	.04	.20*		
NCAST P tot	.03	.01	.23**		

Note. $n = 139$.

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

Hypothesis 2. Two multiple regressions with cognition scores at 24 and 36 months as the outcome variables were employed. In the first model, in which cognition scores at 24 months were used as the dependent variable, a hierarchical multiple regression analysis was conducted. Covariates were entered first and included the parent-child interaction variables, and then joint attention was entered as the independent variable next in the model (see Table 5). Results suggested that the overall model for joint attention behaviors predicting cognition scores at 24 months was statistically significant; however, the model did not account for a high percentage of variance (only 7%) in outcomes. Also, the joint attention coefficient was not significant. Parental sensitivity appeared to drive this model and predicting more optimal cognition development in toddlers.

Table 5

Regression Analysis Predicting 24 month Cognitive Abilities

Variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				-.01	.01
Child age	.03	.25	.01		
Mat Risk	.46	1.01	.04		
Program	2.87	2.38	.10		
Step 2				.08**	.11**
Child age	.26	.25	.09		
Mat Risk	1.18	.99	.10		
Program	2.28	2.31	.08		
Child Interact	.38	1.28	.03		
Parent Sensitiv	2.90	.90	.28**		
NCAST P tot	.30	.22	.12		
Step 3				.07*	.00*
Child age	.25	.25	.09		
Mat Risk	1.24	1.00	.11		
Program	2.08	2.34	.08		
Child Interact	.29	1.29	.02		
Parent Sensitiv	2.77	.93	.27**		
NCAST P tot	.27	.23	.11		
Joint Attention	1.23	1.92	.06		

Note. $n = 139$.
** $p < .01$.

The second model included cognition scores at 36 months as the outcome variable, joint attention as the independent variable, and child age, maternal risk, and program variables as covariates (see Table 6). Similar to the previous model, this model also included parent-child interaction variables as covariates, with the addition of cognition scores at 24 months as a covariate. The overall model was statistically significant, $F(8, 130) = 9.80, p < .001$ and accounted for 34% of variance. Child

interaction (β = -.16, t (138) = -2.03, $p < .05$), parent NCAST total (β = .17, t (138) = 2.17, $p < .05$), and cognition scores at 24 months (β = .52, t (138) = 6.98, $p < .001$) are significant predictors of cognition scores at 36 months. However, child interaction was a negative predictor of cognitive scores at 36 months. Joint attention did not change the R^2.

Table 6

Regression Analysis Predicting 36 month Cognitive Abilities

Variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				-.02	.01
Child age	.14	.16	.07		
Mat Risk	-.06	.66	-.01		
Program	.63	1.56	.04		
Step 2				.10**	.13**
Child age	.35	.16	.19		
Mat Risk	.38	.64	.05		
Program	.62	1.50	.03		
Child Interact	-1.27	.83	-.14		
Parent Sensitiv	1.90	.58	.28***		
NCAST P tot	.40	.15	.25**		
Step 3				.34***	.24***
Child age	.26	.14	.14		
Mat Risk	-.02	.55	-.00		
Program	-.15	1.28	-.01		
Child Interact	-1.40	.71	-.15*		
Parent Sensitiv	.91	.52	.14		
NCAST P tot	.29	.13	.18*		
Cognition 24	.34	.05	.52***		
Step 4				.34***	.00***
Child age	.26	.14	.14		
Mat Risk	.01	.55	.00		
Program	-.26	1.30	-.02		
Child Interact	-1.45	.71	-.16*		
Parent Sensitiv	.85	.53	.13		
NCAST P tot	.28	.13	.17*		
Cognition 24	.34	.05	.52***		
Joint Attention	.68	1.06	.05		

Note. $n = 139$.

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

Hypothesis 3. The final hypothesis states that more joint attention demonstrated at 14 months will predict higher expressive language at 24 months. A hierarchical multiple regression analysis was conducted for this model (see Table 7). Joint attention variable was used to predict expressive language scores at 24 months. The model included child age, maternal risk, and program variables as covariate variables. Parent-child interaction variables were included as covariates; however expressive language scores at 14 months were excluded in this study as covariates because of the joint attention variable. The joint attention measure was created from variables in the expressive language test at 14 months, so to eliminate any repeat variables expressive language scores at 14 months were left out. Results of this model were statistically significant, $F(7, 131) = 6.61, p < .001$, and accounted for 22% of the variance in expressive language suggesting that higher levels of joint attention behaviors does predict better expressive language scores at 24 months.

Table 7

Regression Analysis Predicting 24 month Expressive Language

Variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.10***	.12***
Child age	-1.65	.52	-.26**		
Mat Risk	3.57	2.13	.14		
Program	12.56	5.04	.20*		
Step 2				.21***	.13***
Child age	-1.07	.52	-.17*		
Mat Risk	5.12	2.05	.20*		
Program	11.78	4.78	.19*		
Child Interact	-1.01	2.64	-.03		
NCAST P tot	.68	.46	.12		
Parent Sensitiv	7.81	1.87	.34**		
Step 3				.22***	.02***
Child age	-1.12	.51	-.17*		
Mat Risk	5.46	2.04	.21**		
Program	10.67	4.80	.17*		
Child Interact	-1.49	2.64	-.05		
NCAST P tot	.52	.47	.09		
Parent Sensitiv	7.11	1.90	.31***		
Joint Attention	6.63	3.93	.14		

Note. $n = 139$.
* $p < .05$, ** $p < .01$, $p < .001$***.

Summary

The results indicated that a higher quality of parent and child interactions related to toddlers' joint attention behaviors at 14 months. Parent-child interactions did not only predict toddler's joint attention at 14 months, but impacted the results of cognition and expressive language developments at 24 and 36 months. Thus, toddler's non-verbal

development, specific to joint attention is mainly affected by their interactions with their parents.

CHAPTER FIVE: DISCUSSION

The purposes of this study were to examine parental sensitivity and parent-child interactions in a low-income sample, and how they relate to children's joint attention behaviors at 14 months. Then examine how 14 months joint attention predicts later cognitive and expressive language development at 24 and 36 months. Among these hypotheses, there are low accounts for variance in each, a somewhat common phenomenon in social and behavioral science research. The complexity and multiple variables playing into language development suggest that future research delve into identification of other key factors that might be salient.

The first hypothesis concerned parental sensitivity and parent-child interactions, and how they related to joint attention at 14-months. The more optimal parent-child social interactions were hypothesized to predict more joint attention behaviors. Research shows that sensitive parenting environment promotes joint attention behaviors (Claussen et al., 2002). Results from the current study indicated that toddlers exhibited more joint attention behaviors at 14 months when their parents demonstrated higher levels of sensitive parenting interactions. Findings are in line with prior research. For instance, Dodici and colleagues (2003) suggested that the main element of parent-child interaction is joint attention. High quality parent-child interactions are characterized by the inclusion of joint attention behaviors in the play together. Findings also suggest that sensitive parenting ensures that this shared interest in an object is established by initiating joint coordinated attention with their infants during toy play (Siller & Sigman, 2008). Some examples of parent sensitivity are, interacting with their child when they show them a toy or acknowledging that they are trying to communicate with them.

Interestingly, hypothesis two, which stated that higher levels of joint attention behaviors predict better cognitive development, was not supported by the results of this study. Results showed that joint attention skills at 14-months did not significantly predict cognitive abilities at 24-months. Even though joint attention did not predict cognitive abilities in this study, there is a significant correlation (*r's* = .17 and .18) between joint attention and both cognitive abilities, suggesting an underlying association between these variables. Striano and colleagues (2007) found that the higher level of joint attention in toddlerhood predicted later cognition in preschool. In the current study, cognitive abilities were examined at 2 years rather than 4 years, which could be one of the reasons these findings were not supported. Joint attention mainly supports the growth of children's theory of mind. By understanding that others have different intentions children begin to manipulate situations to focus the attention of others on an object of interest, which emerges from joint attention. In this study, the Bayley's inventories focus on children's ability to apply instruction to a given task, rather than the ability to understand the intentions of others. Children's extent to engage with others significantly predicted cognitive abilities at 36 months. However, the significance was negative. This counterintuitive finding demonstrates that children who successfully complete a given task are less likely to interact with others. One plausible reason might be that children in this study may have the ability to complete a given task because they can ignore what is going on around them allowing more concentration. Therefore, if they do not posses an extent of social interactions with others at 14 months, then by 36 months they have assimilated to this disengagement and may be focusing attention solely on instruction. The effects of child engagement negatively predicting cognitive abilities did amplify

overtime. Results display that there was no significant effect at 24 months, and then by 36 months the extent of child interaction did impact cognition. Therefore, children who are highly interactive with others at 14 months may lack the ability to concentrate in a more demanding, instructional situation at 36 months. This may lead to later behavior problems and ramifications for academic success in preschool.

The joint attention variables chosen for this study may be another explanation for the lack of significant findings for the individual joint attention predictor. Toddlers' cognitive behaviors may develop through other aspects of joint attention behaviors, such as eye contact with parent while manipulating an object. Study variables were, extends arm to show you something he or she is holding, reaches out and gives you a toy he or she has been holding, and points at something interesting (Smith, Mirenda, & Zaidman-Zait, 2007), thus not including all joint attention behaviors. These joint attention items were taken from the MacArthur's gestures scale, therefore, were not specific to studying joint attention skills. An alternative assessment for studying joint attention in toddlers is the Early Social Communication Scales (ESCS; Mundy et al., 2003). This is a valid and reliable scale for accurately measuring every aspect of joint attention in children.

The results of the last hypothesis on joint attention performance and correlations to expressive language displayed significance in the overall model. However, joint attention was not a significant predictor. This final model accounted for a significant amount of variance in the prediction of later expressive language. Children learn to express their needs at a young age whether it is verbally or through communicative actions, such as gestures. Mundy and Gomes (1998) concluded that initiating joint attention predicts expressive language in young children. Smith, Mirenda, and Zaidman-

Zait (2007) measured initiating joint attention behaviors with the same initiating joint attention measure and found a significant relation between expressive vocabulary development over the first two years of life and initiating joint attention abilities. The current studies findings demonstrate that there is a significant relation between expressive language and joint attention. This relation may be due to the variables coming from a similar scale. However, it also may be that during toddlerhood children are using joint attention behaviors to interact with their parent and once they acquire verbal skills they may begin to incorporate them into those interactions.

Implications of this Study

It is made clear in this study that parent-child interactions promote toddlers joint attention behaviors. The quality of parent-child interactions were significant predictors to later cognitive and expressive language abilities. Joint attention skills did not contribute any effects to the overall models. By studying joint attention at 14 months is an implication to this study. Joint attention needed to be studied at an earlier age than 14 months to see any developmental trends in the growth of these skills overtime. Toddlers in the current study mastered a majority of joint attention behaviors. Parent-child interactions and parental sensitivity to their child's behaviors played a more prominent role than joint attention behaviors at children's 14 month development.

From infancy to toddlerhood, children learn from their parents. A highly interactive environment promotes these learning experiences where children can develop. This is why environmental factors, specific to growing up in a low-income household, must be studied in additional child contributions on their own development. In the current study, maternal demographic risk was negative related to the quality of parent-child

interactions, which was a significant predictor of joint attention behaviors. Results from this study suggest that in low-income families, quality parent child interactions play an important role in the development of toddlers' joint attention, a key developmental milestone in toddlerhood. By providing a buffer children can interact with their parents in a way where parents teach their children it is important to demonstrate joint attention behaviors. In addition, joint attention may be a mediator for the developmental trend of parent-child interactions predicting toddler's joint attention, then later joint attention predicting cognitive and expressive language abilities.

Implications for Future Research

Follow-up studies with low-income sample must investigate these results for generalizability. Future research may focus on developing a different variable to measure joint attention skills at 14-months or examine it at an earlier stage. Developmentally, by 14 months, toddlers should regularly be demonstrating joint attention behaviors. Main implications are to study joint attention early and examine the ways in which parent-child interactions in low income families foster joint attention. The process by which interactions promote joint attention behaviors are when parents positively support and are sensitive to their child's behaviors during interactions. Joint attention is central to toddlers' emerging cognitive and language development (Smith, Mirenda, and Zaidman-Zait, 2007), and parents should be encouraged to interact with their toddler and provide optimal sensitivity in that environment for the emergence of toddler initiating joint attention behaviors. However, low-income families lack the resources, such as promoting a highly conducive parent-child teaching environment that allow for more optimal child learning and growth. This may be that parents interact with their child on a more intimate

level that focuses on the sensitivity of the child's needs. Early Head Start could play a part in improving parental engagement behaviors for appropriate toddler initiating joint attention to occur. Also, Schertz and Odom (2007) developed an intervention training model that teaches parents how to promote joint attention behaviors in their infants. This family centered approach used parent-child interactions as a medium for building on the developmental rudiments of joint attention (Schertz & Odom, 2007). Researchers found that this intervention improved toddlers' joint attention behaviors. This training model could also be implemented into a home-based intervention that focuses on child development and parenting in a low-income family. In conclusion, this study sets the groundwork for future studies that can be beneficial to the development of children growing up in a low-income environment. The development of joint attention in toddlers is one of the most important skills for understanding the social world and how to communicate in it. Parents interactions with their children promote these joint attention skills, therefore, highly interactive teaching environment are important for children to learn and develop later cognitive and language skills. Early Head Start can be a prime setting to support low-income families to focus on these interactive techniques that can provide a barrier for children growing up in high risk environments.

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