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INTERACTIONS AND PLAY BEHAVIOR OF MOTHERS OF TYPICALLY
DEVELOPING INFANTS AND INFANTS WITH DISABILITIES:
A VYGOTSKIAN APPROACH

by

Lisa K. Boyce

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Family Life / Family and Human Development

ABSTRACT

Interactions and Play Behavior of Mothers of Typically
Developing Infants and Infants with Disabilities:
A Vygotskian Approach

by

Lisa K. Boyce, Doctor of Philosophy

Utah State University, 1999

Major Professor: Lori A. Roggman, Ph.D.
Department: Family and Human Development

This study follows a Vygotskian approach to investigate the influence and relatedness of several "scaffolding" behaviors for mother-infant dyads of both typically developing infants and infants with disabilities and how early intervention may influence the dyads through the home visiting process. For this primarily low-income sample, maternal participation during play did not enhance the infants' play. The relation of infant level of play with maternal education, income, and the maternal involvement variables of level of play and use of scaffolding varied with the disability status of the infant. Home visitor support of mother-infant interaction did not appear to influence maternal involvement during play, except that mothers of infants with disabilities whose home visitors spent more time with just the infant played at a higher level.

(85 pages)

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Lisa K. Boyce

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CHAPTER I

STATEMENT OF THE PROBLEM

Play is thought to be the primary means of a child's development (Vygotsky, 1976). Mothers often engage in play with their infants with behaviors ranging from responsively following the child's lead to more directly teaching the child. Maternal responsiveness to the child's lead during play is associated with more sophisticated infant play (Fiese, 1990). However, mothers of infants with disabilities are often directive and controlling during play (Brooks-Gunn & Lewis, 1982). Responsiveness in maternal play behavior may thus depend on whether or not the infant is following a typical developmental trajectory. As an increasing number of infants are involved in early intervention programs due to disability or to family risk factors, variations in maternal play may also reflect the philosophy of the early intervention program.

Differences in responsiveness between mother-infant dyads of typically developing infants and infants with disabilities have been investigated (Roach, Barratt, Miller, & Leavitt, 1998), but little research has been done to explore the factors contributing to the differences. A better understanding of the conditions contributing to the differences in maternal play behaviors is needed to determine if a more instructive approach to play with infants with disabilities is beneficial. As intervention programs for infants become more "family focused," it is also important to assess the influence of the professional who works with the family, especially in relation to mother-infant interactions. Relating the findings from this research back to the social-cultural theoretical framework will facilitate a greater understanding of the developmental

importance of the intervention and provide a foundation for designing and implementing intervention programs.

This study was designed to further our understanding in this area by investigating similarities and differences of mother-infant dyads during play for mothers of typically developing infants and infants with disabilities. In addition to directly observing the mothers and infants in play, a home visit involving the early interventionist and family was videotaped and observed. The addition of the home visit observation provides a needed context for increasing our understanding of mother-infant play and its relation to positive child outcomes for both typically developing infants and infants with disabilities who are involved in early intervention. This research has been formulated based on Vygotsky's sociocultural theory. The use of theory allows the processes related to cognitive development in infancy to be examined and provides a mechanism for informing the practice of early intervention.

Purpose of the Study

The purpose of this study was (a) to examine the relation between maternal involvement and level of play for typically developing infants and infants with disabilities, and (b) to examine the relation between the home visitor support of the parent-child interactions and maternal involvement.

This study used a multiple method, multiple observation approach to better understand mother-infant interactions within their natural environment. To better understand the relation between mother-infant interactions and development, this study

focused on processes of interaction comparing mother-infant dyads of both typically developing infants and infants with disabilities within a Vygotskian theoretical framework. In addition, the influence of the interaction style of the home visitor on mother-infant interactions was also explored. This study makes an important contribution because it is descriptive, includes an adequate sample size with multiple observations, is based on developmental contextual theory, and assesses the influence of the home visitor on mother-infant interaction.

Research Questions

The specific research questions are as follows:

1. Does infant cognitive level of play vary in relation to infant assessed cognitive development and maternal involvement as defined as mothers' presence, scaffolding, and play?
 - (a) Does infant cognitive level of play vary based on cognitive test scores?
 - (b) Do both typically developing infants and infants with disabilities demonstrate more sophisticated play when playing with their mother compared to playing alone?
 - (c) Does maternal cognitive level of play vary based on infant cognitive level of play?
 - (d) After controlling for cognitive test scores, is infant level of play higher when mothers scaffold more?
2. Do mothers scaffold more when their home visitor supports the mother-infant relationship during home visits than when the home visitor does not?

(a) Does support of the mother-infant interaction during home visits vary depending on whether or not the infant has a disability?

(b) Do mothers use scaffolding techniques more when the home visitor supports the mother-infant interaction versus interacting with the child herself?

CHAPTER II

REVIEW OF LITERATURE

There has been an increased focus on providing services to families of children with disabilities since the implementation of the Education of the Handicapped Amendments of 1986—Part H (PL 99-457). This amendment allowed early educators to provide services for children with disabilities from birth. Educators were compelled to develop programs to facilitate development in these early, critical years. As various programs were designed, there was a focus on specialized instruction to teach particular skills to children and their parents. One skill intervention approach was designed to teach parents how to play with their child to optimize the child's learning potential. The needs and unique interaction styles of the mother and her infant were often overshadowed by the disability characteristics and the usually didactic methods of intervention. Head Start programs also serve some children with disabilities as Head Start has mandated that 10% of the participants served have a disability. This mandate has required Head Start teachers to develop skills for encouraging development of children with disabilities in addition to typically developing children. Early Head Start is based on home visiting strategies following a model in which parents are supported and encouraged for what they initiate with their child. This model is consistent with Vygotskian theory.

Each mother-infant dyad is unique with different temperaments, disabilities, risk factors, strengths, and ethnicity, with different preferences and goals for interaction. Understanding these differences and how they relate to the synchrony between a mother

and her infant has important implications for educators in early intervention programs. Therefore, Vygotsky's sociocultural theory will be reviewed first in order to lay the foundation for exploring the relation between infant level of play and maternal interaction style. Play will be reviewed next as the medium of observation and development, followed by reviews of interaction style, and strategies of early intervention programs.

Theoretical Framework

Vygotsky (1978) emphasized the importance of learning as a process which leads development. He suggested that each child is functioning within a zone of proximal development. The zone of proximal development refers to the difference between the actual developmental level the child exhibits and that which he is able to do when assisted by an adult or more capable peer. The task of parents and early interventionists is to define this zone while building upon the child's emerging skills. This emphasis on the process of learning focuses our attention on those skills that are emerging instead of skills already within the child's repertoire.

Interaction with adults is an important element in a child's development. Vygotsky (1978) asserted that "human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them" (p. 88). As part of his theory Vygotsky described the process of development as movement from other-regulation to self-regulation. This transition occurs as the child begins to take more initiative in an activity requesting help as needed (Jamieson, 1994). Play is the context in which this transition is likely to occur.

Vygotsky (1976) suggested that "play is the source of development and creates the zone of proximal development. In play a child is always above his average age, above his daily behaviour; in play it is as though he were a head taller than himself" (p. 552). Play allows a natural and comfortable setting to practice and master skills. "Play is defined as the child's spontaneous, pleasurable, and naturally unfolding repertoire of actions on objects, others and self, which leads to the discovery, expression, and mastery of physical reality, ideas, and feeling" (Sheridan, Foley, & Radlinkski, 1995, p. 1). The diversity of play allows for many opportunities to enhance a child's development within the context of the child's culture. The terms "spontaneous" and "naturally unfolding" suggest that the child is the orchestrator of his play experience. Therefore, parental awareness and careful observation of a child's cues are important for the facilitation of development within a play setting. By responding to the child's initiatives, building upon the emerging skills through prompts and awareness of the child's interest level will encourage development within the child's zone of proximal development.

Berk and Winsler (1995) emphasized the importance of children with disabilities being provided the same opportunities to participate in social activities and to experience positive interactions with adults and peers. They ascribe to Vygotsky's view that "higher mental functions have their roots in social interaction and collaborative activities" (Berk & Winsler, 1995, p. 83). Vygotsky (1978) suggested that the underdevelopment of higher processes is not directly due to the disability, but rather their development is impeded by characteristics which interfere with social development and interacting with others. He emphasized that intervention efforts should focus on the "collective relations,

cooperation, and interaction with others" (as cited in Berk & Winsler, 1995, p. 83).

Some parents of both typically developing children and children with disabilities may not be supportive of their child during play and problem-solving activities. The assumption that parents who do not exhibit appropriate parenting skills in interactions with their child just need to be taught these skills may be a faulty assumption. Occasionally parents have the skills to be responsive and encouraging to children other than their own, but are more directive and aversive with their own child (Dumas & LaFrenier, 1993). A limitation of the application of Vygotsky's theory is that researchers have not addressed the question of whether parental perception of their child's abilities and characteristics influences parental support (Fagot & Gauvin, 1997).

Play

It is important to understand the development of play for both infants with disabilities and typically developing infants. Understanding how to facilitate and increase levels of play for children with disabilities is an important factor in intervention because increases in level or complexity of play are associated with increased cognitive abilities (Gowen, Johnson-Martin, Goldman, & Hussey, 1992). Adult-child play encompasses the everyday functions of communicating feelings, defusing conflict, enlivening daily routines, teaching, managing others, and having fun (Berk & Winsler, 1995). Using the concept of zones of proximal development to encourage development, researchers have described how parents "scaffold" during play with their child by being responsive and building upon the child's initiatives. Parents of children with disabilities

have been observed "prompting play behaviors through suggesting and modeling play behaviors that were at or slightly above the children's current play levels" (Gowen et al., 1992, p. 36). Parents' play behaviors which are intrusive and instructive are associated with more simple exploratory play in typically developing 15- to 24-month-olds, but in contrast, joint involvement and turn taking in a shared activity are associated with higher levels of pretense in play (Fiese, 1990).

Following this theoretical framework, when interacting with children with disabilities, parents' interactions should be between the child's developmental age and his chronological age. The current literature is inconclusive whether or not this is occurring. Some research suggests that mothers "tailor" their play behavior to match the child's abilities without encouraging child-initiated play (Brooks-Gunn & Lewis, 1982). Other research suggests that children with disabilities, like those without, may play at a more advanced level when interacting with their mother (Cielinski, Vaughn, Seifer, & Contreras, 1995; Gowen et al., 1992). Gowen et al. (1992) studied the development of object play in a longitudinal design. Through multiple observations they saw that children with disabilities followed the same play development as children without disabilities. A limitation of this study is that the authors did not assess whether or not the level of play the children exhibited was maintained without parent facilitation. Landry, Garner, Denson, Swank, and Baldwin (1996) found that mothers' attempts to encourage and lengthen the infants' interest resulted in more exploratory play than when mothers attempted to direct the infants' attention.

Researchers suggest comparing children with and without disabilities based on

developmental age instead of chronological age (Rosenberg & Robinson, 1988). Gowen et al. (1992) compared children with disabilities with other children of the same developmental level and with other children of the same chronological age. They found the children's level of play to be associated with their developmental age, not their chronological age. They also found children with disabilities to be less active in their involvement with objects than similar developmentally aged children. Perhaps this difference is associated with differences in mothers' play behaviors.

Play interactions between parents and their infants have become an important variable in early intervention research. How parents adjust their assistance to meet the changing needs and competencies of the child has been referred to as "scaffolding" (Berk & Winsler, 1995). A greater understanding of how scaffolding encourages higher levels of play in children will contribute to the current body of literature.

Currently, various behaviors are interpreted as scaffolding. These include attention-directing behaviors, attention-maintaining behaviors, maternal attitudes of warmth toward child, maternal suggestions for play at or above the child's current level of play, and cognitive assistance during play (Damast, Tamis-Lemonda, & Bornstein, 1996; Fagot & Gauvain, 1997; Landry et al., 1996). Effective scaffolding is a dynamic interaction between the parent and child that goes beyond providing cognitive assistance (Berk & Winsler, 1995).

Certain aspects of play interactions are associated with a variety of positive child outcomes. These proximal process variables, such as parent-child interaction in a natural setting, are more informative than distal static variables such as socioeconomic status or

standardized test scores (Portes, 1991). Mothers who often guide or scaffold their children's problem-solving tend to have children who are advanced both academically and intellectually (Portes, 1991). Mother-child interactive relationships that support choices are associated with more involvement in symbolic play. An interactive style that gives verbal and nonverbal support as well as praise when teaching a task is associated with greater persistence for both typically developing children and children with disabilities when they attempt challenging tasks on their own (Hauser-Cram, 1996). Furthermore, children from mutually responsive parent-child dyads are more likely to internalize maternal goals and values (Kochanska, 1997).

One example of scaffolding of infants during play might be how mothers choose to interact with their infants based upon the developmental level of the infant. During play, a 12-month-old who is mastering imitation may be particularly responsive to modeling while an infant who is not yet able to hold onto a large object may benefit more from physical assistance. In other instances, infants may be interested in their play and able to regulate themselves during play so that maternal assistance does not enhance their competence (Lawson, Parrinello, & Ruff, 1992). Knowing when and how to facilitate infant play may be difficult for some mothers.

Play Interactions and Infants with Disabilities

Maternal interactive styles of mothers of typically developing infants and infants with disabilities may be both different and appropriate for the individual behavioral styles of the infants (Roach et al., 1998). Several studies will be reviewed to illustrate

variations in mother-infant interaction. In the language domain, mothers' mean length of utterance is positively correlated with typically developing children's chronological age and with children with disabilities' mental age (Buckhalt, Rutherford, & Goldberg, 1978). Thus, mothers adjust their language complexity to the developmental level of the child. Early mother-infant vocalization patterns have also been related to developmental differences. For example, infants with Down syndrome tend to vocalize less often in response to maternal interactions than typically developing infants (Buckhalt et al., 1978) which may influence subsequent maternal attempts at interaction.

Mother-infant interactions during play have also been shown to vary. In a study of eight preschoolers with and without disabilities, mothers of children with disabilities were two times more likely to initiate the interaction with their children in a play situation than the comparison group. Children with disabilities responded to their mother's initiations about 56% of the time, while the typically developing group responded 78% of the time. Also, mothers of children with disabilities used three times more directives than the comparison group mothers (Eheart, 1982). Even though the small, selective sample limits the generalizability of these findings, other studies document maternal differences during play.

Brooks-Gunn and Lewis (1982) also found evidence to support the belief that mothers of infants with disabilities were more controlling of the interaction than a comparison group of mothers of typically developing infants. They also concluded that while mothers may tailor their play to the infant's behaviors and abilities, they may not encourage the interactions initiated by the infant because of the perceived deficits.

Mother-infant interaction is a powerful variable that researchers are continuing to try to understand. Hauser-Cram (1996) found that maternal didactic interaction was predictive of mastery motivation, even more so than health-risk factors and severity of cognitive delay. Her study contained a sample of three groups which consisted of 25 children with motor impairments, 25 children with developmental delays, and a comparison group of 25 typically developing children. The comparison between groups on mastery motivation tasks emphasized the importance of the interactive behavior of the mothers. This study, however, does not allow for interpretation of direction of effect between interactive behavior and mastery motivation.

Researchers have suggested several explanations for why mothers who have children with disabilities are controlling in their interactions with their children. Explanations include that mothers make attempts at keeping the interaction going (Jamieson, 1994), that mothers initiate because the children are unable to initiate play (Kaplan-Sanoff, Brewster, Stillwell, & Bergen, 1987), and that "so-called negative mother behaviors are appropriate for children who function at lower levels" (Dote-Kwan, 1995, p. 57).

As we focus on the process of development it is imperative to recognize the importance of the individual characteristics of the infants and their contribution to the interactions with their mothers. Dixon, Smith, Hayden, Myers, and Bell (1998) assessed 40 typically developing mother-infant dyads when the infants were 5 months and again when they were 20 months and found an association between fast habituation at 5 months and more sophisticated and varied maternal play at 20 months. Maternal play behavior

was also predicted by the infant temperament dimensions of adaptability, approachability, intensity, mood, and persistence. Infants with more difficult temperaments had mothers who played at higher levels with a greater variety of toys. The regression analyses indicated that both infant habituation and infant temperament contribute uniquely to maternal play behavior at 20 months. The authors suggested that during play mothers adjust for both cognitive level and temperament of the infant (Dixon et al., 1998). Other characteristics may be particularly salient for mother-infant dyads with disabilities.

In the early literature a dismal picture was painted describing children with hearing impairments as having "lowered initiation of voluntary responses, that is, very low rates of spontaneous attempts to interact," with mothers who "were always more dominant in interaction with their deaf children" (Wedell-Monnig & Lumley, 1980, p. 773). Research has also suggested that children with Down syndrome smiled and vocalized less often than typically developing infants (Buckhalt et al., 1978). Statements such as "When compared to nonhandicapped peers, young handicapped children are less active, less responsive to their mothers, initiate fewer interactions and provide fewer communicative and affective cues" (Rosenberg & Robinson, 1988, p. 164) suggest that children with disabilities are quite different from their typically developing peers, making fewer contributions to a mutually responsive mother-infant relationship.

Not all research supported the idea that there are behavioral differences, in general, between infants with and without disabilities. In contrast to perceptions that children with Down syndrome are passive by nature, Ulrich and Ulrich (1995) found that infants with Down syndrome were as active with as many spontaneous leg kicking

movements as typically developing infants. The authors' sample size of 10 per group could be considered a limitation of the study. However, the authors replicated their study of kicking behavior of infants with Down syndrome on two different occasions with two different samples to increase their confidence that they did not make a Type I error. They suggested two different explanations for the difference between the results of their study and previous studies. First, earlier studies may have been based on children who did not have as much medical attention, therapeutic intervention, or support in their home environment as the subjects in their study had. A second explanation suggested is that passivity may be learned, becoming more prevalent later in life.

Results from a recent study indicate that children with Down syndrome exhibited similar rates of object play and vocalizations as their typically developing peers, but that maternal play behaviors varied. Three groups of 28 mother-infant dyads were involved in this study. The three groups consisted of a group of infants with Down syndrome, a group of infants matched for chronological age, and a group of infants matched for mental age. They were asked to play for 15 minutes with a set of toys in a laboratory playroom. The mothers of children with Down syndrome used more directive statements with their children during play than the other two groups, but these directives were embedded in a stream of supportive statements. In fact, mothers of infants with Down syndrome also exhibited a higher frequency of supportive statements than the other two groups. They were also more likely to exhibit supportive behaviors such as moving toys closer or steadying a toy. The higher frequency of supportive behaviors was associated with more optimal play for the infants with Down syndrome (Roach et al., 1998).

Interestingly, the rate of maternal demonstrations of toy use for mothers of infants with Down syndrome was in between the rates for the other two groups. Mothers of infants with Down syndrome in this sample were targeting their guidance between the child's mental age and the child's chronological age. The authors concluded that the different interaction styles of the mothers of the infants with Down syndrome and the typically developing groups may be adaptive and perhaps directive behaviors should not be discouraged (Roach et al., 1998).

In sum, although much research has been conducted to support the claim that mothers of children with disabilities are more directive during play, further analysis of the interactions of these dyads is needed. Much of the research has been conducted in laboratory settings, which may not give an accurate picture of typical mother-infant interaction patterns during play. A closer examination of the behaviors that both the mother and child with a disability bring into the interaction is needed to determine if the adaptive patterns are beneficial to the child and his development.

Intervention Programs

Infant development typically occurs within a family context where the family members adapt to the changing needs of the infant. This process occurs over time and is successful at varying degrees, but most often occurs without expert advice. "One implication of this principle is that, just as well-functioning infants can be interfered with by unneeded intervention, so can adequately functioning families. Even when intervention is called for, it should support the parent-child relationship, not replace it"

(Futterweit & Ruff, 1993, p. 153). A standardized approach to intervention is not likely to meet the unique needs of all of the families served. The intervention approach needs to be dynamic and responsive to the developmental changes of the infant and needs of the family.

Early intervention programs have been associated with positive outcomes in maternal responsiveness and interaction behaviors (Feldman, Sparks, & Case, 1993) and with long-term effects on school achievement and socialization (Barnett, 1995). Intervention programs often place an emphasis either on the child or the caregiver but not both. Earlier programs focused on stimulation of the infant to remediate deficits (Simeonsson & Bailey, 1990). Simeonsson and Bailey (1990) described several factors that contributed to the increased emphasis, in general, on families in early intervention. First, parents became more involved on behalf of their children and more selective in services provided. Second, research verified that parents were successful in modifying their child's behavior. Third, it has been recognized that families have unique needs related to their child's disabling condition. Paralleling the practical considerations is the development of transactional theoretical models, especially Bronfenbrenner's (1986) work, which views the family as a system embedded in a much larger ecological framework of social systems, all of which have some influence on development.

More recent studies suggest that the most important role of the intervention specialist is to support the parents in their relationship with their child (Seitz & Provence, 1990). Interventionists who encourage parents to recognize the unique abilities and behavioral characteristics of their infant attempt to enhance parent-infant interaction

through increasing the sensitivity and responsivity of the parent (Futterweit & Ruff, 1993).

If intervention programs focus on parents, then the parent's development can also be considered in a developmental theoretical framework. As home visitors collaborate with parents to enhance a child's development, they are sharing a social context allowing for advancement of the parents' zone of proximal development. The parental zone of proximal development is defined in terms of enhancing the parental monitoring and facilitation of the child's development with help provided by the home visitor. As a mother's knowledge and confidence increase, so does the quality of mother-infant interaction (Conrad, Gross, Fogg, & Ruchala, 1992). One example of this is a study of mother-child dyads attempting to solve a permutation task. If the mother was familiar with how to solve the task, she was more likely to allow the child to participate more fully in solving the task while monitoring the child's activity (Normandeau & Arseneault, 1994).

Similarly, mothers' knowledge of child development is significantly related to facilitation of infant attention during play (Landry et al., 1996). Landry et al. (1996) also found that mothers with positive parenting beliefs were more likely to attempt to maintain their infant's interest rather than redirecting it. They conclude that "mothers who view children as needing parental support rather than control, and who believe children must be treated differently as they develop new skills, are more likely to provide scaffolding that is contingent on the child's interests and behavior" (p. 196). Therefore, there is a need to discover if home visitors that support mother-infant interaction during home

visits successfully encourage parent sensitivity and responsivity in parent-infant interactions. A better understanding of these intervention techniques will have important ramifications for facilitating mother-infant interaction with high-risk infants and infants with disabilities.

Synthesis of Literature

Vygotsky's theory (1978) suggests that learning and experience lead one's development. For children, play is a rich medium for learning and subsequent development. His theory further suggests that all higher mental functions appear first on a social plane and then are internalized. As young children play with adults, they have the opportunity for the social interaction needed for development. Parents who are responsive to the child's zone of proximal development facilitate learning and subsequent development by guiding and supporting the child's play, enabling the child to master new skills and knowledge. Vygotsky believed that these developmental processes apply to both typically developing children and children with disabilities. He stressed that rich social environments with available scaffolding were especially important for children with disabilities in order to maximize their potential.

For infants, one of the most common social influences is the interactions between themselves and their mothers, which often occur during play. How mothers interact with their infants varies depending upon whether or not the infant has a disability. Mothers of infants with disabilities have been observed to be both more directive and in some instances more supportive of their infants during play than mothers of typically

developing infants (Roach et al., 1998). The particular interaction style of the mother seems to be a key element in relation to sophistication of infant play, which in turn is related to cognitive development.

Many infants with disabilities as well as infants at-risk for developmental difficulties are receiving early intervention services. How these services are presented has the potential for encouraging mutually responsive interactions within both typically developing mother-infant dyads and mother-infant dyads with disabilities. This study examined maternal scaffolding behavior during mother-infant play in relation to the extent that the home visitor supports mother-infant interactions during the home visit.

CHAPTER III

METHOD

Subjects

The participants in this study consisted of families in an Early Head Start (EHS) Program and additional families with infants with disabilities recruited from southeastern Idaho through the Idaho Infant/Toddler Program and from the Logan area through the Center for Persons with Disabilities (CPD). All three programs provide services to families and their children with disabilities from birth to 36 months. Early Head Start (EHS) serves primarily typically developing infants but is required to reserve 10% of their slots for infants with disabilities. EHS, CPD, and the Idaho Infant/Toddler Program all serve a primarily Caucasian, English-speaking population.

A total sample of 41 mother-infant dyads was obtained. This sample consisted of both typically developing infants and infants with disabilities. The group of typically developing infants ($n = 22$) were approximately 18 months old (mean = 18.99, $SD = .58$) and enrolled in the Bear River EHS program. The group of infants with disabilities consisted of EHS infants with disabilities ($n = 7$) and additional infants with disabilities recruited from the Idaho Infant/Toddler Program ($n = 6$) and the CPD ($n = 6$) for a total of 19 mother-infant dyads.

This second group ranged in age from 16 to 25 months (mean = 19.12, $SD = 1.76$) dependent upon the age at recruitment. This difference in age between the two groups is due to the attempt to obtain a comparably sized sample of infants with disabilities close in

age to the standard 18 months for the EHS national data collection. Infants with disabilities were selected based on chronological age instead of developmental age in an attempt to control the amount of time (since birth) the mother-infant dyad has had to interact. A second purpose was to control the type of intervention. Many older children with disabilities, who would be comparable developmentally to the typically developing sample, attend preschool settings instead of receiving home visits. Attempts were made to recruit as many infants with disabilities as possible at 18 months. Two infants with disabilities were recruited who were 16 and 17 months to obtain a sample of 19, and the remaining infants were 18 months or older. Inclusion of older infants with disabilities was preferred as their play was more comparable to the typically developing sample's play than the younger infants with disabilities. The majority of the sample ($n = 29$) came from the EHS program. All participation was voluntary and all families were compensated monetarily.

Demographic Characteristics of the Sample

Maternal level of education was similar for both the disability and nondisability groups, but the annual family income differed. Nondisability group mothers averaged 12.48 years of education, with a standard deviation of 1.78 years, while the disability group mothers averaged 12.89 years of education, with a standard deviation of 2.32 years.

The annual family income difference between groups was statistically significant, $t(37) = 2.54, p < .05$. Nondisability group mothers average income was \$9,093.18, with a standard deviation of \$8,344.79. Incomes in this group ranged from zero to \$37,200.00

with a median income of \$8,166.00. Disability group mothers average income was \$26,187.00, with a substantial standard deviation of \$30,241.00. Incomes in this group ranged from zero to \$135,000.00 with a median income of \$15,532. The reason for this discrepancy is that 90% of EHS families must have incomes below the federal poverty guidelines, but programs for infants with disabilities enroll families regardless of income.

Procedures

Families of both typically developing infants and infants with disabilities in the EHS program were selected as their EHS 18-month assessment was completed. All infants with disabilities from the EHS program were included in the second group. Infants with disabilities from the Idaho Infant/Toddler Program and the CPD were recruited as close to 18 months as possible. Only families where English was their primary language were included in the sample.

Children who had a wide range of disabling conditions were included. The eligibility for intervention services was determined by the programs serving the families. The disabilities identified by program staff included: cleft lip with developmental delay, communication delay ($n = 3$), arthrogryposis (a congenital condition that impairs the ability to use one's joints and muscles), cerebral palsy with developmental delay ($n = 2$), cleft palate with language delay, stroke with developmental delay, motor delay, seizures with developmental delay, Stickler syndrome (an autosomal inherited disease characterized by retinal detachment, joint problems, cataracts, and facial and dental abnormalities) with developmental delay, developmental delay due to prematurity ($n = 3$),

Down syndrome ($n = 3$), and a disorder of unknown etiology that includes developmental delay, sensory sensitivity, hearing loss, and possible vision loss.

Data were collected through questionnaires, interview, assessment, and direct observation. The majority of the data collected from the EHS population was collected by the EHS research project interviewer/assessors as dictated by the federally-funded local data collection protocol (Roggman, 1996). The assessment of the infants and direct observation were conducted in the families' homes. The researcher accompanied the EHS program's home visitor on a home visit to the family and videotaped the intervention session. For the children in the Idaho Infant/Toddler program and the CPD, the researcher collected all data. A time was scheduled to meet in the family's home to assess the infant, videotape a play interaction, and videotape the home visitor and family during an intervention session. This researcher followed the EHS data collection protocol to insure parallel data collection procedures.

As a member of the EHS research team, this researcher followed EHS research project data collection procedures for administrating the Mental Scale of the Bayley Scales of Infant Development: Second Edition (BSID-II) and obtaining a 14-minute play situation videotape involving the infant, mother, and a standard set of toys. The play session included (a) a presentation for 7 minutes of a set of toys (cup, saucer, doll, telephone, ball, truck, six nesting cups, six blocks, jack-in-the-box, and shape sorter) that the infant was allowed to explore alone while the researcher distracted the mother with selected interview questions, and then (b) 7 minutes of free-play in which the mother was encouraged to "play with your baby as you usually would." Instructions for videotaping

were scripted and followed the same format for EHS, CPD and Idaho Infant/Toddler Program infants. The play session was structured by time, toys, and instruction in an attempt to standardize the situation.

Coding

Videotaped observations of the infant play, mother-infant play, and home visit were coded by this researcher and two graduate students. Twenty-five percent of all tapes were coded by a second observer and checked for reliability. Reliability estimates are reported with the description of each coding scheme.

Ratings of play sessions included quality of mother-infant interaction, level of play for the infant playing alone and with the mother, and maternal support of play. Ratings of home visits included frequency counts of the focus and content of the home visitor interactions.

Measures

Developmental Assessment

The Mental Development Index (MDI) of the Bayley Scales of Infant Development: Second Edition (BSID-II) was the developmental assessment that was used in this study as it is used by both the EHS study and the Idaho Infant/Toddler Program. Cronbach's alpha for internal consistency on this assessment was .88 with interscorer reliabilities reported in manual as "correlations" of .96 (Bayley, 1993). Items are scored based on both verbal and nonverbal responses from the child, parent report,

and direct observation of the child manipulating test items. MDI items include "builds a tower of two cubes" and "says one word." For children with disabilities, an estimate of mental age was obtained for those whose mental developmental scores were below 50 (Naglieri, 1981); only two children received mental developmental scores of less than 50. These children's scores were extrapolated based on Naglieri's (1981) "estimates of performance based on statistically derived expected scores" (p. 548).

Observation Measures

Infant level of play alone, infant level of play with mother, maternal level of play, and maternal scaffolding during play were coded from the videotaped play session. Level of play was assessed at 15-second intervals based on the developmental sequences developed by Belsky and Most (1981) and adapted by Gowen et al. (1992) for use with both typically developing infants and infants with disabilities. The categories for coding the cognitive level of play range from the child not being involved with an object to pretend play preceded by evidence of planning. The general categories include: passive involvement with an object such as watching a demonstration, physical guidance during play, tactile stimulation, looks toward an object, mouths or manipulates an object, manipulates the object in the appropriate way, combines objects, engages in pretense, pretends toward self and others, pretends sequentially, and plans pretense. Twenty-five percent of the videotapes were selected for independent coding by another observer. Kappas averaged .82 for the play session when the infant played alone and .84 for the play session when the mother played with the infant. The average level of play when the

infant played alone and with maternal participation was calculated and included in the analyses (Hrcir, Spellar, & West, 1985).

Maternal level of play was rated at the end of the 7-minute mother-infant play segment using a global rating scale developed by Tamis-LeMonda and Spellman (1998). The scale ranged from a 1, indicating that symbolic play was not observed, to a 5, indicating that symbolic play was consistently observed during the 7-minute play session. Twenty-five percent of the videotapes were rated by both coders. Reliability was estimated with Pearson product-moment correlation, which was .87 for the global level of play rating. The authors reported reliability for the 39 variables on the entire scale, from which the level of play rating was extracted, ranged from $r = .81$ to $.93$ (Tamis-LeMonda and Spellman, 1998).

Maternal scaffolding was operationalized as providing maternal guidance and support during the play interaction and was coded at the micro level as cognitive assistance, behavioral directives, positive support, and disapproval (Fagot & Gauvain, 1997). Comparable to cognitive assistance, physical assistance was coded in addition to the four codes developed by Fagot and Gauvain (1997). The inclusion of physical assistance provides a more comprehensive view of the types of assistance provided during play for both infants with and without disabilities. The definitions are as follows: (a) cognitive assistance consists of verbalizations or demonstrations that provide information to the child such as "the blue cup goes next" or showing the child how to turn the handle on the jack-in-the-box; (b) physical assistance pertains to stabilizing the toys or physically helping the child manipulate an object; (c) behavioral directives include all

statements by the mother that give specific directions to the child such as "put the block here" and "call Dad"; (d) positive support refers to statements of praise such as "good job"; (e) disapproval includes corrections of the child's play both verbally and physically such as stating "it doesn't go that way" or taking the jack-in-the-box away from the child to turn the handle more efficiently. The categories are not mutually exclusive. Often during the mother-infant play, statements that were directive also provided cognitive assistance.

The scores of these measures consist of the frequencies of these behaviors during the 7-minute play session. Coding these behaviors provided information regarding the nature and the extent of maternal guidance and support. The authors of this coding scheme report percentage agreement ranging from 70% to 89% with all kappas above .71 (Fagot & Gauvain, 1997). For this study the average percent agreement for this scale was 91% with a mean kappa of .86.

Videotaped home visits were coded to assess the extent of support of the mother-infant relationship by the home visitor. Two mother-infant dyads were not videotaped with their home visitor due to a temporary change in home visitors at the time of the participation in this study. All other mother-infant dyads had been visited by the home visitor being videotaped for at least two consecutive months. The majority ($n = 38$) of the families had been visited by the same home visitor since entry into their intervention program. Coders observed the videotaped home visit and coded who was interacting at 30-second intervals. The interactions of interest and subsequently those used in the analyses were (a) home visitor interacting with just the parent(s), (b) home visitor

interacting with just the infant, and (c) home visitor interacting with the parent-infant dyad. Duration of time spent in each category of interaction was calculated into a percentage to standardize the varied lengths of the home visits. Percentage of time spent with the mother-infant dyad was interpreted to be an indicator of support for the mother-infant relationship. Twenty-five percent of the videotapes were selected for independent coding by another observer. Kappas averaged .79 with a percent agreement of 86%.

Analysis of Data

All data were analyzed using the SPSS software program for windows. All data entered were checked for accuracy.

CHAPTER IV

RESULTS

This chapter includes results obtained through the direct observation coding and cognitive development assessment. The measures utilized to investigate the research questions were outlined in Chapter III. The results addressing each research hypothesis will be presented in this chapter. Discussion of the results obtained in this chapter will be presented in Chapter V.

Infant Level of Play and Maternal Involvement

Hypothesis 1

Infant cognitive level of play varies depending on infant assessed cognitive development and three indices of maternal involvement: presence, scaffolding, and play.

Both the entire sample and the sample grouped by disability category were included in the analyses. The theoretical framework for this study suggested that mothers respond to the developmental level of their infants and then guide and support their infants' play, indicating that grouping by disability status would not be necessary. However, the literature review suggests that mothers of infants with disabilities interact differently with their infants during play than mothers of typically developing infants, and thus there was a need to also analyze the whole sample in addition to subsample divided by disability status.

Before testing hypothesis 1, two issues involving family income and family

income and maternal education were addressed. First, because one family's income was much higher than the rest of the sample, correlations were calculated both with and without this high income outlier. The patterns of association remained the same when the outlier was excluded as when the outlier was included. Therefore, the case was included in all analyses. Second, family income and maternal education means were compared between infants with disabilities and typically developing infants to determine if the differences between groups were statistically significant. Results from the independent-samples t tests indicated a statistically significant difference between the two groups for income, $t(37) = .25$, $p = .01$, but not for education, $t(37) = .63$, $p = .53$. Thus, families of infants with disabilities had higher incomes and similar years of maternal education when compared to families of typically developing infants.

Sample Grouped by Disability

In addition to the demographics, the play variables and cognitive development indices were analyzed to assess group differences. The mean scores and standard deviations of the play variables and cognitive development indices were calculated both as an entire group and also broken down by disability status as seen in Table 1. Maternal level of play means ranging from 2.23 to 2.32 indicate that the mothers rarely played symbolically. This global measure of maternal play remained consistent across groups. For the entire sample, the mean level of play when the infant played alone was essentially the same as the mean infant level of play when the mother participated in play, paired t (39) = .05, $p = .96$. For the typically developing infants the mean level of play decreased

Table 1

Means and Standard Deviations for Complexity of Play and Cognitive Indices for The Entire Sample and by Disability Status

Measure	All infants ($n = 40$)		Typically developing infants ($n = 22$)		Infants w/disabilities ($n = 18$)	
	Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Maternal play	2.27	.77	2.23	.75	2.32	.82
Infant play alone	3.77	1.06	4.27	1.02	3.16	.75
Infant play with mom	3.75	.91	4.06	.78	3.38	.94
MDI	80.10	21.97	92.32	11.36	65.95	22.99

only slightly when the mother participated, paired t (21) = .88, $p = .39$, and for the infants with disabilities the mean level of play increased only slightly when the mother participated, paired t = 1.11, $p = .28$. The mean level of play for the typically developing infants indicated that on average they were combining objects indiscriminately. The mean level of play for the infants with disabilities was somewhat lower, indicating that on average they used objects functionally. As one would expect, cognitive indices varied substantially, with the mean Bayley score much higher for the typically developing infants in comparison to the infants with disabilities, t (39) = 4.76, $p = .00$. But it should be noted that the standard deviations were quite large for both groups, 11.36 for the typically developing infants and 22.99 for the infants with disabilities. These cognitive

test score standard deviations indicate that there was some overlap between groups in that some infants identified as having disabilities were functioning in the average range cognitively and that some typically developing infants were functioning at two standard deviations below the mean where they may be considered to have a development delay. Therefore, cognitive test scores were included in analyses addressing cognitive development as a more precise measure than disability status.

The first step in testing hypothesis 1 was calculating a Pearson correlation coefficient to assess how infant cognitive level of play varies in relation to the infant's cognitive test score. The results of the correlation testing are grouped by disability and presented in Table 2. The relations between the infants' cognitive test scores and their level of play, when they play alone and with their mothers, were statistically significant for the entire sample. The associations were much weaker when calculated separately for the typically developing sample and for the infants with disabilities. The moderate and statistically significant strength of the correlations of cognitive test scores with infant level of play alone and infant level of play with mothers are similar for the entire sample,

Table 2

Pearson Correlations Between Cognitive Test Score and Infant Level of Play

Infant level of play	Entire sample ($n = 40$)	Typically developing infants ($n = 22$)	Infants with disabilities ($n = 18$)
Alone	.41**	.28	.02
With mom	.40**	.09	.32

** $p < .01$

but are smaller and not statistically significant for the smaller samples grouped by disability status.

The second step used one-way ANOVA, between-group design, to assess the group differences between typically developing infants and infants with disabilities for complexity of infant play both with and without maternal participation. These analyses revealed significant effects for both infant level of play alone, $F(1, 39) = 14.96, p < .01$, and infant level of play with maternal participation, $F(1, 40) = 6.48, p < .05$, indicating that the typically developing infants played at a higher level as expected.

Next, a repeated-measures two-way ANOVA was used to assess both the main effects and interaction effect of disability status and maternal participation on infant level of play. Infant level of play alone and infant level of play with maternal participation, continuous variables, were the repeated dependent variables. Whether or not the infant had a disability, a nominal variable, was included as the between-subjects independent variable. Whether or not the infant was playing with the mother or alone was included as the within-subjects independent variable. This analysis indicated that there was no interaction between disability and maternal participation, $F(1, 38) = 1.86, p = .18$. Therefore, the main effects of disability and infant play were examined. These analyses revealed a statistically significant main effect of disability status, $F(1, 38) = 14.87, p = .00$, with a small effect size or eta-squared of .28, but no main effect for maternal participation, $F(1, 38) = .007, p = .93$. Thus, typically developing infants played at a higher level than infants with disabilities. No differences were detected for maternal participation, and the interaction term was not statistically significant.

The next step in testing hypothesis 1 was to calculate Pearson correlation coefficients to assess how maternal behaviors during play vary with infants' play sophistication. Three sets of correlations were included in these analyses: for the entire sample, for mothers of infants with disabilities, and for mothers of typically developing infants. First, intercorrelations among the scaffolding variables were explored. Second, correlations of maternal scaffolding and maternal level of play with infant level of play were assessed. Finally, the relation of the demographic variables of maternal education and income with maternal behaviors of scaffolding and level of play were assessed.

Few correlations stood out as meaningful when the entire sample was included in the analyses as shown in Table 3. Intercorrelations among the scaffolding variables were weak. Correlations of maternal scaffolding behaviors with the global rating of maternal level of play, as well as with the infant level of play when mom participated, indicated minimal association between the variables. Maternal education and income were statistically significantly related to the scaffolding variable of behavioral directives, indicating that mothers with more education and income used more behavioral directives. Income was also statistically significantly related to maternal level of play, indicating that mothers with higher incomes played at a higher level.

When the sample was grouped to include only typically developing mother-infant dyads, several patterns of association become apparent (see Table 4). First, there was a strong negative correlation between cognitive and physical assistance, indicating that mothers who used more physical assistance used less cognitive assistance and that those for the typically developing group, maternal level of play was associated with several

Table 3

Means, Standard Deviations, and Pearson Correlations for the Maternal Variables for the Entire Sample

Variable	n	Mean	SD	1	2	3	4	5	6	7	8	9
1. Cognitive assistance	41	28.34	12.54									
2. Physical assistance	41	20.32	12.65	-.25								
3. Behavioral directives	41	26.80	11.65	-.08	.11							
4. Positive support	41	4.44	4.89	-.03	-.28	.18						
5. Disapproval	41	1.76	2.15	.01	-.09	-.04	-.04					
6. Maternal level of play	41	2.27	.77	.10	.13	.11	-.14	-.08				
7. Education	39	12.67	2.03	.08	-.02	.38*	.16	-.18	.20			
8. Income	39	16,544	22,299	-.04	.07	.33*	.11	-.14	.32*	.48**		
9. Infant level of play alone	40	3.77	1.06	.08	-.04	-.07	-.22	.09	.01	-.28	-.16	
10. Infant level of play with mom	41	3.75	.91	-.11	-.15	.02	-.03	.10	.24	.04	.00	.48**

* $p < .05$.

** $p < .01$.

Table 4

Means, Standard Deviations, and Pearson Correlations for the Maternal Variables for Typically Developing Infants

Variable	n	Mean	SD	1	2	3	4	5	6	7	8	9
1. Cognitive assistance	22	27.14	14.12									
2. Physical assistance	22	20.73	12.35	-.69**								
3. Behavioral directives	22	27.77	11.45	-.19	.16							
4. Positive support	22	3.64	4.04	.13	-.24	.36						
5. Disapproval	22	2.18	2.52	.17	.08	.06	.08					
6. Maternal level of play	22	2.23	.75	.05	-.03	-.30	-.55**	-.08				
7. Education	21	12.48	1.78	.04	.00	.15	.40	-.18	-.07			
8. Income	22	9,093	8,344	-.26	-.06	-.02	.15	.09	-.27	-.16		
9. Infant level of play alone	22	4.27	1.02	.11	-.12	-.36	-.36	-.09	.15	-.44*	.16	
10. Infant level of play with mom	22	4.06	.78	-.05	-.22	-.17	.01	.05	.45*	-.07	.04	.28

* $p < .05$.

** $p < .01$.

scaffolding variables. The strongest associations were inverse relations between maternal level of play and behavioral directives and between maternal level of play and positive support. These findings suggest that mothers whose play was more sophisticated used fewer behavioral directives and fewer positive support statements. For this portion of the sample, maternal level of play was also statistically significantly correlated with infant level of play during maternal participation, indicating that mothers' play was similar to infants' play.

Correlations among the maternal variables were stronger for the sample of infants with disabilities than for the typically developing portion of the sample (see Table 5). The intercorrelations among the scaffolding variables were not statistically significant. No associations were seen between infant level of play and the scaffolding variables, but there was a relatively strong, statistically significant association between maternal level of play and behavioral directives. Behavioral directives were also highly correlated with maternal education and income, a relation in the opposite direction than for the group of typically developing infants. In addition, maternal level of play was strongly correlated with income and moderately correlated with education. These patterns of association suggest that mothers who played at a high level had high levels of education and income and that they used a high frequency of behavioral directives during play.

The maternal scaffolding variables were included in additional analyses to assess whether the mothers of infants with disabilities used more cognitive assistance, physical assistance, behavioral directives, positive support, or disapproval during play with their infant than mothers of typically developing infants. Results from independent-samples t

Table 5

Means, Standard Deviations, and Pearson Correlations for the Maternal Variables for Infants with Disabilities

Variable	n	Mean	SD	1	2	3	4	5	6	7	8	9
1. Cognitive assistance	19	29.74	10.63									
2. Physical assistance	19	19.84	13.33	.36								
3. Behavioral directives	19	25.68	12.08	.09	.05							
4. Positive support	19	5.37	5.70	-.25	-.30	.08						
5. Disapproval	19	1.26	1.56	-.29	-.41	-.30	-.10					
6. Maternal level of play	19	2.32	.82	.16	.29	.54*	.14	-.24				
7. Education	18	12.89	2.32	.11	-.02	.57*	-.01	-.35	.41			
8. Income	17	26,187	30,241	-.04	.13	.58*	.04	-.19	.60*	.68**		
9. Infant level of play alone	18	3.16	.75	.26	.01	.27	.11	.10	-.03	.11	.04	
10. Infant level of play with mom	19	3.38	.94	-.11	-.14	.13	.05	-.02	.15	.21	.22	.49*

* $p < .05$.

** $p < .01$.

tests indicated no statistically significant differences between the means of the groups for any of the scaffolding variables (see Table 6). Thus, both mothers of infants with disabilities and mothers of typically developing infants used similar frequencies of cognitive assistance, physical assistance, behavioral directives, positive support, and disapproval during play.

An additional test of hypothesis 1 was to calculate a partial correlation to examine whether, after controlling for cognitive test scores, infants of mothers who scaffold more demonstrate more sophisticated play than infants of mothers who scaffold less during play. Results from the partial correlations for the entire group and broken down by disability did not indicate an association between maternal scaffolding behavior and infant level of play after controlling for cognitive test score.

Table 6

Results of t Tests Comparing Groups on Scaffolding Variables

Scaffolding variable	Infants with disabilities		Typically developing infants		t	p
	Mean	<u>SD</u>	Mean	<u>SD</u>		
Cognitive assistance	29.74	10.63	27.14	14.12	.67	.51
Physical assistance	19.84	13.33	20.73	12.35	.22	.83
Behavioral directives	25.68	12.08	27.77	11.45	.56	.57
Positive support	5.37	5.70	3.64	4.04	1.11	.27
Disapproval	1.26	1.56	2.18	2.52	1.44	.16

N = 41

Sample Grouped by Increase or
Decrease in Level of Play

The results presented thus far have provided little support for an association between maternal involvement and infant level of play. Therefore, the sample was divided into two groups: those infants whose level of play increased with maternal participation, and those infants whose level of play decreased with maternal participation. (There were no infants whose average level of play remained the same with maternal participation.) This distinction was made to explore which maternal and infant variables were associated with increased and decreased infant level of play when mothers participated.

To explore the associations between the scaffolding variables and infant level of play, correlations were calculated separately for those whose average level of play increased with maternal participation and those whose average level of play decreased with maternal participation. With this breakdown, one association between the scaffolding variables and level of play with maternal participation that was statistically significant for both groups was the use of physical assistance (see Tables 7 and 8). Interestingly, the direction of association differed between the two groups, resulting in a positive association between level of play and use of physical assistance for those whose level of play increased with maternal participation and a negative association between level of play and use of physical assistance for those whose level of play decreased with maternal participation.

For the group of infants whose level of play increased with maternal participation,

Table 7

Summary Table of Pearson Correlations for the Maternal Variables for Those Infants Whose Level of Play Increased with Maternal Participation

Variable	1	2	3	4	5	6	7	8	9
1. Cognitive assistance									
2. Physical assistance	.01								
3. Behavioral directives	.08	.19							
4. Positive support	-.09	-.31	-.04						
5. Disapproval	.01	-.30	-.12	-.19					
6. Maternal level of play	.08	.59**	.15	-.09	-.06				
7. Education	.18	.13	.70**	-.21	-.25	.35			
8. Income	-.02	.19	.32	-.04	-.19	.44	.61*		
9. Infant level of play alone	.08	.32	.17	-.11	.25	.07	-.21	-.32	
10. Infant level of play with mom	.07	.51*	.09	-.29	-.12	.36	-.05	-.04	.66**

N = 19

*p < .05.

**p < .01.

Table 8

Summary Table of Pearson Correlations for the Maternal Variables for Those Infants Whose Level of Play Decreased with Maternal Participation

Variable	1	2	3	4	5	6	7	8	9
1. Cognitive assistance									
2. Physical assistance	.60**								
3. Behavioral directives	-.08	.22							
4. Positive support	.27	-.02	.31						
5. Disapproval	.00	.04	.04	.17					
6. Maternal level of play	.23	-.35	-.09	-.50*	-.06				
7. Education	.18	.02	-.06	.52*	-.10	-.26			
8. Income	.02	.03	.26	.32	-.07	-.14	.18		
9. Infant level of play alone	-.11	-.50*	.07	.03	.06	.09	-.19	.07	
10. Infant level of play with mom	-.11	-.45*	-.13	.00	.23	.13	-.03	-.07	.79**

N = 21

*p < .05.

**p < .01.

there were positive associations between maternal level of play and use of physical assistance and between maternal education and use of behavioral directives. Thus, mothers who played at a high level often used physical assistance and those with high levels of education often used behavioral directives.

For those infants whose level of play decreased with maternal participation, cognitive and physical assistance were positively correlated, indicating that those mothers who provided physical assistance were also likely to provide cognitive assistance. This finding is very different from the negative, nonsignificant correlation of $r = -.25$ between these two scaffolding variables for the entire sample, suggesting a different pattern of involvement for those mothers of infants whose level of play decreased with maternal participation. For this group, physical assistance was negatively correlated with infant level of play when the infant played alone and with maternal participation. Also, for those infants whose level of play decreased with maternal involvement, use of positive support was negatively related to maternal level of play and positively related to maternal education. Thus, mothers who frequently used positive support played at lower levels and had more education.

Patterns of association between the scaffolding variables and the maternal variables indicate that there were some differences between the two groups. Therefore, group differences on cognitive test scores, infant level of play with maternal participation, maternal level of play, maternal education, and maternal income were analyzed using independent t tests (see Table 9). Only the infants' mean level of play with maternal participation was statistically significantly different between the two groups, $t(26.86) =$

Table 9

Means, Standard Deviations and t Values for Selected Infant and Maternal Variables
Divided by Increased or Decreased Infant Level of Play with Maternal Participation

Variables	Increase in Play		Decrease in Play		t	p
	Mean	SD	Mean	SD		
MDI	74.95	22.44	84.67	21.57	1.40	.17
Infant level of play	3.15	.46	4.33	1.14	1.40	.16
Maternal level of play	2.37	.90	2.24	.62	.53	.60
Education	13.28	1.93	12.35	1.81	1.52	.14
Income	20,994	29,258	13,366	13,400	1.01	.32

4.34, $p = .00$, with those whose play increased with maternal participation playing at a statistically significantly lower level than those whose play decreased with maternal participation.

To explore the relation between maternal variables and infant level of play with maternal participation further, a discriminant analysis was used to describe the differences between the two groups of those whose level of play scores were higher with maternal participation and those whose level of play scores were higher without maternal participation. The maternal variables selected to predict grouping were: behavioral directives, physical assistance, cognitive assistance, and maternal level of play. This discriminant function was statistically significant with a Wilks Lambda of .71, accounting

for 29% of the variance and with a chi-square (4, $N = 40$) of 12.28, $p = .01$, indicating there was significant overall association. Based on both the standardized coefficients and the discriminant function-variable correlations, the scaffolding variables of physical assistance, cognitive assistance, and behavioral directives seemed to define the discriminant function while the much lower values for maternal level of play indicate that it was not a useful predictor (see Table 10). Thus, combining the information from the standardized coefficients and the discriminant-function variable correlations indicated that the discriminant function was characterized as a physical/cognitive assistance-behavioral directive continuum.

The group centroid mean or average discriminant was .59 for those infants whose level of play decreased with maternal participation and the group centroid mean or average discriminant was -.65 for those infants whose level of play increased with maternal participation. Note from the group centroid means that the mothers of infants

Table 10

Discriminant Function Standardized Coefficients and the Discriminant Function-Variable Correlations

Maternal variables	Standardized coefficient	Correlation
Physical assistance	.92	.48
Cognitive assistance	.75	.38
Behavioral directive	-.55	-.39
Level of play	.38	-.14

whose level of play decreased with maternal participation used more physical and cognitive assistance and fewer behavioral directives and mothers of infants whose level of play increased with maternal participation used less physical and cognitive assistance and fewer behavioral directives.

A second discriminant analysis was included to determine if maternal education and income would be as useful in describing the differences between the two groups of those whose level of play scores were higher with maternal participation and those whose level of play scores were higher without maternal participation. The discriminant function consisting of maternal education and income was not useful in describing the differences between the two groups, Wilks Lambda of .93, chi-square (2, $N = 39$) = 2.4, $p = .30$.

Maternal Involvement and Time Spent with Home Visitor

As stated in hypothesis 2, mothers are more involved with their infant during play when their home visitor supports the mother-infant relationship during the home visit than when the home visitor does not.

Correlation and regression techniques were used to explore the association between the amount of time the home visitor spent supporting the mother-infant dyad during the home visit and the maternal involvement indicators of scaffolding behaviors and maternal level of play. Correlations were calculated for the whole group and separately for infants with disabilities and infants without disabilities.

The percentages of time the home visitor spent (a) interacting with the child only,

(b) interacting with the parent only, and (c) interacting jointly with the mother and infant during the home visit were included as the home visiting variables in the analyses for the second hypothesis. For the entire sample, home visitors spent about equal time interacting with only the parent and interacting jointly with the mother and infant, but much less time interacting with the child alone (see Table 11).

When the sample was compared by disability category, this trend continued for the home visitors serving both the typically developing infants and the infants with disabilities. Independent-sample *t* tests were calculated to determine if the percentage of time the home visitors spent interacting with the mother, child, and mother-child jointly was different dependent on whether the infant was developing typically or had been diagnosed with a disability. This analysis revealed a significant difference between the two groups, $t(36) = -2.37$; $p = .02$, for the time the home visitor spent interacting with the child alone, but not for the time spent interacting with the mother alone or with the mother-infant jointly.

Table 11

Means and Standard Deviations for Percentage of Time Spent During Home Visits

Measure	All infants (<i>n</i> = 38)		Typically developing infants (<i>n</i> = 21)		Infants w/disabilities (<i>n</i> = 17)	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
With mother	.40	.21	.43	.21	.35	.21
With infant	.09	.14	.05	.06	.15	.19
Joint mother-infant	.38	.22	.40	.20	.36	.24

Correlations were calculated to assess the association between the home visit variables of the time the home visitor spent with the mother, the infant, and the mother-infant dyad and the maternal scaffolding variables of cognitive assistance, physical assistance, behavioral directives, positive support, and disapproval as well as the rating of maternal level of play. For the entire sample, only the correlations of time the home visitor spent with just the child with maternal use of positive support during play, $r = .36$, $p = .03$, and with maternal level of play, $r = .37$, $p = .02$, were statistically significant. All other correlations were less than .2. For the typically developing sample, none of the correlations were either statistically or practically significant. For the sample of infants with disabilities, the correlation between the time the home visitor spent with the infant and maternal level of play, $r = .55$, $p = .02$, was the only statistically significant correlation.

A partial correlation was calculated for the entire sample to assess if the association between the time spent with the infant and maternal level of play was statistically significant after controlling for cognitive test scores. The association remained statistically significant after controlling for the cognitive test scores, $r = .38$, $p = .02$.

To explore further the relation between the time the home visitor spent with the just the infant and maternal level of play, multiple regression was used to determine if the home visit time allocation remained associated with maternal behavior when infant variables were taken into consideration. Variables more proximal to the infant, cognitive test score and infant level of play alone, were also included as predictor variables. Using

the stepwise method for multiple regression, only the percentage of time the home visitor spent with the infant during the home visit was included in the model, accounting for 13% of the variance in maternal level of play, $F(1, 35) = 5.32, p < .05$. The beta weight (standardized multiple regression coefficient) of .36, $t(36) = 2.31, p = .02$, indicates that the percentage of time the home visitor spent with the infant during the home visit is relatively important in the prediction of maternal level of play, and the infant variables are relatively unimportant (see Table 12).

In summary, infant cognitive level of play was found to vary depending on infant cognitive test scores and maternal involvement. Patterns of association of the infant variables with the maternal involvement variables of maternal presence, scaffolding, and play varied for the entire sample, for the typically developing infants, and for the infants

Table 12

Summary Table of Stepwise Regression Analysis Examining the Predictors of Maternal Level of Play

Step/Variable	B	SE B	β	R
Predictors:				
Time home visitor spent with infant alone				
Cognitive test score				
Infant play alone				
Step 1				
Time home spent with infant alone	1.92	.83	.36	.13
Variables not entered:				
Cognitive test score				
Infant play alone				

with disabilities. Mothers did not seem to become more involved with their infant during play when the home visitor supported the mother-infant relationship during the home visits. Interestingly, home visitor time spent with just the infant was associated with increased maternal level of play.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Summary of Results

The research literature suggests that maternal scaffolding is associated with enhanced cognitive level of play for both typically developing infants and infants with disabilities. This study assessed the association between maternal involvement (presence, scaffolding, and play) and infant play as well as home visitor support of mother-infant interaction and mother-infant play for both typically developing mother-infant dyads and mother-infant dyads with disabilities. Maternal scaffolding, defined as cognitive assistance, physical assistance, behavioral directives, positive support, and disapproval, maternal demographic variables, and home visitor support variables included in this study were selected in an attempt to learn more about the process of maternal facilitation of infant play. Specifically, this study focused on how infant play varied based on infant cognitive development and maternal involvement and how maternal involvement varied based on home visitor support of mother-infant interaction during the home visits. The results summarized in the following paragraphs are statistically significant unless noted otherwise.

Entire Sample

The results from this study provide some support for the hypothesis that infant cognitive of play varies depending on assessed cognitive level of the infant. Infant level

of play was related to cognitive test scores for the entire sample, although not within the smaller samples separated by disability status. Furthermore, there was a difference between the group of typically developing infants and the group of infants with disabilities for their mean level of play both alone and with maternal participation.

Overall, results from the correlations did not provide support for the premise that infant level of play varies with maternal involvement. However, increased maternal education and income were associated with increased use of behavioral directives. In addition, increased maternal income was related to increased maternal level of play.

Sample Compared by Disability Category

However, for the typically developing sample, there was some indication that maternal participation was related to infant level of play as maternal level of play was positively associated with infant level of play and negatively related to the use of positive support.

For the sample of infants with disabilities, use of behavioral directives was highly correlated with maternal level of play, education, and income. Also, higher ratings of maternal level of play were associated with higher maternal income. Demographic confounds should be noted, making comparisons between the groups of typically developing infants and infants with disabilities somewhat problematic. The group of infants with disabilities have a much higher income and slightly higher level of maternal education. Thus, the possibility that the patterns of maternal involvement may be due to family income and maternal education instead of disability status should be considered.

Sample Compared by Increased or
Decreased Level of Play

Discriminant analysis was used in an attempt to learn which maternal involvement variables described the difference between those infants who played at a higher level with their mother than alone and those infants who played at a lower level with their mother than alone. The scaffolding variables of cognitive assistance, physical assistance, and behavioral directives defined the discriminant function, indicating an overall association. For this sample, infants whose play was more complex with maternal participation had mothers who did not use (or infrequently used) the scaffolding variables of cognitive assistance, physical assistance, and behavioral directives during their play. Furthermore, infant level of play was positively correlated with physical assistance for those whose level of play increased with maternal participation and negatively correlated for those whose level of play decreased with maternal participation.

Mothers of infants whose level of play increased with maternal participation played at a high level often used physical assistance and those with high levels of education used a high frequency of behavioral directives. In contrast, mothers of infants whose level of play decreased with maternal involvement who had high levels of education and played at lower levels were more likely to use positive support during play. Also, in this sample cognitive and physical assistance were highly correlated, indicating that mothers who frequently provided cognitive assistance also provided physical assistance.

Home Visitors

The results failed to support the second hypothesis that mothers would scaffold more when their home visitor supports the mother-infant relationship during the home visits than when the home visitor does not. Overall, home visitors spent about equal percentages of time interacting with the mother alone and with the mother-infant dyad during the home visits, but spent much less time interacting with just the infant. This was also true for the total sample broken down into the groups of typically developing infants and infants with disabilities, but the home visitors working with the infants with disabilities spent more time interacting with just the infant.

Almost all correlations between the time the home visitor spent interacting with the mother, infant, or mother-infant dyad and the maternal scaffolding variables and maternal level of play were neither statistically nor practically significant. An interesting exception, for the entire sample and the sample of infants with disabilities, was that the time the home visitor spent interacting with just the infant was related to a higher level of maternal play. This association between the time the home visitor spent interacting with just the infant during the home visit and maternal level of play for the entire sample remained after controlling for cognitive test scores.

Interpretation of Results

Maternal Involvement and Infant Play

The basic assumption of this study that infants' play would be enhanced with

maternal participation was not supported by the results. Because this basic assumption was not met, addressing the variables that facilitate infant play for the entire sample or for those with and without disabilities was not very helpful. For the entire sample, infant level of play was related to the cognitive test scores, but not to any of the maternal involvement variables. Thus, infants do not appear to be influenced by whether or not their mothers participate in their play. The factors of education and income did seem to make a difference with how mothers participated during play: Mothers who had more years of education and those who had a higher income were more likely to use behavioral directives during play and to play at a higher level.

Family income is one variable that differentiates between a recent study by Bornstein, Haynes, O'Reilly, and Painter (1996) and the present study regarding whether or not maternal participation enhances infant play. In contrast to the results of the present study, the Bornstein et al. (1996) study provided clear and compelling evidence that maternal involvement in play enhances infant level of play. The sample from the Bornstein et al. (1996) study was from intact families with most of the mothers having college degrees. That sample of middle to upper SES families may be very different from the present sample that consists primarily of families who meet the federal poverty guidelines.

A review of the methodology of the two studies indicates many similarities supporting the interpretation that it is only the differences between the samples that explains the lack of concordance in the results. Both the method of observation and coding of the play behavior were comparable. Both studies videotaped the infant playing

alone followed by the mother and infant playing and invited the mother to "play as you usually would." The length of each play session differed by 3 minutes (10 minutes compared to the present 7 minutes). The studies used similar exhaustive play category coding systems with codes ranging from "no play" to sequential pretense.

A methodological difference in defining the play variable is evident but is not likely to account for the differences in results. The current study rated level of play as the highest level of play observed per 15-second interval and then calculated a mean across the intervals, providing estimates of level of play not exclusively symbolic. In comparison, Bornstein et al. (1996) recorded the duration of each individual play behavior and then calculated the frequency of symbolic play, the proportion of play that was symbolic, and the total duration of symbolic play. The differences in the creation of the play sophistication variables would not explain the differing results of the two studies because the same measurement was used in both sessions of each study. So infant level of play alone was compared to infant level of play with maternal participation using the same method of measurement whether it was based on an overall mean of play sophistication or a proportion, frequency, or duration of pretense, which defines the higher levels of the play scales.

Home Visitor Support

The theoretical assumption that home visitors who supported the mother-infant relationship during the home visit would contribute to maternal involvement and subsequent enhancement of play was not supported. Only the amount of time home

visitors spent interacting with just the infant was related to maternal behaviors. Mothers whose home visitor spent more time interacting with just the infant played at a higher level with their infants. Furthermore, even though the time the home visitor interacted with just the infant accounted for a small portion of the variance of maternal level of play, it was a much stronger predictor for maternal level of play than the more proximal infant variables of cognitive test scores and infant level of play.

Interestingly, maternal level of play was not associated with home visitor support of the mother-infant dyad during the home visit. The relation between time the home visitor spent interacting with just the infant and maternal level of play was significant for the entire sample and the sample of infants with disabilities, but not for the typically developing sample. Interpretation of these results is difficult within the proposed framework that home visitor support of mother-infant interaction would promote maternal scaffolding during play. The interpretation that mothers are learning from the behaviors modeled by the home visitor interacting with their child seems premature, but may suggest that intervention models should be different for infants with disabilities. Nevertheless, it should be noted that the quality of home visiting interactions was not coded and that the variables selected may not be the most helpful in understanding the influence of intervention programs on maternal interactions during play. For example, ratings of child enjoyment and length of time children have been in intervention have been shown to have a significant association with maternal behavioral style (Mahoney, Finger, & Powell, 1985).

Maternal Involvement and Infant
Play Grouped by Disability

For the typically developing sample, maternal participation during play did not make a difference in the infant's level of play, although more sophisticated maternal play was associated with more sophisticated infant play and use of fewer behavioral directives and positive support statements during play. In sum, even though maternal participation did not enhance infant play through the use of scaffolding behaviors, there was an association between the level of play the mother demonstrated and infant level of play. The direction of the effect cannot be determined from this study, but it appears that mothers who do not intrude in the infants' play with behavioral directives are playing at a higher level. The allocation of time by the home visitor during the home visit did not appear to contribute to the interpretation of maternal influences on infant play for this portion of the sample.

For the infants with disabilities, in contrast to the typically developing sample, the positive association between maternal level of play and use of behavioral directives may reflect a different orientation of word play among mothers of infants with disabilities. The level of play shown by mothers of infants with disabilities was also associated with more education, a higher income, and home visitors who spent more time interacting with just the infant.

For infants with disabilities, the positive association between use of behavioral directives and maternal level of play may reflect different developmental trajectories. This notion is consistent with a previous study of children with Down syndrome whose

mothers were more directive and intrusive during play than mothers of typically developing children (Cielinski et al., 1995). The authors speculate that "subtle differences in patterning of mothers' behaviors may be supporting similarities in behavior profiles of DS [Down syndrome] and ND [normally developing] children. This could be an example of transactional pathways leading to similar outcomes for children" (p. 173).

Maternal Involvement Related to Increased or Decreased Infant Play

The discriminant analysis indicated that mothers who do not demonstrate (or infrequently demonstrate) the scaffolding variables of physical assistance, cognitive assistance, and behavioral directives enhance their infants' play. Perhaps, this difference is related to the infants' developmental level and need for physical assistance. Infants whose play increased with maternal participation had somewhat lower cognitive test scores than those whose play decreased with maternal participation. An additional difference between the two groups was that increases in level of play with maternal participation, for those infants whose mean level of play was higher with maternal participation, were associated with more physical assistance, whereas decreases in level of play with maternal participation, for those infants whose mean level of play was lower with maternal participation, were associated with increased physical assistance. It may be that providing physical assistance promotes more sophisticated play for those infants who have further to go developmentally, but hinders play for those who are starting to display pretense during play. For example, in the play sessions mothers provided physical assistance most often by encouraging infants to stack the nesting cups and then stabilizing

the cups while they were being stacked. Stacking the nesting cups is coded as a 5 for combining two objects appropriately. For infants who are playing with toys functionally, coded as a 3, maternal physical assistance of handing cups to the infant to be stacked and then stabilizing the cups while the infant stacks them would enhance the infants' play, and would be considered to be scaffolding within the infants' zone of proximal development. In contrast, for infants who are demonstrating pretend play by playing with the doll or talking on the phone, coded as 7, maternal physical assistance of handing cups to the infant to be stacked and then stabilizing the cups while the infant stacks them would be encouraging play at a less sophisticated level than the infant had demonstrated and would not be considered responsive to the infants' zone of proximal development.

Interpretations, Limitations, and Conclusions

Failure of this study to provide support for the expectation that maternal participation would enhance infant play may reflect the population sampled. The majority of this sample met the federal poverty guidelines, which are very different from the middle to higher SES samples of previous studies demonstrating that maternal involvement enhances infant play (Bornstein et al., 1996; Fiese, 1990; Slade, 1987a). The differences in the populations may account for the finding that maternal participation does not enhance infant level of play for this at-risk population. The finding that maternal level of play was associated with maternal education and income suggests that SES may play a role in maternal participation during play. Another explanation may be that the nature of the situation under observation is not a true representation of maternal

play. In this study mothers were asked to play as they usually would, yet they were provided with a standard set of toys, were asked to have their child stay in a particular area, and were videotaped. Thus, the data obtained may reflect how mothers play in this particular context but not how they ordinarily play with their child (Fein & Fryer, 1995).

An alternative explanation for lack of maternal contributions in play may be found within the mother-infant relationship and the subsequent attachment relationship. Studies of security of attachment and infant play suggest that secure and insecure infants respond quite differently when their mothers are involved in play. With maternal participation, securely attached children play at higher levels than insecurely attached children (Roggman, 1986; Slade, 1987b). Security of attachment may have been a confound in trying to understand the influence of maternal participation on infant play with at-risk families and was not addressed in this study. Another plausible explanation for infants playing at a higher levels without maternal participation is that their cognitive development, reflected in their play, is being stimulated in other contexts not dependent upon their mothers as a play partner. The infants' own initiation in exploring the physical and social environment may facilitate learning beyond specific didactic play experiences (Tamis-LeMonda & Bornstein, 1991).

The anticipated association between maternal scaffolding and infant level of play was not observed. Indeed, results from a discriminant analysis indicated that maternal scaffolding seemed to hinder instead of enhance infant play. These results fail to support Vygotsky's (1978) prediction that children would perform above their current capabilities when supported by a more experienced partner. These results differ from research that

found maternal scaffolding behaviors to enhance infant play for both typically developing infants (Bornstein et al., 1996; Kavanaugh & Cinquegrana, 1997) and infants with disabilities (Cielinski et al., 1995; Roach et al., 1998). The selection of scaffolding behaviors and definitions varied from study to study, but most of the studies addressed maternal directives and support. The studies varied on including specific codes for ways that mothers facilitate pretense and maintain infant attention. Maternal use of behavioral directives was not associated with level of play for either the typically developing infants or the infants with disabilities and the directives were used only slightly more frequently by mothers of children with disabilities. These findings are inconsistent with previous research that found mothers of children with Down syndrome to be more directive and controlling in their play interactions than mothers of typically developing infants (Cielinski et al., 1995; Roach et al., 1998). The diversity of disabilities included in this sample may contribute to the lack of concordance with samples including only children with Down syndrome.

Lack of association between maternal scaffolding and enhanced infant level of play may be due to a number of limitations. First, the free-play situation may be limiting the opportunity to scaffold and the feedback to the parent regarding the infants' learning. A problem-solving or teaching task is often used to assess maternal scaffolding (Fagot & Gauvain, 1997; Portes, 1991) and may be beneficial in providing an opportunity to assess maternal support with the immediate feedback regarding the child's ability to accomplish the task. Second, it is possible that these mothers did not facilitate play because they did not understand the developmental sequence of play or have an understanding of child

development. Although knowledge of the developmental sequence of play as a predictor for effective scaffolding has not been tested directly, Bornstein et al. (1996) found no relation between maternal knowledge of child development and any type of child symbolic play, in a middle-class sample. In this sample, with a wider range of education, knowledge could have been more limited and had an effect in mother's behavior.

Third, the scaffolding definition itself may be problematic. Defining scaffolding as cognitive assistance, physical assistance, behavioral directives, positive support, and disapproval may be too limiting for a free-play situation. Also, behavioral directives were not differentiated between those that were intrusive and those that were nonintrusive. Fagot and Gauvain (1997) found that these scaffolding variables of cognitive assistance, behavioral directives, positive support, and disapproval influenced children's problem-solving skills over time. Other variables such as maternal responsiveness, maintaining infant attention, and redirecting infant attention may provide additional information that may be more relevant to the free-play situation and concurrent infant measures. Berk and Winsler (1995) suggested that effective scaffolding includes joint problem solving, intersubjectivity (beginning a task at different points of understanding and ending with a shared understanding), warmth and responsiveness, keeping the child in the zone of proximal development, and promoting self-regulation. Although it would be much more labor intensive to include all of these elements in a scaffolding coding scheme, the breadth of the definition may provide the foundation for understanding maternal scaffolding in a variety of contexts with diverse samples.

Methodological limitations may not be the only explanation for failure of this

study to find that maternal involvement enhances infant level of play. Perhaps the theoretical framework itself should be scrutinized. Vygotsky's social-cultural theory of development may not be the best theory for describing the development of children's play. Attachment and ethological theory have also been used to promote the view that symbolic play with adults should promote children's symbolic play (Bornstein & Tamis-LeMonda, 1995), and may be more compatible with the results.

Several other limitations of this study should be noted. Because of the small sample size (especially when the sample was grouped by disability) and the lack of random assignment to disability groups, generalizing the results from this sample should be done with caution.

A sample size of 41 may not have been large enough to detect subtle effects. The sample size has the most influence on the statistical power and magnitude of the true effect as power is a direct function of sample size and variance (Howell, 1987). Since the sample was limited to 41 participants, support for the hypotheses was limited to large effects that were statistically significant.

Several measurement issues are also of concern. Even though mothers and infants were videotaped in their home, they still may have reacted to being videotaped and not acted as they normally would. Also, because the sample size was small, the number of maternal and home visitor variables that were coded was limited and may not have reflected the most accurate description of maternal influence on infant play.

With these caveats in mind, the research and practical applications should be noted. One important finding is that for this particular sample with most of the families

living below the federal poverty guideline, maternal participation did not facilitate infant play. Future research should include samples of families living in poverty to discern if and how mothers influence infants' play. Another important direction for future research would be to develop more comprehensive coding schemes that assess the elements of scaffolding as outlined by Berk and Winsler (1995) and that would be sensitive to subtle differences in a variety of populations and across contexts. Specifically for infants with disabilities, a more comprehensive scaffolding coding scheme would help determine the extent that mothers adapt their play strategies to their perceived needs of the infant.

Practically, a better understanding of the influence of the home visiting process on the mother-infant relationship would be helpful in designing and implementing intervention programs for both children at-risk and with disabilities. Intervention programs that support the mother as the key facilitator of her child's development have been proposed as beneficial, but not compared directly to programs with differing philosophies. Some possible strengths are that parent-focused interventions might increase the amount of time the child receives "therapy," increase the amount of follow-through on suggestions for facilitating development that would occur throughout daily activities, and increase the amount of support for strengthening the parent-child relationship. Through interacting jointly with the mother-infant dyad, it is likely the parent would develop the skills needed to encourage her child's optimal development beyond the time in the intervention program.

Because of the relative lack of research concerning the facilitation of the mother-child relationship during the home visit, the concept of intervention through supporting

the mother-child dyad may not be fully understood and, consequently, may not be fully developed. It is clear that more research is necessary to assess how interventionists support the mother-child dyad as the target of intervention for at-risk infants and infants with disabilities and when such support is the most effective. Future research should build on this initial study of how home visitors spend their time during home visits, develop a coding scheme to assess the interventionists' behavior that supports the mother-child relationship, and then apply this knowledge in practical settings.

In conclusion, play and maternal involvement have both been found to be important to infants' development, but for this primarily low-income sample, maternal involvement during play did not seem to enhance infants' play. The relations of infant level of play with maternal education, income, and the maternal involvement variables of level of play and use of scaffolding varied with the disability status of the infant. Those infants whose play increased with maternal participation had lower cognitive scores and had level of play scores positively associated with physical assistance. Those infants whose play decreased with maternal participation had higher cognitive scores and had level of play scores negatively associated with physical assistance. Home visitor support of mother-infant interaction did not appear to influence maternal involvement during play, except that mothers' infants with disabilities whose home visitors spent more time with just the infant played at a higher level. Future research should explore the influence of poverty on maternal involvement during infant play and how early intervention may support the mother and infant in play.

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EDUCATION

Ph.D. Family and Human Development, Utah State University, May 1999
M.Ed. Psychological Services, Idaho State University, August 1992
B.S. Psychology, Idaho State University, May 1991
A.A.S. Pre-Technical Biology, Ricks College, April 1989

HONORS & RECOGNITIONS

Research Assistant of the Year, College of Family Life, 1996-1997
Research Assistant of the Year, Department of Family and Human Development,
1996-97
Head Start Research Scholars Grant Award, 1996-1998
Graduated with Honors, B.S., Idaho State University, May 1991
Kasiska Foundation Scholarship, Idaho State University, 1990-91
Leadership Scholarship, Ricks College, 1987-88

GRANTS

Interactions and Play Behavior of Mothers of Typically and Atypically Developing Infants: A Vygotskian Approach. Head Start Research Scholars Grant, Administration on Children, Youth and Families, Washington, D.C. Amount \$30,000 for two years, 10/96 to 10/98.

PUBLICATIONS

Roggman, L. A., Benson, B., & Boyce, L. B. (in press). Fathers with infants: Knowledge and Involvement in relation to psychosocial functioning and religion. Infant Mental Health Journal.

Roggman, L.A. Boyce, L. B., & Cook J. (in press). The role of fathers in infant and toddler development. In H. Fitzgerald, K. Karraker, & T. Luster (Eds.) Infant Development: Ecological Perspectives. Garland Press.

Roggman, L. A., Boyce, L.B., & Newland, L. (in press). Assessing mother-infant interaction in play. In C. E. Schaefer, K. Gitlin-Weiner, & A. Sandgrund,(Eds.), Play Diagnosis and Assessment, 2ND Edition. New York: John Wiley & Sons.

MANUSCRIPTS IN PREPARATION

Roggman, L. A., & Boyce, L. K., Attachment and toddler play: A longitudinal follow-up.

CONFERENCE PRESENTATIONS

Boyce, L. A. (April, 1999). Maternal interpretation of directive behaviors during play: A comparison of typically and atypically developing mother-infant dyads. Society for Research in Child Development, Biennial Meeting, Albuquerque, New Mexico.

Roggman, L.A., Boyce, L. K., Cook G., & Jump, V. (July, 1998). Correlates of attachment security among 10-month-olds in an Early Head Start Program. Head Start's Fourth National Research Conference, Washington, D.C.

Roggman, L. A. & Boyce, L. K. (July, 1998). Mothers and fathers in Utah's Early Head Start. Head Start's Fourth National Research Conference, Washington, D.C.

Newland, L. A., Roggman, L. A., Boyce, L. K., & Cook, G. (April, 1998). Mother-infant social play related to infant language and play behaviors at 11 and 14 months. International Society on Infant Studies, Atlanta, Georgia.

Roggman, L. A., Boyce, L. K., & Benson, B. (April, 1998). What Dads know about babies: Relations with attitudes, well-being, and social context. International Society on Infant Studies, Atlanta, Georgia.

Roggman, L. A., Jump, V.K., Boyce, L. K., & Cook, G. (April, 1998). Attachment and maternal responsivity: The context of infant affect and temperament. International Society on Infant Studies, Atlanta, Georgia.

- Boyce, L. K. & Sørensen, S. (March, 1998). Preparation for life and preparation for death: Planning preferences of older American and Canadian women. Southwestern Society for Research and Human Development, Galveston, Texas.
- Roggman, L. A., Cook, G., Boyce, L. K., & Benson, B. (March, 1998). Maternal influence on infant level of play: A longitudinal analyses. Southwestern Society for Research and Human Development, Galveston, Texas.
- Boyce, L. K., Benson, B., Roggman, L. A., & Cook, G. (April, 1997). Influence of infant-mother play at home on infant's level of cognitive play in a laboratory setting. The Association for the Study of Play, Washington, D.C.
- Newland, L. A., Roggman, L. A., Boyce, L. K., & Cook, G. (April, 1997). Toy sharing, symbolic play, and language development in infancy. The Association for the Study of Play, Washington, D.C.

REPORTS

- Roggman, L. A., Cook, G. A., Jump, V. K., & Boyce, L. K. (1998, December 31). Early Head Start Continuous Program Improvement: Year 2. Submitted to Bear River Early Head Start, Logan, UT.

EMPLOYMENT/ RESEARCH EXPERIENCE

- 07/96 to Present **Early Head Start Project**
 Logan, Utah
Coding Supervisor. Responsible for training and monitoring coders, developing and implementing coding schemes, conducting data analysis.
- 01/97 to Present **Early Intervention Research Institute**
 Logan, Utah
Research Assistant. Participant in the development of a ecocultural interviews and parent-child interaction coding schemes to be used with low-income families and families with a very low birth weight infant. Responsible for data management and for training and supervising both assessors and coders.

- 03/96 to 12/96 **Planning for Care Giving Project**
 Logan, Utah
Research Assistant. Participant in development of questionnaire, qualitative interviews and qualitative data analysis.
- 09/95 to 03/96 **Utah Sate University**
 Logan, Utah
Teaching Assistant for Human Development. Lectured on topics of intelligence, parenting styles and physical development.
Research Assistant. Involved and assisted with the development of the Early Head Start Research grant.
- 01/92 to 07/95 **State of Idaho, Department of Health and Welfare, Child Development Center**
 Pocatello, Idaho
Clinician/Psychologist. Assessment of children with disabilities, service coordination and parent training.

COURSES TAUGHT

Utah State University

- 09/98 to 12/98 **Instructor for two sections of the course entitled "Early Childhood."**
 Developed the syllabus for the first time the course was offered after the switch to semesters. Lectured two times per week, developed and supervised case studies where the students conducted a Denver Assessment and HOME Inventory within a home visiting framework and developed exams and other classroom activities.
- 09/96 to 12/96 **Team teacher for the course entitled "Human Growth and Development."**
 Developed the syllabus, lectured two to three times per week, developed exams and classroom activities.
- 09/95 to 03/96 **Teaching Assistant for Human Development.**
 Lectured on topics of intelligence, parenting styles and physical development.

OTHER PRESENTATIONS

- 05/96 Presented topics of child development to Head Start parents participating in a research study.
- 07/95 Presented on recognition and referral of children with disabilities to resident physicians at the Family Practice Residency Program at Idaho State University.
- 02/95 Presented on family involvement in service coordination at regional service coordination conference for the State of Idaho Department of Health and Welfare.
- 10/94 Presented on emotional disturbances and mental illness to personal care providers at Idaho State Technical College

PROFESSIONAL SOCIETIES

Head Start Reviewer/Consultant
Southwestern Society for Research and Human Development
Society for Research in Child Development

COMMITTEES

Local Arrangements Committee (1995-1996) for Southwest Society for Research in Human Development.
Grant Proposal Planning Committee member (1995) for Early Head Start research grant proposal.