

4-27-2007

Mother/Infant Interaction in the Context of Four Maternal Risk Factors

Deirdre Ann Winder
Portland State University

Follow this and additional works at: https://pdxscholar.library.pdx.edu/open_access_etds



Part of the [Educational Leadership Commons](#)

Let us know how access to this document benefits you.

Recommended Citation

Winder, Deirdre Ann, "Mother/Infant Interaction in the Context of Four Maternal Risk Factors" (2007).
Dissertations and Theses. Paper 6055.
<https://doi.org/10.15760/etd.7925>

This Dissertation is brought to you for free and open access. It has been accepted for inclusion in Dissertations and Theses by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: pdxscholar@pdx.edu.

MOTHER/INFANT INTERACTION IN THE CONTEXT OF
FOUR MATERNAL RISK FACTORS

by

DEIDRE ANN WINDER

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


DOCTOR OF EDUCATION
in
EDUCATIONAL LEADERSHIP:
SPECIAL AND COUNSELOR EDUCATION

Portland State University
©2007

DISSERTATION APPROVAL


The abstract and dissertation of Deidre Ann Winder for the Doctor of Education in Educational Leadership: Special and Counselor Education were presented April 27, 2007, and accepted by the dissertation committee and the doctoral program.

COMMITTEE APPROVALS:



Leslie J. Munson, Chair


Joel Arick



Ruth Falco


Susan Halverson


Jacqueline Waggoner


Donna Boudreau
Representative of the Office of Graduate Studies

DOCTORAL PROGRAM APPROVAL:


Randy Hitz, Dean
Graduate School of Education

ABSTRACT

An abstract of the dissertation of Deidre Ann Winder for the Doctor of Education in Educational Leadership: Special and Counselor Education presented April 27, 2007.

Title: Mother/Infant Interaction in the Context of Four Maternal Risk Factors

Social-emotional skill acquisition in infancy can effect positive outcomes in all developmental domains as the child matures. Caregiver/infant interaction provides a critical context for positive social-emotional development in the infant (i.e., attachment, emotional regulation, communication). Within interaction, these three areas of infant social-emotional development are fostered by the dyadic relationship between caregiver and infant. However, infant skill acquisition within these areas of social-emotional development may be interrupted by risk factors in the caregiving environment. Four maternal risk factors (i.e., mental health, literacy level, age, income) associated with a negative impact on developmental outcome and on interaction were the focus of this study.

Interactions during feeding and playing of 11 mother/infant (less than 12 months old) dyads were evaluated using qualitative and quantitative methods.

Analysis of interactive behaviors indicated limited dyadic maternal behaviors of turn taking, directing intentional communication, providing playful routines, imitating behaviors, and using positive verbalizations. Infant dyadic behavioral concerns were initiating interactions, taking turns, participating, displaying playful behaviors, and imitating behaviors.

ACKNOWLEDGEMENTS

This was a very long and very personal journey that would not have been possible without my husband Dean. Dean cajoled, coached, and prodded, but always he supported. I am thankful for his understanding of my needs as we traveled this road together.

Another support person that made this trip possible was Dr. Leslie Munson. Leslie's wisdom, perceptions, and understanding maneuvered me through the highs and the lows of the program and the study. Somewhere in the process I realized, in addition to an advisor, I had a friend. I am thankful, as a friendship lasts beyond writing a dissertation.

Dr. Jackie Waggoner is my historian, as well as, a support on this journey. Jackie was a role model, supervisor, and common sense perspective that supported me at White Shield, Portland State University, and in Florida. I am thankful for her friendship.

Finally, I must acknowledge the infants and toddlers I have observed for this study or worked with in the past. I admire and respect their resiliency, determination, and spirit. These children, developing in contexts of risk, were the incentive that kept me moving to completion and I thank them.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	i
LIST OF TABLES	vii
CHAPTER	
I INTRODUCTION	1
Maternal Mental Health	3
Maternal Literacy Level.....	3
Maternal Age.....	4
Maternal Poverty.....	4
Difficulties in Conducting Research on the Impact of a Single Risk Factor	5
Multiple Risk.....	5
Purpose of Study	6
Dissertation	6
II REVIEW OF THE LITERATURE.....	8
Interaction	8
Characteristics	
Elements of Interaction	15
Goodness-of-Fit	
Maternal Sensitivity	
Interactional Synchrony	

Components of Social Emotional Development.....	19
Communication	
Emotional Regulation	
Attachment	
Caregiver Risk Factors and Interaction.....	29
Cumulative Risk	
Maternal Mental Health	
Maternal Literacy Level	
Maternal Age	
Maternal Poverty	
Culture.....	63
Summary	68
Purpose of Study	76
Research Questions	76
III METHOD.....	78
Participants.....	78
Participant Recruitment	
Age	
Poverty	
Low Literacy Level	
Mental Health	
Study Participants	
Setting	85
Research Design.....	87
Qualitative Methodology	89
Qualitative Procedures	89
Observational Data	

	Interview	
	Observations	
	Quantitative Methodology	92
	Demographic Information	
	Descriptive Statistics	
	Dependant Measure	
	The <i>ICIS</i>	
	Validity	
	Internal Consistency	
	Interrater Agreement	
	Quantitative Procedures	96
	Videotaping Play	
	Videotaping Feeding	
	Interrater Agreement	
IV	RESEARCH ANALYSIS AND FINDINGS.....	102
	Maternal and Infant Behaviors.....	102
	Field Notes	
	Environment	
	Videotaping	
	Interviews	
	Qualitative Results	127
	Field Notes	
	Interviews	
	Results Persistent Patterns: Education	
	Results Persistent Patterns: Family	
	Quantitative Results	137
	Interrater Agreement	
	The <i>ICIS</i>	
	Playing and Feeding	

V	DISCUSSION	143
	Qualitative Discussion	143
	Maternal Interactive Behaviors	
	Infant Interactive Behaviors During Observation	
	Multiple Risk	
	Quantitative Discussion	151
	Maternal Concerns	
	Infant Concerns	
	Comparing Behaviors in Two Contexts	
	Limitations	160
	Implications and Recommendations for Practice.....	162
	Develop Positive Interactions Between Mothers and Their Infants	
	Utilize Videotaped Interactions	
	Increase Focus on Multiple Risk Populations	
	Future Studies	170
	Multiple Risk	
	High School Programs for Teen Mothers	
	Infants	
	Mothers	
	Conclusion	172
	REFERENCES.....	174
	APPENDICES	
A	INFORMED CONSENT FORM FOR THE TEEN MOTHER	190
B	INFORMED CONSENT FORM FOR THE INFANT FROM THE TEEN MOTHER	194

C	INFORMED CONSENT FORM FOR THE GUARDIAN OF THE TEEN.....	196
D	READING ACHIEVEMENT LEVELS: SCALE AND DEVELOPMENTAL SCALE SCORES.....	200
E	ACHIEVEMENT LEVELS: DEFINITIONS.....	202
F	SEMI-STRUCTURED INTERVIEW FOR THE MOTHERS.....	204
G	DINING ROOM OBSERVATION DOCUMENT.....	206
H	<i>ICIS</i> COMPONENTS	211
I	FEBRUARY SCHOOL DISTRICT MENU.....	215

LIST OF TABLES

Table		Page
1	Participant Characteristics Maternal Characteristics Including Risk Factors.....	85
2	Infant Characteristics	85
3	Mean Behavior Ratings < 3.0 and Standard Deviation for Mothers During Feeding	138
4	Mean Behavior Ratings < 3.0 and Standard Deviation for Mothers During Playing	139
5	Mean Behavior Ratings < 3.0 and Standard Deviation for Infants During Feeding	139
6	Mean Behavior Ratings < 3.0 and Standard Deviation for Infants During Playing	140
7	Mean Behavior Ratings < 3.0 and Standard Deviation for Combined Scores (Playing and Feeding)	141
8	Profile of Concerns: Maternal and Infant Interactive Behaviors	142

CHAPTER I

INTRODUCTION

Shonkoff and Phillips (2000) suggested infancy is the most critical period in human development. Skill acquisition during infancy can set developmental trajectories that span a lifetime (Kennedy & Itkonen, 1996). Infant skill acquisition is often categorized into five domains of development (i.e., social-emotional, cognition, communication, motor, and adaptation). Each domain of development is comprised of basic skills that are then linked to maturational outcomes.

As the infant grows, positive developmental outcomes linked to the social-emotional domain include problem solving skills, communication abilities, emotional literacy, relationship development, anger management, and eventually school success (Webster-Stratton & Reid, 2004). Social-emotional skill acquisition starts within the relationship between the infant and the caregiver. Within the caregiver/infant interaction (i.e., dyadic context) the caregiver and infant respond to one another, fostering the infant and caregiver relationship. This relationship acts as the template from which social-emotional development is organized into a working model for the infant (Balbernie, 2002).

The context in which the dyadic exchange occurs influences infant developmental outcomes, either in a positive or negative way. The stressors (e.g., environmental risk factors) of the caregiver can affect the quality of the interaction.

The impact from negative environmental risk factors of the caregiver is linked to poor outcomes for the child in social-emotional skill development. Knowledge regarding the impact of environmental risk, as it pertains to early interaction, requires an understanding of the cumulative effect of risk factors within the caregiver/infant interactive context.

The current study focused on caregiver/infant interaction and its contribution to social-emotional development. First, the characteristics that the infant and the caregiver contribute to the interaction were identified. Second, the attributes of quality (i.e., goodness of fit, maternal sensitivity, synchrony) as they pertain to function within the interaction were presented. Third, while there was a number of skill areas related to infant social-emotional development, this study focused on three areas: (a) communication, (b) emotional regulation, and (c) attachment to define social-emotional skill development within caregiver/infant interaction.

The impact of environmental risk factors on caregiver/infant behaviors of interaction was examined to determine how risk may impact the social-emotional development of the infant. The four risk factors of (a) maternal mental health, (b) maternal literacy level, (c) maternal age, and (d) maternal poverty were chosen for further discussion because research links the effect of these risk factors to negative outcomes of relationship development, mental health issues, and language/linguistic difficulties as the child matures (Sameroff & Seifer, 1990).

Maternal Mental Health

Maternal depression may interfere with positive developmental outcomes from within the context of caregiver/infant interaction. Depression may impact a caregiver's ability to respond to her infant in a consistent and sensitive manner (Wright, George, Burke, Gelfand & Teti, 2000). Maternal depression appears to disrupt affective attunement between the caregiver and infant. Secure attachment can be interrupted by caregivers who are diagnosed with depressive symptoms that last beyond 6 months.

Maternal Literacy Level

Although not as well documented in the research literature as maternal depression, low maternal literacy level is a risk factor that may affect and be affected by caregiver/infant interaction. This risk factor was chosen to increase knowledge about the influence a mother's literacy skills may have on her ability to be consistent, sensitive, and verbal during interactions with her infant. A relationship between infant/caregiver interaction and development of early literacy skills was found in the study review (DeTemple & Tabors, 1994; Dodici, Draper, & Peterson, 2003). The impact of low maternal literacy skill level was found to be statistically significant regarding infant/caregiver interaction, child vocabulary, and literacy skills measured when the child was 54 months of age (Pan, Rowe, Singer, Snow, 2005). More information on the impact of caregiver's identified with low literacy skills, as a risk factor during caregiver/infant interaction, could provide

needed information to foster foundations for positive early social/emotional and early literacy skill acquisition.

Maternal Age

Mothers of young maternal age appear to lack some of the quality elements that promote infant social-emotional development within dyadic interaction. These mothers, when compared to older mothers, were less sensitive, negative in manner, and lacked contingent responsiveness. A teen mother is likely to have confounding environmental risk factors that further jeopardize the caregiver/infant interaction. In fact, a mother who is a teen with two additional identified risk factors is linked to disruptions in dyadic interaction and negative long-term developmental outcomes for her child. However, when given special instruction in parenting skills, quality maternal interaction behaviors showed a positive increase for young mothers.

Maternal Poverty

Mothers and their infants who live in poverty appear vulnerable to disruptions in caregiver/infant interaction. Stress for caregivers living in poverty may be exacerbated by a lack of income. These caregivers are linked to less sensitive responding to their infant's cues. Infants living in poverty may lack emotional regulation, which can further frustrate the caregiver and interrupt contingent responsiveness within the dyad. Dyadic interaction that is lacking contingency is linked to insecure attachment. As the infant matures social-

emotional issues of depression, externalizing/internalizing behaviors and antisocial behavior are of concern.

Difficulties in Conducting Research on the Impact of A Single Risk Factor

No single risk factor is tied to positive or negative outcomes for children. Instead, it is the accumulation and interaction of risk factors presented through the caregiver that may affect developmental achievement. Additionally, the research is thin when evaluating multiple risk factors and specific behaviors of interaction.

Multiple Risk

When a caregiver is exposed to more than one risk factor, cumulative risk occurs and becomes even more detrimental to the caregiver/infant interaction. Risk factors are additive, with four factors shown to have a more negative impact on child outcomes compared to three risk factors (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson, Oberlaid, Pedlow, & Prior, 1991). Therefore, caregiver/infant interaction that takes place in a context of multiple risk (i.e., four or more risk factors) is more likely to be associated with a lack of positive social-emotional skill acquisition. The outcomes for infants in a disrupted dyadic interaction may be negative mental health issues as the infant matures.

Research indicated that environmental risk, as it impacts developmental outcomes for the child, is linked to the risk factors of the caregiver. Further, research indicates that child outcomes are not tied to any one risk factor of the

caregiver, rather, risk factors are cumulative. Multiple risk factors are more likely to disrupt or interfere with the caregiver's ability to respond to the infant with interactive behaviors linked to positive developmental outcomes. Additional research is needed to increase knowledge of the dyadic behaviors of caregivers and infants when at least four maternal risk factors are present. This information is critical to developing interventions that foster the dyadic relationship of caregiver and infant in a context of multiple risk.

Purpose of Study

The purpose of this research was to identify maternal and infant behaviors of interaction when at least four risk factors of the caregiver are identified. A descriptive research study was employed using both qualitative and quantitative data. Qualitative methods provided a description of mother/infant interactive patterns as well as similarities in the life circumstances (i.e., home and school) for a population of mothers identified with at least four risk factors. Quantitative information about the interactive behaviors of mothers and their children, when the mother has been identified with at least four risk factors, was provided by a numerical score from the *Infant Caregiver Interaction Scale (ICIS)* initially developed by Munson and Odom (1995).

Dissertation

Social-emotional skill acquisition in infancy can affect positive outcomes in all developmental domains as the child matures. Caregiver/infant interaction

provides a critical context for positive social-emotional development (i.e., attachment, emotional regulation, communication in the infant). Within interaction, these three areas of infant social-emotional development are fostered by the dyadic relationship between mother and infant. However, infant skill acquisition within these areas of social-emotional development may be interrupted by risk factors in the caregiving environment.

The dissertation presents the following chapters: chapter 2 reviews the research as it pertains to mother/infant interaction in a context of four maternal risk factors, then proposes the research questions; chapter 3 describes the qualitative and quantitative methods used to answer the research questions; chapter 4 presents study results; and chapter 5 discusses the implications of the findings for intervention, limitations of the study, and directions for future research.

CHAPTER II
REVIEW OF THE LITERATURE

Interaction

Social-emotional development is critical to enhancing an individual's quality of life. Researchers link skill attainment in the area of social-emotional development to lifelong outcomes in personal relationships, social competence, and emotional stability. The very first opportunity for skill acquisition in social and emotional development, occurs in the caregiver/infant interaction. "It is in the context of this first relationship with a familiar adult that the infant is introduced to the rules of social response, initiation, and interaction" (Cripe, Slentz & Bricker, 1993, p. 429).

Skills associated with social-emotional development start at birth as the infant interacts with the primary caregiver to meet basic physical needs (Cripe et al., 1993; Rothbart, Ahadi, & Evans, 2000). The field of infant mental health recognizes that facilitating positive early caregiver/infant interactions is the first and most critical context for the infant (Clarke-Stewart, 1975; Rothenberg, 2005). As the infant matures, the quality of the interactional dyad sets the course for future competence in social-emotional development (Kelly & Barnard, 2000).

Characteristics

Through the caregiver, the infant gains access to social and physical environments (Cripe et al., 1993; Rothbart et al., 2000). The relationship between an infant and a caregiver starts within the dyad at the level of physical contact. Initially, the baby cries and the caregiver responds by touch. This physical cue and response sequence typically develop into a social and emotional relationship with the caregiver (McCollum & Hemmeter, 1997; Rothbart et al., 2000). Characteristics of the individual partners in a dyad influence the cues and responses within an interaction. The infant and the caregiver enter the interaction with a set of characteristics (i.e., individual temperaments) that contribute to the function of the interactive dyad.

Infant characteristics/temperament. Berk (2001) defined infant temperament as the individual differences or characteristics in infant social behaviors that may influence caregiver response. According to Rothbart (1996), reactive behaviors of the infant combine with self-regulative behaviors to form individual characteristics. So, infant temperament is indicated by behavioral measures of reactivity and self-regulation (Rothbart et al., 2000).

Reactivity may be defined as “the excitability, responsiveness, or arousability of the behavioral and physiological systems of the organism...” (Rothbart et al., 2000, p. 124). According to Lyons-Ruth and Zeanah (1993), reactivity to stimuli refers to the arousability of motor activity, affect, and autonomic and endocrine

response. Thus, reactivity reflects individual infant differences in response to environmental stimuli. For example, one infant may quickly reduce fussing or crying in response to soothing techniques of the caregiver, whereas another infant may take longer to soothe (Berk, 2001; Rothbart et al., 2000).

Distinguished from reactivity, self-regulation refers to the neural and behavioral processes that function to modulate reactivity (Rothbart et al., 2000). At birth, the development of self-regulation is based on the infant's need to maintain homeostasis. Self-regulation is the infants' response to internal reactivity to stimuli. The infant modulates physiological states moving to self-calming and self-regulation. "Self-regulation tasks move quickly beyond physiological stability to many capacities as the infant learns to cope with and embrace stimulation through all senses and especially in human interaction" (Benham, 2000, p. 338).

Initially, researchers measure self-regulation by the same parameters as those of reactivity: (a) latency, (b) threshold and intensity of reaction, (c) time to peak, and (d) recovery time (Rothbart et al., 2000). Buss and Goldsmith (1998) grouped infant behaviors of self-regulation and temperament into the functional categories of (a) active avoidance, (b) orientation toward caregiver, (c) approach/withdrawal, (d) attempts to control, (e) self-stimulation and (f) attunement allocation. For example, active avoidance (e.g., gaze aversion or turning away) is an emotional regulatory strategy used by an infant to control sensory

stimulation that is overwhelming (Buss & Goldsmith, 1998; Grolnick, Bridges, & Connell, 1996).

As the infant matures, modulation of reactivity is achieved via adult response to the infant. Infant characteristics that may influence the caregiver's response to the infant include (a) predictability of behavior, (b) social responsiveness, (c) clarity of cues, and (d) activity level (Shonkoff & Phillips, 2000). Additional infant behaviors associated with temperament that may influence the interaction are defined as orientation, range and use of emotional states, and consolability (Shonkoff & Phillips, 2000).

Infant temperament interacts with characteristics of the caregiver to set the tone of the interactional dyad. However, infant behaviors are not a separate process in the caregiver/infant interaction. Beginning at birth and within the context of interaction, caregiver/infant behaviors of cue and response continually modify the behavior of each partner through reciprocal behaviors (Meisels & Fenichel, 1996; Sameroff & Chandler, 1975; Sameroff & Fiese, 2000). Reciprocity continues to develop within the interaction as partners respond and adapt to one another (Kelly & Barnard, 2000). Therefore, the role of caregiver is vital to the functioning of the interactive dyad.

Caregiver characteristics/temperament. The caregiver brings a unique, personal internal working model when responding to the infant. According to Berk (2002) adult internal working models are reconstructed memories affected by

factors such as, relationship experiences, personality, and current life situation. The caregiver's own internal working model of social-emotional development and the match between caregiver temperament and infant temperament influence the quality of the interactive dyad. Although each infant is unique in reacting to stimuli, the caregiver response to the infant influences and alters infant affective responses. It is the caregiver who provides the infant with internal strategies for arousal, attention, and affect that over time become models of regulation for the infant (Barton & Robins, 2000).

Additional caregiver characteristics. Included in the caregiver characteristics associated with positive matches to infant temperament are warmth, predictability, and contingent responsiveness (Shonkoff & Phillips, 2000). Caregiver temperament described as “warm” is often associated with the characteristics of patience, gentleness, and a positive emotional expression during interaction (Guralnick & Neville, 1997). A caregiver may also be described as warm or responsive when sensitively adapting caregiving to the needs of the infant (Berk, 2002). The term “balance of care” developed by Erikson (1950) further defines warmth and sensitivity, especially during caregiver feeding of the infant. Caregivers promptly relieve the infant's discomfort (e.g., hunger) by feeding while holding the infant gently. By reading the infant's cues, the caregiver is patient and does not stop feeding until the infant is satisfied.

/

When considering adult characteristics of temperament promptness of response along with consistency in responding, are elements of predictability. For example, the intensity or duration of the infant's crying repeatedly elicits the same quick effective responses from the caregiver in helping the infant regulate reactivity (Crockenberg & Leerkes, 2000). Beckwith (1990) reported that caregivers who respond quickly and consistently to the cries and nondistress vocalizations of their infants are more likely to have infants who cry less and display communicative competencies and motoric exploration skills as they mature. Kochanska (1995) also reported on the benefits of predictability, linking infants described as cooperative and compliant with caregivers who are consistently available and responsive toward the infants' behaviors.

Contingent responsiveness refers to the caregiver facilitating a change in the environment in response to the infant's cues. The definition of contingent responsiveness is based on a behavioral perspective with the focus on the relationship between the infant and the environment, specifically, the caregiver (Wolery, 2000). When an infant behavior occurs in the dyadic context, the caregiver responds. If the infant initiates a distress cry, the quick, responsive behavior of the caregiver might include physically moving the infant and offering the infant some nourishment. The timely and appropriate responding by the caregiver reduces the infant's distress. The consequence of the dyadic interaction is a change in the environment for the infant. Positive changes in the environment

increase the likelihood that the infant behavior will occur again within the dyad (Wolery, 2000). Contingent responsiveness indicates a caregiver who can satisfy basic needs of the infant with a range of social interactions (e.g., talking, smiling, laughing, eye contact, holding/touching), appropriately responding to and matching infant cues. With positive and negative affect and behaviors, the caregiver facilitates a positive context in reaction to the infant's cues. The caregiver creation of a positive outcome to infant reactivity promotes a sense of effectiveness or capability in the infant (Clarke-Stewart, 1975; Guralnick & Neville, 1997).

DeWolf and van IJzendoorn (1997) found a link between positive attachment and caregivers who responded quickly, consistently, appropriately, and sensitively to infant cues. Conversely, infants identified as insecurely attached had caregivers described as negative, resentful, rejecting and holding their infant less or in an awkward manner (Isabella, 1993). Lack of caregiver sensitivity is also linked to avoidant infants (i.e., those who turn away or interrupt the interaction) with adult initiations and responses described as over stimulating or intrusive in manner (Berk, 2002). According to Shonkoff and Phillips (2000), when parents maintain high levels of sensitivity and responsiveness, even infants who are temperamentally difficult will develop positive social-emotional growth with secure and trusting relationships.

Infant and caregiver temperament may work together to influence positive outcomes in social-emotional development (Berk, 2001). Responsive exchanges

between the infant and caregiver determine the quality of the interaction. Positive elements of the caregiver/infant interaction are identified and linked with skill acquisition in the infant.

Elements of Interaction

Within the interaction, infant behaviors may lead to a secure relationship if the caregiver sensitively adjusts her behaviors to fit the infant's needs (Berk, 2001). This review addresses three elements of caregiver/infant interaction linked to positive social-emotional development in the infant. They are goodness-of-fit, maternal sensitivity, and synchrony. These behavioral constructs are used to describe quality within dyadic function, considering both infant and caregiver temperament.

Goodness-of-Fit

Thomas and Chess (1977) proposed the goodness-of-fit model as the concordance between the infant's temperament and the mother's care taking responses. The term goodness-of-fit implies a match between the infant's inherent behavioral style and the caregiver's ability to be sensitive and appropriate in responding to the infant's behaviors (Parker & Zuckerman, 1990; Seifer & Dickstein, 2000). The infant has an individual level and range of tolerance for stimulation and arousal which results in reactivity. When the caregiver matches behaviors to the infant's state of arousal, a fit has been achieved. Goodness-of-fit does not assume an all-or-nothing match within the dyad; rather, it is the ability of

the caregiver to be flexible, accepting, and nonrestrictive to some of the infant's characteristics (Berk, 2002; Seifer & Dickstein, 2000; Stern, 1985). In fact, Lyons-Ruth and Zeanah (1993) report more mismatches exist (70%) between caregiver and infant than matches (30%). Mismatches between the caregiver and infant can broaden the infant's experience, as long as the mismatch is repaired or falls within a tolerated level for the infant. Conversely, numerous or extreme mismatches may be detrimental to infant social and emotional learning (Seifer & Dickstein, 2000). Thus, goodness-of-fit reflects the degree to which a caregiver adapts and is flexible to the unique characteristics of the infant.

Maternal Sensitivity

Sensitive caregiving by the mother is a critical component of caregiver response to infant behaviors (Isabella, 1993). As previously discussed, sensitive caregiving is another element within caregiver/infant interaction associated with positive outcomes for social-emotional development (DeWolf & van IJzendoorn, 1997). According to Isabella (1993), maternal sensitivity is the central element of interaction that promotes a secure pattern of attachment for the infant.

Maternal sensitivity is often associated with a warm caregiver manner and effect (Guralnick & Neville, 1997). Specific maternal behaviors associated with warmth and sensitivity are consistent perceptions and accurate interpretations with contingent and appropriate response to infant signals (Beckwith, 1990; Guralnick & Neville, 1997). The caregiver facilitates contingency between the infant's actions

and the environment through a range of sensitive responses (e.g., caregiver talking, smiling, laughing, making eye contact, touching and adjusting posture) that are gratifying to the infant (Beckwith, 1990). In contrast, less sensitive caregivers are inconsistent and unresponsive to infant cues. These caregivers display ambivalent or negative behaviors of touch and present a resentful or rejecting affect in responding to infant cues (Beckwith, 1990).

Interactional Synchrony

Closely related to the concept of sensitivity is the quality of synchrony within the caregiver/infant dyad (Beckwith, 1990). Designated a form of communication, interactional synchrony has been labeled a “dance” in which the caregiver/infant dyad is mutually rewarding (Berk, 2002). The caregiver responds to infant signals with a well-timed, appropriate response. For example, the caregiver synchronizes her tempo of feeding to the infant’s intake.

This interaction has been defined as a “dialogue composed of action cycles” (Kelly & Barnard, 2000, p. 260). For this synchrony to develop, the individual characteristics of the infant must evoke different responses from the caregiver. Synchrony may be measured by the number of initiations and responses to cues given by both caregiver and infant (Barnard & Kelly, 1990). Infant regulatory behaviors of consolability and self-soothing also contribute to synchrony within the interactional dyad (Kelly & Barnard, 2000). Additionally, infant behaviors of

engagement and disengagement, coupled with the caregiver's ability to interpret them, allow the infant some control of stimulation within the interaction.

The caregiver becomes the reinforcer of behaviors that may increase the infant's positive expectations of interaction (Kelly & Barnard, 2000). Chu and Powers (1995) reported that synchrony is the basis for future learning experiences in the environment. Interactional synchrony is linked to the infant's development of a secure attachment with the caregiver and later social competence (Chu & Powers, 1995).

The constructs of goodness-of-fit, maternal sensitivity, and interactional synchrony provide insight into elements of caregiver interaction linked to positive social-emotional development in the infant (Berk, 2000; DeWolf & van IJzendoorn, 1997; Seifer & Dickstein, 2000). Caregiver responses that match the infant's temperament indicate positive goodness-of-fit within interaction. A warm, sensitive, caregiving manner provides positive contingent responses to infant signals. Synchrony within the caregiver/infant dyad leads to positive attachment and social skills as the infant develops. However, early disturbances or disruptions in the context of the caregiver/infant interaction may result in long-term consequences for the infant's social-emotional development. Those consequences may impact components of social-emotional development including communication, emotional regulation, and attachment.

Components of Social Emotional Development

According to Zeanah and Zeanah (2001), infant mental health is defined as the “state of emotional and social competence in young children who are developing appropriately within the interactive context of biology, relationships, and culture” (p. 14). For the infant, social competence is comprised of behaviors and affect integral to the infant’s interaction with the primary caregiver. Emotional competence for the infant is defined as “competence in incorporating covert felt-emotions” and “the overt behaviors” that emerge from emotional experiences (Wittmer, Doll, & Strain, 1996, p. 301).

Using a review of the literature, Crockenberg and Leerkes (2000) identified two major periods of reorganization in physiology and experience during the first year of life that may be critical to social and emotional competence. At 2 to 3 months, infants will likely display abilities in receptive and expressive communication including social smiling and anticipation of social interactions with a caregiver. During this time, patterns of synchrony and specific emotions may begin to emerge. At 7 to 9 months, infants may begin to detect different affective states in the caregiver and use this recognition to regulate their emotions and behavior. The main goal of affective monitoring is to maintain contact with attachment figures. Bonding or attachment is tied to exploration at this time. Successful exploration helps promote a sense of efficacy or capability in the infant.

The caregiver/infant interaction constitutes the foundation for infant mental health and the context in which positive social and emotional development continues to thrive (Chazan-Cohen, Jerald, & Stark, 2001). The caregiver/infant relationship is a result of the quality of the interactive dyad and contributes to all future relationships for the infant. The following section focuses on three aspects of social-emotional developmental competence: (a) communication, (b) emotional regulation, and (c) attachment, all of which develop within the caregiver/infant interactive dyad.

Communication

Communication skills are fostered within the context of the caregiver/infant interaction (McLean, 1990; Prizant, Wetherby, & Roberts, 2000). Infants first express communication skills through nonverbal behaviors, eventually progressing to sophisticated, symbolic, verbal behaviors. The context of the caregiver/infant dyadic interaction facilitates communicative behaviors as the infant matures.

As a general construct, Prizant et al. (2000) defined communication as “... any behavioral act, intentional or unintentional, that influences behavior, ideas, or attitudes of another person” (p. 282). Within the context of social-emotional development, the social-affective exchange between the infant and caregiver is the foundation for later development of the social aspects of language (McLean, 1990; Prizant et al., 2000). The following review presents four areas of communicative behaviors commonly linked to the social-emotional development of the infant (a)

affective attunement, (b) social referencing, (c) joint attending, and (d) turn taking (Berk, 2002; Emde & Robinson, 2000; Owens, 2005; Prizant et al., 2000).

Affective attunement. Beginning at birth, expressive behaviors within the caregiver/infant dyad influence emotional and social experiences of the infant (Izard & Harris, 1995; Lyons-Ruth & Zeanah, 1993). At this very early stage, the infant is particularly responsive to the caregiver's voice and face (Owens, 2005). When the caregiver interprets the infant's expressive behaviors (i.e., facial expressions, body posture, vocalizations, and skin color) and responds to convey emotional resonance to the infant, then a "fit" or affective attunement is achieved (Beckwith, 1990; Seifer & Dickstein, 1993). Thus, affective attunement is a matching process, but one that extends beyond simple matching of facial expressions to focusing on the internal state of the infant (Barnard & Kelly, 1990). For example, the caregiver who responds positively does not pick up a crying infant in distress and go "wah, wah" back to the infant. Rather, the caregiver may initially frown as the infant cries but changes expression to a smile as she attempts to soothe the infant and reduce reactivity. In their review of the literature on infant interaction, Barnard and Kelly (1990) reported affective attunement is refined as the caregiver focuses on and interprets the internal state of the infant. Stern (1985) equated affective attunement to empathy or the ability of the caregiver to know what the infant is thinking. Beckwith (1990) described the four characteristic features of attunement. First is imitation that is not a simple duplication of the

infant's overt behavior but use of a different modality of expression from that used by the infant. Second, the caregiver reference for the match is not the external behavioral act of the infant but the infant's internal state. Third, caregiver external manifestations then match the infant's inner state. Finally, for the sensitive caregiver, this process occurs almost automatically.

Sometime within the first year, the infant begins to monitor the emotional expressions of others (Emde & Robinson, 2000; Izard & Harris, 1995). This skill promotes a new level of shared meaning in the caregiver/infant interaction known as social referencing. Affective attunement and monitoring precede and facilitate the skill of social referencing in the infant toward the end of the first year of life (Emde & Robinson, 2000; Izard & Harris, 1995).

Social referencing. By monitoring the emotional expressions of the caregiver, the infant begins to use affective signals to guide their behavior (Emde & Robinson, 2000). For example, if the infant is faced with a new or strange situation and monitors the caregiver's facial expression, the infant may positively regulate reactivity to the new situation if the caregiver smiles and nods encouragement to the child (Emde & Robinson, 2000). On a developmental continuum, social referencing demonstrates infant knowledge that affective signals have a social significance beyond the dyad. Social referencing not only allows the infant to resolve uncertainty from the appraisal of a new situation but also to regulate emotion and behaviors (Crockenberg & Leerkes, 2000; Izard & Harris, 1995).

Information from social referencing can alert the infant to potential dangers in a situation and allow the infant to develop strategies needed for emotional regulation within the new or strange situation (Crockenberg & Leerkes, 2000). If the caregiver's affect matches the infant, this confirms the infant's appraisal of the situation, confirming emotional reactivity and triggering regulation strategies (i.e., working models) to maintain homeostasis within the context (Crockenberg & Leerkes, 2000). Social referencing indicates an infant understands that affective involvement can (a) influence caregiver behavior in predictable ways, (b) facilitate an effective exchange within the dyad, and (c) promote the flow of contingency and change in the interaction.

Joint attending. Another communication skill developing within caregiver/infant interaction is that of joint attending. Labeled visual coordination or joint attending, this shared interaction provides learning opportunities for the infant (Berk, 2002). Joint attending refers to signals used to direct another's attention to interesting objects for the purpose of sharing the experience with another (Prizant et al., 2000). Through the mother's behavior of visual coordination, the infant learns that dyadic interaction can be expanded to include objects outside the context of the caregiver/infant interaction (Berk, 2002; Seifer & Dickstein, 1993).

When the parent attends to the infant's affect and follows the infant's gaze to an object of interest, this creates an opportunity that allows the parent to expand the interaction through communication by labeling and commenting on the shared

object (Baron-Cohen, 1995; Seifer & Dickstein, 1993). According to Seifer and Dickstein (1993), the interaction centered around joint attending allows an infant to learn the difference in affective cues in relation to external objects (i.e., which to approach versus which to avoid) and regulation of social behavior based on affective cues in relation to external objects.

Turn taking. In addition to affective attunement, social referencing, and joint attending, the infant learns to be a social partner within the dyadic relationship of the caregiver/infant interaction through turn taking. In the dyadic context, caregivers and infants attend to each other and take turns initiating and responding to each other. Turn taking is the mutual regulation of mother and child behaviors during interaction (Kelly & Barnard, 2000). Through this reciprocal relationship, a process or behavior pattern develops in a three-part cue-response sequence. First, the infant gives a cue. Then, the caregiver gives the cue (i.e., imitation) and then a response back to the infant. Finally, the infant responds to the caregiver's action (Kelly & Barnard, 2000). Within the process of turn taking the infant learns the rules for beginning and ending a communication exchange from the caregiver's feedback.

As early as 2 to 3 months, patterns of vocal turn taking begin to appear in the dyad indicating the infant's awareness of the caregiver's behavior (Crockenberg & Leerkes, 2000). By 6 months, the interactions between the infant and caregiver include "give and take" as the infant is more sensitive to the structures and timing

of the dyadic exchanges (Berk, 2002). Turn taking is a lifelong and necessary skill for social partnerships. According to Kelly and Barnard (2000), the reciprocity that develops, as the caregiver and infant respond and adapt to each other's cues, is the basis of social communication in the infant.

Communicative skills fostered within infant/caregiver interaction appear critical to social-emotional development in the infant. The infant skills of (a) affective attunement, (b) social referencing, (c) joint attending, and (d) turn taking are interrelated with the next aspect of social-emotional development to be discussed, that of emotional regulation.

Emotional Regulation

Crockenberg and Leerkes (2000) labeled emotional regulation as the keystone of social-emotional development during infancy. As previously stated, the development of self-regulation of internal reactivity to maintain internal homeostasis is thought to begin at birth (Ryan, Deci, & Grolnick, 1995). A child's ability to control a range of emotions that are appropriate to a situation (e.g., looking sad versus laughing when it is more appropriate to demonstrate sadness) are indicators of emotional well-being (Wittmer et al., 1996). According to Thompson (1994), emotional regulation eventually becomes the child's attempt to monitor, evaluate, and modify emotional reactions in pursuit of a goal.

Such regulatory attempts by the child may involve two processes, internal and external (Eisenberg, & Losoya 1997). Internal emotional regulation may be

thought of as the maintenance or modification of physiological arousal or internal feeling states (Crockenberg & Leerkes, 2000). The external process of emotional regulation is the modification of overt expressions of emotion, and the frequency, intensity, and duration of facial expressions. These also include vocalizations and actions that are external expressions of the internal state (Crockenberg & Leerkes, 2000).

Intensity or duration (or both) of an infant's crying will most likely elicit emotional reactions and behavior from the caregiver. The manner in which the caregiver responds is critical in helping the infant regulate reactivity, which in turn influences emotional regulation (Cassidy, 1994). The infant is concerned with inner equilibrium and sends affective signals to the caregiver (Ryan et al., 1995). Initial regulation through caregiver mediation becomes the basis from which the infant learns to monitor and manage internal homeostasis. Emotional regulation continues to develop within the context of the caregiver/infant interaction, given the caregiver's ability to calibrate emotional affect to that of the infant's reactivity and emotional state (Osofsky & Thompson, 2000).

The context of caregiver/infant interaction fosters basic social-emotional skill acquisition. Infant skills pertaining to communication and emotional regulation have been described. The third aspect of social-emotional skill acquisition to be reviewed is the development of attachment.

Attachment

The positive dyadic exchange between the infant and primary caregiver creates the context for the development of a secure caregiver/infant attachment. Secure attachment is considered a positive predictor of social-emotional competence and subsequent relationships as the infant matures (Cicchetti, 1990; Cicchetti & Cohen, 1995). According to Bowlby (1982) the attachment relationship for the infant serves two related functions; reducing distress and regulating emotion while promoting exploration. If the attachment system is activated by a threat to infant proximity to the caregiver, the infant attempts to increase or maintain proximity for a sense of safety and reduction of stress (Crockenberg & Leerkes, 2000).

The development of infant attachment is based on interactive experiences with the caregiver. From repeated experiences with the caregiver, the infant understands that a pattern exists within the interaction (i.e., how the caregiver responds to emotions in a variety of contexts and over time) (Bowlby, 1982). The patterns become the core of the infant's internal schema or internal working models of relationships (Crockenberg & Leerkes, 2000). Internal working models are cognitive/emotional representations of the infant's interaction with a primary caregiver over time (Crockenberg & Leerkes, 2000).

The way in which the infant approaches exploration also becomes an individual strategy or a working model. The internal working model is the child's

individual method of achieving proximity to the caregiver while exploring and becomes the guideline for all future relationships (Carlson & Sroufe, 1995; Crockenberg & Leerkes, 2000; Zeanah, Mammen, & Lieberman, 1993).

Emotions are also developing within attachment, becoming physically evident in the caregiver/infant dyad. At 2 to 3 months, specific emotions begin to emerge (e.g., joy differentiated from contentment and sadness/anger differentiated from general distress) (Lewis, 2000). Emotions, indicated by attachment behaviors in the infant, are also known as signaling behaviors. Attachment behaviors of smiling, vocalizing, and crying combine with approach behaviors (e.g., crawling, tugging) to promote proximity to the caregiver (Crockenberg & Leerkes, 2000; Zeanah et al., 1993).

On a continuum with emotional development, the refinement of working models lays the groundwork for later social-emotional development in two ways. First, the repetition of organized behavioral experiences (patterns) provides the infant with a resource of action schemes from which to draw. Second, affective exchanges (most often of pleasure and delight) become a standard for matching subsequent interpersonal interactions (Carlson & Sroufe, 1995).

According to Zeanah and Boris (2000, p. 355), attachment is “fully functional” in the normally developing infant by 7 to 9 months of age. At this age, the infant demonstrates attachment with a caregiver by turning preferentially toward a selected caregiver for nurturance, comfort, support, and protection.

Stranger wariness and separation anxiety in the infant identifies this period of preferred attachment. At the end of the first year, the infant develops clear expectations about the availability and responsiveness of the caregiver. The infant responds to new situations using past experiences, behaviors known to elicit a pattern of responses from the caregiver. In general, attachment is reflected in the quality and organization of infant behavior displayed in relation to the primary caregiver (Zeanah & Boris, 2000).

The quality of the dyadic interaction is tied to positive and negative outcomes in social-emotional skill attainment as the infant matures. Positive early caregiver/infant interactions are the first and most critical context for the three aspects of social-emotional development (i.e., communication, emotional regulation, and attachment). However, there are negative environmental factors that may interrupt the positive social-emotional skill attainment of the infant. Environmental stressors of the caregiver may impact the positive influences of the dyadic interaction.

Caregiver Risk Factors and Interaction

Biological and environmental conditions of the infant and caregiver that interfere with a caregiver's ability to establish positive patterns of interaction are considered risk factors (Guralnick, 1997). For infants and young children, risk is often classified as established medical risk, biological risk, or environmental risk

(Tjossem, 1976). Meisels and Wasik (1990) defined the classification of risk as follows:

Established diagnosis refers to children whose early developmental disabilities are presumed to be related to diagnosed medical disorders. Examples of such disorders include Down syndrome, inborn errors of metabolism (e.g., untreated PKU), multiple congenital anomalies (e.g., spina bifida), and morphological anomalies (e.g., cleft palate).

Biologically vulnerable refers to children who have a history of biological factors during their prenatal, neonatal, or postnatal period that could have developmental sequelae. Such factors include metabolic disease and nutritional deficiencies in the mother, toxic drug exposure in utero, low birth weight, and prematurity, among others.

Environmentally at-risk refers to children whose experiences are significantly limited during early childhood in areas of maternal attachment, family organization, and in opportunities for physical, social, and adaptive stimulation. Such factors are highly correlated with a probability of delayed development. (p. 608)

These classifications are not mutually exclusive. For example, mothers who abuse drugs during pregnancy present a greater risk for delivering low birth weight infants, who are at risk for maintaining homeostasis, regular sleep patterns, and consistencies in social interactions. Additionally, these mothers may be presented with an infant who cries more, sleeps less and is less inclined to give the caregiver eye gaze to establish rapport. Under these conditions, consistent and appropriate responses are not likely to occur between mother and infant (Field, 1980). This review focuses on environmental risk to the infant and the impact of risk on caregiver/infant interaction. The consequences of any type of biological risk for an infant are variable and without inevitable outcomes (Shonkoff & Marshall, 2000).

Early environmental risk factors are more predictive of poor developmental outcomes for the infant than biological risk factors (Chamberlin, 1994; Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson et al., 1991).

Environmental risk to the infant is associated with the contextual factors that stress the caregiver. The literature refers to caregiver stress associated with poverty, marital conflict, teen parenting, and maternal mental illness, among others, when describing environmental risk factors (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). Environmental risk factors often occur simultaneously for the caregiver. For example, maternal depression is often linked to maternal alcohol abuse (Beckwith, 2000). Additionally, the cumulative effects from multiple risk factors increase the likelihood that development in the infant will be compromised (Chamberlin, 1994; Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sameroff et al., 1987; Sanson et al., 1991).

In a study examining multiple risk, Greenspan (1990) evaluated 47 families with multiple risk factors for infant developmental outcomes. The mothers in the study were identified with four risk factors that included (a) mental health issues, (b) impaired psychosocial functioning, (c) current physical abuse and (d) disruptions in the relationship with their parents (due to psychosocial issues or sexual or physical abuse). Infant evaluation at 1 month of age indicated infants from the multiple risk families were developmentally behind a control group in orientation, habituation, and motor organization. At 3 months of age, these infants

lacked capacity for self-regulation, organization, and visual exploration of the environment. Additionally, these infants showed increased tendencies toward muscle rigidity, gaze aversion, and an absence of organized sleep-wake, alert, and feeding patterns. The caregivers with multiple risk factors tended to withdraw and avoid interaction or to over stimulate and lack consistency in responding to the infant. Greenspan found the behavior of the infants between 3 and 9 months of age, from families with multiple risk factors, lacked emotional regulation with random and chaotic reactivity to internal states, compared to the control group. The caregivers of these infants lacked contingent responsiveness to the infant's cues and instead ignored or misread signals.

This perspective, emphasizing the impact of environmental risk factors on caregiver/infant interaction, links infant development to the number of risk factors within the caregiving environment. As seen in the Greenspan (1990) study, multiple risk factors appear to disrupt the caregiver's ability to respond to the infant with the elements of quality previously identified within the dyadic interaction. Thus, positive infant outcomes in social-emotional development appear susceptible to the number of risk factors identified in the caregiving environment.

Cumulative Risk

No single risk factor is tied to positive or negative outcomes for children. Instead, it is the accumulation and interaction of risk factors that affect developmental achievement (Sameroff & Chandler, 1975; Sanson et al., 1991). No

one-to-one relationship exists between poverty and negative outcomes for children. Research is available, however, that supports the deleterious effect of poverty in conjunction with additional environmental risk factors of the caregiver, such as substance abuse or mental illness (Meisels & Wasik, 1990).

The 1987 Rochester Longitudinal Study evaluated 10 environmental risk factors in a population of children at 4 years of age (Sameroff & Fiese, 2000). The environmental factors included (a) maternal mental health, (b) anxiety, (c) interaction, (d) education, (e) parental attitudes, (f) occupation, (g) minority status, (h) family support, (i) stressful life events, and (j) family size. The study explored whether poor development was a function of poverty or an accumulation of environmental risk factors that are often linked to the context of poverty. Infants were assessed by measures of cognitive, social, and emotional competence. In addition to observations in the home, evaluation tools included the Bayley Scales of Infant Development, the Research Obstetric Scale, and a mother reported infant temperament scale. Major differences were found between children with a low number (i.e., 0 to 2) of identified environmental risks and those with a high number of risks (i.e., 4 to 8). Children with no risks scored more than 30 points higher in cognition than children with 8 or 9 risk factors. A similar range was found for social-emotional scores (Sameroff & Fiese, 2000). Results indicated that the number of risk factors, not income level, was the prime determinant of negative outcomes.

The identification and analysis of individual risk factors may be problematic due to overlap among environmental factors. Use of multiple regression analysis from individual risk variables is associated with “creating composites that reflect empirical not conceptual grouping of variables” (Burchinal, Roberts, Hooper, & Zeisel, 2000, p. 805). When selecting a statistical method to describe the association between risk factors and negative developmental outcomes Burchinal et al. (2000) support the use of a risk factor index. A risk factor index is computed by a tally of the number of risk factors present in the caregiver’s, and thus the infant’s, environment. The advantage of a risk-index is one of simplicity; the number of risk factors in the child’s life becomes the predictor of negative developmental outcomes. According to Burchinal et al., the use of a risk-index works effectively for relating social risk to developmental patterns, even when a large number of risk variables are addressed with a small sample.

An important caveat to the nature of risk is that multiple risk is exponential rather than additive (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson et al., 1991). One or two risk factors (e.g., living in a single-parent household and/or poverty) do not appear to impact development significantly. But, as the number of risk factors increases, the impact on development is disproportionately harmful (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson et al., 1991). Sanson et al. (1991) reported a threshold effect of four risk factors, with a 10-fold increase in the incidence of problems compared to one or two risk factors.

In a later report, Sanson et al. found that when two environmental risk factors were present in infancy, an increase in negative outcomes for behavioral and emotional competence were found at 4 to 5 years of age. When three or four risk factors were present in infancy, two thirds of the high-risk group fell into the poorly adjusted range at 4 to 5 years of age (Sanson et al., 1991).

Using data from the Rochester Longitudinal Study, Sameroff et al. (1987) found a relationship between verbal intelligence scores and a cumulative risk index. Zero to one risk factor indicated the low-risk group. The researchers considered children with two to three risk factors moderate-risk and labeled children with four or more risk factors as high-risk. Twenty-six percent of the children in the high-risk group had verbal intelligence scores in the low range (50 to 84) compared to none of the children in the low-risk group.

The Philadelphia Study supports findings that an increase in environmental risk factors, beyond two or three, increases the probability of negative outcomes relating to psychological adjustment, self-competence, behavior, activity involvement, and academic performance (Sameroff & Fiese, 2000). The study identified four multiple risk groups: (a) a low-risk group having three or fewer risks, (b) two moderate risk groups (i.e., four to five and six to seven risk factors), and (c) a high risk group with eight or more factors. A large decline in positive outcomes was found with increasing risk. For example, in the area of academic performance the relative risk for a negative outcome increased from 7% in the low-

risk group to 45% in the high-risk group, or an odds ratio of 6.7 to 1 (Sameroff & Fiese, 2000).

Certain risk factors may be linked to negative outcomes for children. For example, parental conflict and being born to a single teen parent who resides in a large family are two risk factors associated with the development of conduct disorder as the child matures (Dodge, 2000). Specific risk factors (e.g., maternal depression) are also associated with disruptions to early social-emotional development as it pertains to caregiver/infant interaction. However, the amount of research literature that links infant and caregiver interaction to the acquisition of social-emotional skill development during infancy is greater for school-age outcomes than for birth to 12 months.

Additionally, understanding the accumulation (e.g., two factors versus four) and interactional nature of risk and how it may impact positive child development is meaningful. From the above review, it appears that caregivers with four or more environmental risk factors increase the probability of negative developmental outcomes for social-emotional skill attainment in the infant. The four risk factors of (a) maternal mental health, (b) maternal literacy level, (c) maternal age, and (d) maternal poverty were chosen for further discussion because research links the effect of these risk factors to negative outcomes of relationship development, mental health issues, and language/linguistic difficulties as the child matures (Sameroff & Seifer, 1990).

Maternal Mental Health

While a number of mental health issues exist (e.g., conduct disorder or schizophrenia) that may disrupt dyadic interaction skills, the research literature is more prolific when evaluating the effects of caregiver depression on child development (Osofsky & Thompson, 2000). Chronicity and severity of depression can contribute to less adequate and even negative parenting behaviors that may disrupt infant social-emotional skill acquisition within the dyadic interaction (Osofsky & Thompson, 2000).

Generally, mothers who are depressed tend to be more critical and irritable compared to mothers who are not depressed (Tarullo, DeMulder, Ronsaville, Brown, & Radke-Yarrow, 1995; Teti, Gelfand, Messinger, & Isabella, 1995). They have children who are likely to develop psychopathology. Kelly and Jennings (2003) explained depression as an affective disturbance with caregivers who are described as negative, intrusive, and less warm in manner. Gelfand and Teti (1990) reported that maternal behaviors of a group of women with depression were labeled as disorganized, with behaviors alternatively disengaged or intrusive. The mothers who were depressed were less responsive in interacting with their infant compared to a group of women not experiencing depression. Additionally, symptoms of depression may include a sense of helplessness, fatigue, irritability, and lack of interest in activities (Nolen-Hoeksema, Wolfson, Mumme, & Guskin, 1995). These symptoms and behaviors may impact the caregiver's ability to present a contingent,

positive affect when responding to infant cues. In general, mothers with depression display a negative affect and are less responsive to their infant's negative affect compared to nondepressed mothers (Nolen-Hoeksema et al., 1995).

Two factors of maternal depression, chronicity and severity are often associated with negative outcomes to child skill development (Nolen-Hoeksema et al., 1995; Teti et al., 1995). Researchers evaluated a sample of 4,953 infants in Australia at 6 months of age with a follow-up study at age 5 (Brennan et al., 2000). Chronicity of maternal depressive symptomology was significantly related to a behavior problem score and lower vocabulary scores. Additionally, higher maternal depressive severity scores were linked to children with lower vocabulary scores and a higher number of behavior problems. Nolen-Hoeksema et al. (1995) found a significant correlation between caregiver chronicity and severity of depression and toddler problem-solving abilities. The toddlers of mothers who were depressed were less persistent and more easily frustrated during problem solving tasks.

Mothers who are depressed may be less behaviorally competent with their infants. Mothers reporting relatively higher levels of depressive symptoms display a tendency to be less positive and more negative in their interactions with their children (Teti et al., 1995). Even mothers rated as mildly depressed were negatively impacted by depressive symptoms with fewer positive facial expressions and cues, such as smiling (Raag et al., 1997).

The infants and toddlers of caregivers who are depressed also experience more negative and less positive facial expressions. These infants are described as passive and withdrawn in behavior and affect (Jones, Field, Fox, Davalos, & Gomez, 2001; Pickens & Field, 1993). Pickens and Field (1993) found that at 3 months of age, infants of mothers who were depressed spent a significantly greater proportion of time displaying affects of sadness and anger during interactions. These authors speculate that infants with a caregiver who is depressed are more psychologically stressed and less likely to show interest in the face of a depressed caregiver during an interaction. Children of mothers who are depressed are also more likely to have difficulties in regulating negative emotions (Field et al., 2002; Kelly & Jennings, 2003; Zahn-Wexler, Cummings, McKnew, Davenport, & Radke-Yarrow, 1984).

A study by Hernandez-Reif, Field, Diego, and Largie (2002) using a sample of 20 neonates of mothers who were depressed and mothers who were not depressed also found depressive symptoms of the caregiver to have a negative impact on infant affective attunement. At least 50% of the infants of mothers who were depressed versus 10% of mothers who were not depressed showed no visual preference for their mother's face and voice compared to a female stranger's face or voice (Hernandez-Reif et al., 2002).

Compared to mothers without depression, mothers with depressive symptoms are less sensitively attuned to their infants. Murray, Fiori-Cowley,

Hooper, and Cooper (1996) compared caregiver to infant affect in face-to-face interactions when infants were 2 months of age. Mothers who were depressed responded to their infants' cues with less affirming and a more negating affect. The authors defined negating affect as rejecting, emotionally discordant, or both, in responding to infant behaviors or expressions. For example, rejection occurred when the infant was fussy and the mother looked stern and said, "Oh no, we can't have that." An example of emotionally discordant behavior would be if the infant was fussy and the mother laughed. The authors found that the infants of mothers who were depressed were more likely to display disruptive behaviors in the dyadic interaction. The infants would suddenly stop an activity or interaction and become somber and still in affect.

Attachment insecurity has been significantly associated with maternal depression among infants and preschoolers. Teti et al. (1995) examined security of child and mother attachment for two groups, one group of mothers who were depressed (in therapy) and a control group of mothers who were not depressed. Analysis of data found maternal depression to be significantly associated with a lack of attachment security in both infant and preschool groups. The percentage of insecure attachment among infants of mothers who were depressed was 80% and for preschoolers it was 87%. According to Teti et al., these percentages are high compared to earlier studies and likely reflect the fact that the group of mothers who were depressed were diagnosed in the moderate to severe range of depressive

symptomology. Lyons-Ruth, Easterbrooks, and Cibelli (1997) found disorganized caregiver/infant attachment critical to the prediction of later maladaptation (i.e., cognitive lag, aggressive behavior, expressive deficits).

Campbell, Cohn, and Meyers (1995) isolated the impact of maternal depression from the multiple risk factors (e.g., poverty, substance abuse) often associated with depression. The authors examined depression in a sample of married, middle class, first time mothers to eliminate multiple risk factor influence. To conduct the study, the authors videotaped (at home) 74 mothers who were depressed and 70 mothers who were not depressed, when their infants were 2, 4, and 6 months of age. At 2 months, there were no differences among comparison groups of infants in either positive or negative interactions. At 6 months, however, mothers who were depressed were less positive during face-to-face interactions. Data indicate that clinical depression has an impact on caregiver/infant affective attunement in relatively low-risk, first-time mothers when it lasts through the first 6 months of infant life. Murray et al. (1996) found infant attachment to be significantly affected with the occurrence of an additional risk factor and postpartum depression. Among infants of mothers experiencing one additional risk factor plus postpartum depression, 62% were classified as insecurely attached to their infant compared to 26% for the control group.

Maternal depression may interfere with positive developmental outcomes from within the context of caregiver/infant interaction. Depression may impact a

caregiver's ability to respond to her infant in a consistent and sensitive manner (Wright et al., 2000). Maternal depression, then, appears to disrupt affective attunement between the caregiver and infant. Secure attachment can be interrupted by caregivers who are diagnosed with depressive symptoms that last beyond 6 months.

Maternal Literacy Level

Maternal literacy level is the second factor of risk to be reviewed when considering social-emotional development within the context of infant/caregiver interaction (McLaughlin, August, & Snow, 2000; Pan et al., 2005). For the infant, literacy is a complex set of skills that begin to develop within infant/caregiver interaction (McLane & McNamee, 1991; Rosenkoetter & Knapp-Philo, 2005). Information on early literacy skill development as a foundation for reading scores, verbal performance, and school achievement, as the child matures, is documented in the literature (Daly, 2005; Dodici et al., 2003).

According to McLane and McNamee (1991) early literacy is part of the social process that takes place between an infant and a caregiver. Early literacy is embedded in infant relationships with caregivers and is linked to infant/caregiver behaviors during interaction. Therefore, early literacy is shaped by the opportunities afforded the infant in the caregiving environment (Dodici et al., 2003; McLane & McNamee, 1991; Rosenkoetter & Knapp-Philo, 2005).

Becoming literate includes infant development of interactive behaviors that lead to an expectation of response from the dyadic partner (Dodici et al., 2003; McLane & McNamee, 1991). Consistency during infant/caregiver interaction leads to infant understanding of familiar responses from the caregiver (e.g., “When mommy holds me this way, it is time to eat.”). Infants learn that gestures (e.g., hands out mean “pick me up”) and words have shared meaning with the caregiver during interaction (McLane & McNamee, 1991). Understanding shared meaning eventually leads to symbol knowledge and vocabulary development (i.e., “A yellow M means a Happy Meal.”) (Dodici et al., 2003; McLane & McNamee, 1991; Rosenkoetter & Knapp-Philo, 2005). The development of shared meaning is a “...direct pathway to children’s literacy” (Howes & Wishard, 2004, p. 10).

According to Rosenkoetter and Knapp-Philo (2005) in addition to consistency of response during interaction, caregiver time and vocabulary use are also critical in early literacy development. The authors describe the term “time” as caregiver ability to notice and expand on the infants’ efforts to communicate. Caregivers take the time to observe infant expression, behavior, and gesture and then respond to these behaviors to encourage shared meaning. Dodici et al. (2003) include maternal sensitivity (i.e., maternal adapting to the infant’s needs) as part of this definition of time.

The amount of time a caregiver and child are mutually focused on a single object or activity is defined as joint attention (Dodici et al., 2003; Prizant et al.,

2000). As previously stated, this shared interaction provides learning opportunities for the infant (Berk, 2002). Maternal pointing helps to establish periods of joint attending with the infant and is related to maternal vocabulary use (Pan et al., 2005). The definition of time, then, includes mutual gaze and gesture (pointing) to a person, activity, or object with the purpose of shared meaning between the caregiver and infant (Pan et al., 2005; Prizant et al., 2000).

In addition to time, caregivers help infants develop early literacy skills with their vocabulary use (McLaughlin et al., 2000; Rosenkoetter & Knapp-Philo, 2005). When caregivers use words to label the infant's efforts at communication they are also increasing shared meaning (Rosenkoetter & Knapp-Philo, 2005). Caregiver verbal labeling during joint attending to an object, person, or activity, provides learning opportunities for the infant that increases shared meaning through caregiver vocabulary (Berk, 2002; Pan et al., 2005; Rosenkoetter & Knapp-Philo, 2005). According to Dodici et al. (2003) children are more likely to acquire novel words and other vocabulary skills when their parents respond to joint attention as directed by the child versus more adult directed joint attending. At age 3, a child's vocabulary can predict their reading achievement in school through the third grade (Dodici et al., 2003).

Early literacy is fostered in relationships with caregivers and is shaped by interaction in the caregiving environment. Caregiver contingent responding, sensitivity, joint attending, and vocabulary use are key to literacy skill development

in the infant. So, as the infant matures, the interaction that occurs with a caregiver during reading a book may be based on behaviors that develop early within infant/caregiver interaction (Dodici et al., 2003). Given the relationship between early infant/caregiver interaction behaviors and early literacy skill development, understanding the impact of caregiver risk factors on interaction is critical to the positive development of social-emotional and literacy skills as the infant matures (Parlakian, 2004).

The development of language skills in the infant is intertwined with literacy development in the literature (Im et al., 2004; Strickland, 1990; Strickland & Shanahan, 2004). The term language-literacy development is frequently used when reviewing early or emergent literacy development (Im et al., 2004). According to Parlakian (2004) studies often link oral language to literacy by measuring vocabulary growth and listening comprehension. However, a possible link between early infant /caregiver interaction and early language skill development was described by Robinson and Emde (2004).

Robinson and Emde (2004) reported on the effectiveness of curricula in 17 Early Head Starts in Denver Colorado. Curriculum derived from Partners in Parenting Education (PIPE) was offered in home based services to pregnant women and mothers with children less than 1 year of age in one participant group. The PIPE program is designed for teen parents who are returning to school after childbirth. The goal of the PIPE program is to teach parents the skills of emotional

communication, emotion regulation, and relationship building (Butterfield, 1996). Another participant group received a Montessori-based curriculum in a parent meeting format. Both curricula were linked to modest but positive effects for child cognitive and language development, as well as, parent-child interaction at 24 and 36 months of age (Robinson & Emde, 2004).

The relationship between parent/child interactions and early literacy skills for 27 families living in low income households was examined by Dodici et al. (2003). Parent/child interactions were videotaped when the children were 14, 24, and 36 months of age. The interactions were then coded using the Parent/Infant/Toddler Interaction Coding System (PICS). The PICS is a scale that rates child language, parent language, parent emotional tone (positive affect in facial, gesture, and verbal statements), joint attention, parental guidance (verbal prompting of asking rather than telling the child what to do), and parental responsiveness (contingent responding) and sensitivity. The Peabody Picture Vocabulary Test-Third Edition (PPVT-III) was used to measure child outcomes in vocabulary growth. The authors report statistically significant correlations were found between the Woodcock-Johnson III, Reading (WJ-R) and the 24 month PICS scores, the WJ-R and the Overall PICS score, and the Test of Language Development-Primary-Third Edition (TOLD-P: 3) and the 36 month PICS scores. Additionally, the authors report the quality of parent/child interaction, observed when children were 24 months old, was related to early literacy skills (i.e.,

receptive vocabulary, symbolic representation, and phonemic analysis) measured when the children were 54 months old. Observed parent-child interaction was a better predictor of early literacy abilities than a parent report of home literacy experiences (Dodici et al., 2003).

Vocabulary development in the infant, pertinent to language and literacy ability as the infant matures, is also embedded in relationships with caregivers and linked to interaction in the caregiving environment (McLaughlin et al., 2000; Pan et al., 2005). Pan et al. investigated predictors of growth in toddlers' vocabulary production between the ages of 1 and 3 years by analyzing mother/child communication in 108 low income families using videotaped interactions during a reading task. Mother and child interaction was videotaped at three time points when children were 14, 24, and 36 months of age. In addition to maternal communication, the relationship between maternal predictors (i.e., language and literacy skills) and child growth in vocabulary was investigated. Maternal communication was defined as verbal and nonverbal (pointing with the index finger to a person or object). Maternal vocabulary and literacy skills were determined using the vocabulary subscale of the Wechsler Adult Intelligence Scale-Revised (Mean for maternal Vocabulary IQ was 36.7 with a *SD* of 5.2, Min = 12, Max = 66) and the letter-word identification portion of the Woodcock-Johnson Tests of Achievement (Mean of 50.6 and a Standard Deviation of 5.2, Min = 28, Max = 57). Maternal vocabulary and literacy measures were related to one another ($r = .55, p <$

.0001). Study results indicated maternal word types (i.e., different words) versus number of words was a stronger predictor of vocabulary production growth in children. The total number of maternal pointing gestures was also related to growth in child vocabulary production between 1 and 3 years of age. Mothers of children with the lowest vocabulary growth rate fell into the 10th percentile for language/literacy skills and the 10th percentile for word type usage. Additionally, the study results indicated that low maternal language-literacy skills had more of a negative impact on vocabulary growth as children reached 36 months of age (Pan et al., 2005).

A study by DeTemple and Tabors (1994) involved participants from a comprehensive program designed to increase the education and vocational skills of teenage mothers. Described as an observational study, the authors used videotaping during an interaction in which 290 mothers, aged 16 to 21, read to their children, 27 to 63 months of age. The videotaped interactions were transcribed using the Codes for the Human Analysis of Transcripts (CHAT). A tool for analyzing talk, CHAT was developed for the Childes project (MacWhinney, 1991). Four distinct styles of mother/child book reading interaction were identified by the authors. The first style, straight readers, consisted of mothers who read the text out loud but seldom paused to discuss the book during the actual reading. The second and most common style of reading interaction was labeled as standard interaction readers. Two types of standard interaction readers were identified: immediate talk,

described as information that is available from the text or illustration (e.g., labeling, color naming, counting), and non-immediate talk, described as information that extends beyond that immediately available from the book (e.g., the child's own experience, predictions, explanations, inferences). The third reading interaction style, non-readers, consisted of mothers who interacted during reading with their children by using the pictures in the book as the topic of discussion, with little or no attention paid to the story line of the book. The final style, recitation readers, consisted of mothers who read single words or a phrase from the text and expected the child to repeat what she read verbatim.

Study results indicate the use of immediate talk and non-immediate talk, under the standard interaction reader style, were related to the mother's literacy level. According to the authors non-immediate talk is positively correlated with kindergarten language and literacy measures while immediate talk is negatively correlated with the same kindergarten measures. Mothers with higher literacy scores on the Test of Adult Basic Education were more likely to have a higher percentage of non-immediate talk. Mothers with lower literacy scores on the Test of Adult Basic Education were more likely to have a higher percentage of immediate talk during a book reading task. According to DeTemple and Tabors (1994) caregiver-child interaction styles should be part of any discussion or training program for reading with young children. For an intervention program to be

effective the authors believe it must start with the observation of the mother's existing interaction style.

Although not as well documented in the research literature as maternal depression, low maternal literacy level is a risk factor that may effect and be effected by caregiver/infant interaction. This risk factor was chosen to increase knowledge about the influence a mother's literacy skills may have on her ability to be consistent, sensitive, and verbal during interactions with her infant. A relationship between infant/caregiver interaction and development of early literacy skills was found in the study review (Dodici et al., 2003; DeTemple & Tabors, 1994). The impact of low maternal literacy skill level was found to be statistically significant regarding infant/caregiver interaction, child vocabulary and literacy skills measured when the child was 54 months of age (Pan et al., 2005).

Increasing our knowledge about the influence a mother's literacy skills have on her ability to be consistent, sensitive, and verbal during interactions with her infant could provide needed information to foster foundations for positive early literacy skill development. More information on caregiver literacy level, as a risk factor during caregiver/infant interaction, could benefit early intervention program effectiveness for social/emotional and early literacy skill acquisition.

Early literacy programs are being developed and evaluated as federal and state initiatives are channeling funds to improve literacy skills for school aged children. Understanding the impact of what happens to a child early in life could

direct the focus and purpose of programs developed to promote early literacy and thus reading ability as the child enters school (Daly, 2005; Rouse, Brooks-Gunn, & McLanahan, 2005).

Maternal Age

The age of the mother is the third environmental risk factor to be considered when reviewing possible disruption to the caregiver/infant interaction. Compared with older women, most mothers who are teens are neither financially nor emotionally prepared for motherhood (Carnegie Corporation, 1996; Causby, Nixon, & Bright, 1991). Other risk conditions are often linked to teen motherhood that may further impact the positive aspects of interaction. These include but are not limited to, low parental education, substance abuse, single parenting, and poor socialization skills (Fewell & Wheeden, 1998; Hanna, 2001; Pomerleau, Scuccimarri, & Malcuit, 2003). Compared to mothers who are not teens, mothers in their teen years demonstrate less verbal communication with their infants, lack eye gaze during interaction, and are less sensitive to their infants' communicative cues (Koniak-Griffin & Verzemnieks, 1991). Berlin, Brady-Smith, and Brooks-Gunn (2002) reported that a mother who is a teen is cognitively and emotionally immature which may be partially responsible for her inability to sensitively respond to her infant.

In infancy, children of mothers who are in their teens often exhibit diminished activity and fewer vocalizations than infants of mothers who are no

longer in their teens (Pomerleau et al., 2003). These infants are more likely to have poorer outcomes in cognitive and behavioral development as they mature (Causby et al., 1991). For example, Hann, Osofsky, and Culp (1996) found poor cognitive-linguistic development in a study of 69 children at 13, 20, 30 and 44 months of age who were born to mothers in their teens. These authors found maternal and dyadic variables to be the salient predictors of later linguistic and cognitive outcomes in the children (Hann et al., 1996). At 13 months, videotapes of mother/infant interactions were evaluated for infant affect, maternal affect, and dyadic verbal reciprocity. At 20 months, interaction evaluations included goodness-of-fit. At 30 months, the authors then gave the Stanford-Binet and Peabody Picture Vocabulary test. Specifically, linguistic and cognitive outcomes were linked to a less positive and less sensitive maternal manner within the caregiver/infant interaction. Dyads that included a mother who was a teen were described as having fewer caregiver/infant reciprocal verbal interactions and were linked to poorer outcomes in the infant. As the infant of a teen mother matures subsequent developmental problems may manifest as communication disorders, attention disorders, and school problems associated with hyperactive behavior (Shiono & Berhman, 1995).

At birth, infants of mothers who are teens are more likely to be of low birth weight (LBW). However, mothers in their teens who are poor and single are also more likely to lack immediate and adequate prenatal care. For the infant of a mother in her teens, it is likely that poor prenatal care is linked to the higher

incidence of LBW (i.e., 2,500 grams or less) (Shiono & Berhman, 1995). Buchholz and Korn-Bursztyn (1993) maintain that adequate prenatal care minimizes the complication of LBW in the infants of mothers who are teens. A study divided 67 primiparous mothers into two age groups ($n = 17$, ages 15 to 19 and $n = 50$, ages 20 to 32) with both groups receiving adequate prenatal care. In this study researchers noted a slight but non-significant difference in length of pregnancy and size of the infant were noted when prenatal care was not a factor for a mother who was a teen.

The results from research studies on the effects of teen parenting may be limited by a disparity in defining what age range constitutes a teen mother (Buchholz & Korn-Bursztyn, 1993). Some studies identify the age of a teen mother as 17 years or younger; others choose older cutoff points such as 19 or 20 years old (Berlin et al., 2002). This may be a critical variable to the research literature as Buchholz and Korn-Bursztyn (1993) report that younger teens are at greater risk for parenting problems compared to older adolescents.

Also, establishment of economic level may be confounded by the fact that some teen mothers reside at home with financial support from their parents (Berlin et al., 2002; McLoyd, 1998). Some are financially independent, while others move between the two economic contexts. Additionally, sample participants are often drawn from a single community or neighborhood in a large city, compromising generalization of study results (Berlin et al., 2002).

Causby et al. (1991) evaluated the maternal interaction behaviors of mothers in their teens by using the Nursing Child Assessment Satellite Training Scales (NCAST). Three scales compose the NCAST: the Home Observation for Measurement of the Environment (HOME), the Nursing Child Assessment Feeding Scale (NCAFS), and the Nursing Child Assessment Teaching Scale (NCATS) developed by Sybil Carrere at the University of Washington, School of Nursing. The parenting items of the NCAST are organized into four subscales: (a) sensitivity to cues, (b) response to distress, (c) social-emotional growth fostering, and (d) cognitive growth fostering. The experimental group ranged in age from 14 to 17 years and received a specialized school curriculum for parenting skills. The control group ranged in age from 18 to 19 years of age and received no special parent training as part of their school curriculum. There were significant differences between the experimental and control groups on 2 of the 6 subscales for home environment (i.e., maternal involvement and maternal stimulation). Significant differences were also found on the total score of the teaching scale between groups, with the special parenting group linked to positive outcomes (Causby et al., 1991).

Pomerleau et al. (2003) studied teen parenting in conjunction with other risk factors. These authors evaluated maternal behaviors of mothers who were teens and considered high-risk, compared to older moderate-risk, and older low-risk groups of mothers at 1 and 6 months postpartum. The risk factors were (a) low maternal age (i.e., less than 20 years old), (b) less than 12 years of high school, (c) family

income (i.e., below \$25,000), and (d) living alone with the infant. The high-risk mother group consisted of women less than 20 years of age with at least two other risk factors. Mothers in the moderate risk group were 20 years or older with at least two risk factors. The mothers in the low-risk group were 20 years of age or older with none of the defined risk factors. The researchers assessed maternal/infant interaction behaviors (i.e., maternal vocalizations, stimulation, gaze) to examine the relationship between maternal behaviors and infant development scores on the Bayley Scales. Study results indicated that teen mothers in the high-risk group and adult mothers in the moderate-risk group vocalized less and had lower contingency rating scores compared to low-risk adult mothers. Infants in both high and moderate risk groups obtained lower mental scores at 6 months compared to the low-risk group. Lower infant mental scores, at this age, were also associated with fewer maternal vocalizations and behavioral contingency rating scores for the high and moderate risk groups (Pomerleau et al., 2003).

Berlin et al. (2002) looked at a sample of mothers in their teens (19 years of age or younger) who were part of a large study sample ($N = 1,702$) of mothers and infants who were living in the low-income range and enrolled in Early Head Start. When the infants were 14 months old, an in-home videotaped assessment was coded for parenting behaviors during free play. The authors rated teen mothers in the sample as significantly less supportive, more detached, more intrusive and more negative/hostile with their infants than the older mothers. These authors report that

their findings provide the most “definitive evidence to date” of differences between teenage and older mothers in interactive skills (Berlin et al., 2002, p. 121).

Mothers of young maternal age appear to lack some of the quality elements that promote infant social-emotional development within dyadic interaction. These mothers, when compared to older mothers, were less sensitive, negative in manner, and lacked contingent responsiveness. A teen mother is likely to have confounding environmental risk factors that further jeopardize the caregiver/infant interaction. In fact, a mother who is a teen with two additional identified risk factors is linked to disruptions in dyadic interaction and negative long-term developmental outcomes for her child. However, when given special instruction in parenting skills, quality maternal interaction behaviors showed a positive increase for young mothers.

Maternal Poverty

According to Ramey and Ramey (1992), children living in poverty make up the largest group of children at risk for poor developmental outcomes pertaining to school success. Poverty, as a risk factor, has long been associated with intelligence quotient (IQ) scores that place children below same-aged peers not living in a poverty context (Bendersky & Lewis, 1994). However, the impact of poverty reaches beyond a single measure of developmental outcomes as the infant matures. More recently, language skills (i.e., expressive and receptive) have also been used as predictors of developmental outcomes for children living in poverty (McLoyd, 1998). The focus of developmental impact associated with children living in

poverty has expanded to include such social-emotional outcomes as social adjustment, self-esteem, depression, social competence, and externalizing/internalizing behaviors (McLoyd, 1998; Yoshikawa, 1995).

McLoyd (1998) attributes poorer outcomes in social-emotional functioning of children living in poverty as being facilitated by harsh, inconsistent parenting. Lack of sensitive responding to the infant may be exacerbated in a caregiver exposed to the acute and chronic stress of living in a context of poverty. Maternal poverty is associated with diminished affect and less response to infant social-emotional needs (McLoyd, 1990). However, the preponderance of empirical research is based on child outcomes at school age, not on the interaction between an infant and a caregiver living in a context of poverty.

Several authors support the need for long-term studies beginning in infancy and extending to school age (Duncan, Brookes-Gunn, & Klebanov, 1994; McLoyd, 1998). It is suggested that longitudinal data across the entire period of childhood is needed to draw definitive conclusions about the significance of the timing of economic deprivation as it pertains to developmental outcomes (Duncan et al., 1994; McLoyd, 1998). Longitudinal studies of poverty make up the majority of empirical research literature correlating developmental outcome results as the child matures. However, the research literature is thin when reviewing the impact of poverty on caregiver/infant interaction. An emphasis on studies that involve low income population samples of mothers and their children at 5 years of age or

younger will be used to review poverty as a potential risk factor linked to the quality elements of the dyadic interaction.

When reviewing the literature as it pertains to poverty in childhood, it is beneficial to describe the difference between the terms socioeconomic status (SES) and income poverty (McLoyd, 1998). Use of SES signifies an individual, a family, or a group ranking in a hierarchy according to access of control over some combination of wealth, power, and social status. The following criteria comprise SES: parental occupation, family income, prestige, power, and a certain life style. Income poverty is defined by cash income, using the federal poverty threshold as the defining marker (McLoyd, 1998). According to McLoyd, use of the federal poverty threshold is advantageous to using SES as a unit of measurement when evaluating the effects of poverty for the following reason. The use of income poverty enables researchers to link child outcomes to the unique contribution of income versus the multiple components of SES.

Another consideration, when defining poverty, is understanding persistent poverty versus transitory poverty. Persistent poverty is associated with negative outcomes for cognition, school achievement, and social-emotional functioning compared to children who experience transitory poverty. However, children who experience persistent and/or transitory poverty have poorer outcomes than children who never experience any type of poverty (McLoyd, 1998).

Generalization from the research literature on poverty studies may also be affected by a narrow focus of studies on African American populations. Despite high rates of poverty within Latino, Native American, Asian American and non-Latin White populations, there is a lack of research on poverty within these populations. Additionally, different kinds of poverty may be linked to different races. For example, African American children living with parents of low SES are associated with persistent and geographic considerations compared to a transitory, geographically diffuse poverty among non-Latin White children (McLoyd, 1990).

In addition to IQ scores, a study by Duncan et al. (1994) looked at behavioral outcomes when children had lived below the federal poverty threshold for 4 years starting at birth. At age 5, developmental outcomes were measured by cognitive functioning (i.e., Wechsler Pre-school and Primary Scale of Intelligence) and behavioral competence (i.e., Revised Child Behavior Profile). Duncan based his investigation on data from the Infant Health and Development Program (IHDP). The IHDP was an eight-site randomized clinical trial begun at birth for LBW, premature infants and their mothers with educational services, family support, and pediatric services offered in the first 3 years of life. The sample of mothers and infants was well diversified according to race with 55% African American, 11% Hispanic and 34% non-Hispanic Whites being represented. The authors of the study labeled the duration of poverty as persistent (i.e., lasting all four years), or poor some of the time, but not all of the time. Never-poor families were not part of

group regressions. Results, as measured by a four year average family income compared to needs, indicates the family poverty status, even after accounting for other differences (i.e., maternal education and single-parenting), serves as a powerful predictor of both cognitive functioning and behavioral competence in children. The authors found birth weight, in connection with poverty, to be a significant predictor of IQ but not behavior problems (Duncan et al., 1994).

Behavior competence of children living in poverty is often linked to externalizing behaviors as the child matures. Shaw et al. (1998) examined the association between mothers of low income with a rejecting manner and externalizing behaviors in their children at 3.5 years of age. The sample consisted of 130 caregiver/infant dyads, of which 57% were Caucasian, 39% were African American, and 4% were classified as other (e.g., Hispanic, Asian). The researchers in this study followed the participants longitudinally from 12 to 42 months using observational measures that identified maternal responsiveness and infant/toddler disruptive behavior to predict early externalizing behavior problems. The researchers measured maternal responsiveness using the Early Parenting Coding System (EPCS) and then scored five maternal interaction behaviors to indicate maternal rejecting. Rejection meant the mother's manner lacked warmth and contingent caregiving. For both sexes, the interaction of high maternal rejection and high child noncompliance was associated with externalizing behavior scores significantly higher compared to dyads having only one or none of these factors.

The most consistent predictor of early externalizing behaviors, however, for both boys and girls was maternal rejection (Shaw et al., 1998).

McLeod and Shanahan (1996) found mental health issues of depression and antisocial behavior in 4- and 5-year-old children who had a history of persistent poverty or were living in poverty (below the federal threshold) at the time of assessment (i.e., 1986). These authors used data sets from the National Longitudinal Surveys of Youth (NLSY). McLeod and Shanahan then correlated depression and antisocial behavior by the use of a maternal rating scale. Children living in poverty with high levels of depression maintained those higher levels of depression over the life of the study. The authors reported that the number of years that children were poor between 1986 and 1990 correlates significantly with negative changes in children's antisocial behavior during those years. According to McLeod and Shanahan, these results "demonstrate the accelerating behavioral disadvantages faced by persistently poor children" (p. 207).

Shaw and Vondra (1995) assessed caregiver/infant dyads ($N = 100$) to determine if there is a relationship between infant attachment security and maternal poverty as evidenced by behavior problems. The authors included the variables of mothers living in poverty, who were depressed, and perceived infant temperament to predict behavior problems for children at age 3. Shaw and Vondra assessed each mother/infant dyad before the infant was 12 months old using questionnaires and videotaping. Subsequent assessments were completed at 15, 18, and 24 months of

age. Measures included mother ratings on the Infant Characteristics Questionnaire (ICQ) and the Beck Depression Inventory with the Strange Situation used to measure infant attachment. Insecure attachment noted at 12 and 18 months was related to behavior problems at age 3. The authors suggest the study results offer support for the link between attachment insecurity and the development of later behavior problems for children living in poverty.

Ispa, Fine, and Thornburg (2002) also conducted a study on infant attachment security as it relates to the stress of mothers living in poverty and infant temperament. A sample of 82 inner-city, low-income (yearly gross income averaged \$3,759), primarily single mothers who were African American and their infants participated in the study. When the infants were approximately 10 months of age, the mothers completed the Infant Behavior Questionnaire (IBQ) to determine infant temperamental reactivity and self-regulation. At the same time, the mothers self-reported on two subscales of the Multidimensional Personality Questionnaire (i.e., Stress Reaction and Alienation) to determine maternal negative emotionality. When the infants were 12 months of age, the mothers completed the Attachment Behavior Q-Set (Revision 3.0) to determine infant attachment security. Study results found an inverse relation between attachment security and both infant and maternal negative emotionality. Insensitive responding to infants with difficult temperaments by mothers who are stressed and living in poverty is linked to insecure attachment. According to Ispa et al., infants with difficult temperament

may be prone to poor regulation abilities that require extra care and patience, which may lead to frustration and additional stress for the mother. This means mothers who are stressed and living in poverty are more likely to be insensitive in manner which is then linked to insecure attachment in the infant.

Mothers and their infants who live in poverty appear vulnerable to disruptions in caregiver/infant interaction. Caregivers who live in poverty are associated with characteristics of insensitive responding that may be exacerbated by the stress associated with a lack of income. Infants living in poverty may lack emotional regulation, which can further frustrate the caregiver and interrupt contingent responsiveness within the dyad. Dyadic interaction that is lacking contingency is linked to insecure attachment. As the infant matures social-emotional issues of depression, externalizing/internalizing behaviors and antisocial behavior are of concern.

Culture

The literature review is limited to and focused on the impact of risk factors to caregiver/infant interaction. Additionally, it is important to understand cultural influences and demonstrate sensitivity when responding to issues of infant mental health (Randolph & Koblinsky, 2001). Sensitivity acknowledges the possible impact of culture on parenting behaviors. This creates a need to understand how cultural values and child rearing practices may influence interaction and child development (Zeanah, 2000).

However, according to Garcia Coll and Magnuson (2000), research that leads to cultural constructs is not yet available to provide frameworks from which to approach the social/emotional development of children from different cultural backgrounds. Phinney (1993) reported that in spite of the current emphasis to consider cultural issues in child development there is limited empirical research to drive clinical practice. With the lack of research, Garcia Coll and Magnuson suggested that assumptions about culture do not explain all processes and trajectories of development for all ethnic populations. It is more important to gain an understanding of a child's development from the immediate influences (e.g., caregiver) to larger cultural environments (e.g., neighborhoods).

Coll and Magnuson (2000) found that although there is a presumption that developmental processes should be similar among the different cultural groups, differences can be found within individual cultures as influenced by the environment. Phinney (1993) reported it may not be clear that a caregiver represents a specific culture. Rather, the caregiver reflects an adaptation to unique socioeconomic and historical contexts.

Additionally, McDermott and Varenne (1995) stated that cultural adaptation is also a cultural continuum, not static but highly variable and changing, again depending on the contextual influence. For example, there may be a different level of cultural involvement between a first generation caregiver of Mexican descent and a fourth-generation caregiver of Mexican descent. Therefore, a

researcher/practitioner needs to understand traditional child-rearing attitudes, values, and practices of an ethnic group, as well as, more recent adaptations of the caregiver to specific needs and circumstances.

There are similarities in patterns of childcare, as well as differences, between cultures. To increase understanding of infant development beyond those families already assimilated into mainstream culture, Francasso, Lamb, Scholmerich, and Leyendecker (1997) reported on their study using a group of participants who recently immigrated to the United States. The study was designed to describe the interactive behaviors of mothers from two culturally and economically diverse participant groups. The authors report more similarities than differences between the two diverse groups (Francasso et al., 1997).

Twenty-one 3 month old Euro-American infants and their mothers and fathers comprised one group of participants. Mean age of infants was 14 weeks (12.5 to 15.5) and the mothers ranged from 25 to 42 years of age ($M = 31$ years). All the mothers in this group were married with a reported mean annual household income of \$82,200. Ten of the participant group had completed a college education and 11 had completed at least some postgraduate education.

Mean age of infants from Central America was 15 weeks (13 to 16) with the mothers ranging from 17 to 40 years of age ($M = 24$ years). All mothers in this group had lived in the United States between 7 and 60 months. All but one of the mothers lived with the baby's father and reported a mean annual income of

\$11,435. Nine mothers and seven fathers had completed high school with some high school and elementary school experience reported by the rest of the mothers and fathers.

All participants were observed during four unstructured, time-sampled, observations in their homes. Each of the four evaluations lasted approximately 4 hours. An observation coding system was used that sampled mother and infant behaviors in five domains: (a) visual orientation which included face-to-face behaviors, mutual visual attention, infant looking at mother, and mother watching/checking on the infant, (b) vocalizations between the infant and an adult (i.e., mother, father, other), (c) adult activities, such as, soothing, playing, caring for the infant, (d) infant activities, for example, playing, (e) infant location, which included information about the room and the infant's location in the room.

Results indicated mothers who were Euro-American spent more time looking at and talking to their infants than mothers from Central America ($p < .05$ and $p < .001$). However, there were no differences in the amount of time the participant groups engaged in visual attending. Further similarities occurred between the participant groups in the proportion of time mothers and infants spent engaged in various activities (i.e., social interaction, feeding, playing). Findings are in agreement with other research that reports more similarities in mother/infant interactive behaviors than differences between cultures (Francasso et al., 1997; Lewis & Ban, 1977).

A study by Burchinal, Follmer, and Bryant (1996) indicates the influence of stress on parenting behavior regardless of culture. Using two participant groups of mothers who were African American and of low-income, Burchinal et al. found interaction behaviors were linked to the amount of social support available to the mother. Mothers with the larger social support network were more responsive when interacting with their infants compared to mothers with less social support. Mothers identified with larger support networks also were associated with more stimulating home environments compared to mothers with a smaller network of support. The authors suggest that these findings support the cross-culture generalizability of the critical role of social support to secure attachment in infants.

Zeanah and Zeanah (2001) emphasized that emotional and social competence in young children happens in the interrelated contexts of biology, relationships, and culture. However, these authors also report that the interaction between caregiver and infant is the primary focus of infant mental health assessment and intervention efforts. Additionally, Benoit and Parker (1994) found significant agreement between a mother and her infant's pattern of attachment. This pattern of attachment agreement was also consistent with the mother's pattern of attachment with her mother. Finally, intergenerational influence was demonstrated by agreement in attachment pattern between grandmothers and their grandchildren.

Therefore, an identified pattern of attachment that resulted in poor outcomes in emotional and social development in the mother, regardless of culture, indicate

interaction assessment could be critical to the mental health of her infant (Benoit & Parker, 1994; Zeanah & Zeanah, 2001). Promoting positive attachment skills through interactive behaviors does not appear to be counter to cultural sensitivity. Cultural understanding should always be a consideration, especially as the ecological contexts of the child and mother broaden to other family members and neighborhoods. However, addressing interaction behaviors of the mother and infant may need to be combined with cultural awareness to promote infant mental health, especially if the caregiver is identified with at least four factors of risk.

Summary

Of the five domains of typical infant development, this review focused on the social-emotional domain and related skill acquisition within the first 12 months of life. Caregiver/infant interaction was the contextual lens in which components of social-emotional skill acquisition were reviewed. The context of interaction appears to be critical to fostering the social-emotional skills the infant will need for positive development as maturation occurs. In infancy, the ability to create and maintain effective relationships within the caregiver/infant interaction is a “powerful predictor of mental health in adulthood” (Wittmer et al., 1996, p. 299).

This review presented infant and caregiver characteristics and their influence on dyadic interaction as the partners (i.e., mother and infant) shape and influence the behaviors of the other. Characteristics of warmth, predictability, and contingent responsiveness that the caregiver brings to the dyadic interaction are

linked to positive social-emotional outcomes for the infant. Infant temperament as it pertains to regulation of physical reactivity and developing emotions adds to the interactions of signal and response within the dyad.

Positive dyadic functioning is linked to quality aspects of interaction (i.e., goodness-of-fit, maternal sensitivity, and synchrony). When positive quality aspects function within the caregiver/infant interaction, infant social-emotional skills are fostered. This review presented the infant social-emotional skills of *emotional regulation*, *attachment*, and *communication*, because their development is initiated in the context of caregiver/infant interaction.

However, factors of the caregiving environment exist that may cause disruptions to the quality elements of dyadic functioning within the caregiver/infant interaction. Environmental factors of risk (i.e., maternal mental health, maternal literacy level, maternal age, and maternal poverty) are linked to disruptions in the caregiver's ability to provide maternal sensitivity and synchrony, and, thus, goodness-of-fit within the dyad. Lack of quality elements due to multiple risk factors may be attributed to poor outcomes in infant social-emotional development.

Review of the research indicated that each of the four risk factors is associated with a lack of maternal sensitivity and contingent responding within caregiver/infant interaction. Additionally, mothers who are depressed and/or present with low literacy levels besides lacking positive affect, verbalize less often to their children. All of these maternal behaviors are deleterious to development of

the quality aspects of interaction within the dyad (e.g., Dodici et al., 2003, Koniak-Griffin & Verzemnieks, 1991; McLoyd, 1990; O'Connor, Sigman, & Kasari, 1992; Wright et al., 2000).

Infant behaviors linked to the four maternal risk factors included less infant activity and fewer vocalizations with a negative versus a positive affect (e.g., Jones et al., 2001; Pickens & Field, 1993). Emotional regulation difficulties were noted in the infants of mothers living in poverty, as well as mothers with depression. Lack of regulation was often linked to insecure attachment. As the infant matures, insecure attachment may compromise social competence. Infants living with mothers in a context of risk were associated with communication, cognitive and behavior problems as they matured.

Each of the four maternal environmental risk factors may disrupt consistent caregiver sensitivity and contingent responsiveness. Without consistent maternal sensitivity and contingent responding, the infant is less likely to gain a sense of effectiveness or capability within the dyad. More important, lack of maternal sensitivity and contingent responsiveness is linked to insecure attachment between caregiver and infant. Secure attachment is necessary to foster internal working models in the infant for exploration and relationship building.

In addition to insecure attachment, a lack of consistent maternal sensitivity and contingent responding will disrupt the caregiver/infant quality of synchrony within dyadic interaction. The quality of synchrony in interaction is critical to the

development of positive social communication skills. Communicative skill acquisition is developed in dyadic interaction based on maternal sensitivity described as “warm” (Shonkoff & Phillips, 2000). Lack of warm maternal sensitivity will impact affective attunement and social referencing abilities in the infant. Additionally, a lack of contingent responding will interrupt dyadic skill development of joint attending and turn taking. This disruption of basic communication skills continues to exacerbate a lack of synchrony in the dyad. Interruptions to synchrony and basic communicative skill ability jeopardize goodness-of fit within dyadic interaction. With synchrony interrupted between dyadic partners, infant learning, including expressive and receptive language skills, and early literacy, may be negatively impacted.

When a caregiver is exposed to more than one risk factor, cumulative risk occurs and becomes even more detrimental to the caregiver/infant interaction. Risk factors are additive, with four factors shown to have a more negative impact on child outcomes compared to less than four risk factors (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson et al., 1991). Therefore, caregiver/infant interaction that takes place in a context of multiple risk (i.e., four or more risk factors) is more likely to be associated with a lack of positive social-emotional skill acquisition. The outcomes for infants in a disrupted dyadic interaction may be negative mental health issues as the infant matures.

Previous research also established that environmental risk for the infant is associated with the environmental risk factors of the caregiver. Risk factors may disrupt or interfere with the caregiver's ability to respond to the infant with the characteristics linked to positive aspects within dyadic interaction. Further, research indicates that child outcomes are not tied to any one risk factor, but rather to the additive nature of cumulative risk factors (Sameroff & Chandler, 1975; Sanson et al., 1991). This review of the literature generated as many questions about infant/caregiver interaction in a context of multiple risk, as it generated informative answers. The following questions highlight what is missing from the previous research and drive the purpose of this study.

Is additional information needed concerning multiple risk factors of the caregiver and their impact on infant social-emotional development? Social-emotional skill development in the infant is dependent upon the interactional relationship with the caregiver (Cripe et al., 1993). Identification of positive aspects within the dyadic interaction is necessary to support and strengthen the development of the dyadic relationship. Although the research supports the importance of caregiver/infant interaction, there is much information on interaction and risk factors that is not forthcoming.

Research information on social-emotional developmental outcomes and the impact of environmental risk emerged from landmark longitudinal studies initiated in the 1960s, 1970s, and the 1980s (e.g., Rochester Longitudinal Study, Perry

Preschool Study; Sameroff & Fiese, 2000). These longitudinal studies provided substantial support for the need to understand the impact of multiple risk factors on interactive behaviors. The potential for psychosocial or mental health disorders is rarely associated with any single infant environmental risk experience. Instead, it is linked to the number of risk factors in the environment and the duration of exposure to them. However, the research repeatedly provides examples of studies that attempted to focus on the impact of one specific environmental risk factor to infant or child development. These studies did not clearly link child outcomes to a single risk factor, but attributed outcomes to the multiple environmental risk factors of the caregivers (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000).

Additional information is needed concerning multiple risk factors of the caregiver and impact to social-emotional development of the infant. Interaction competence of the caregiver is essential in a multiple risk environment to ensure infant progress toward developmental potential. Additional studies that identify the interactive behaviors of the caregiver and the infant are needed when four risk factors are identified in the caregiving environment.

When should caregiver/infant interactive behaviors be measured? The research established the importance of social-emotional skill acquisition in the infant (e.g., Kelly & Barnard, 2000). The context of caregiver/infant interaction fosters early social-emotional skill development. Social-emotional development is linked to mental health, emotional competence, and positive relationships as the

infant matures. Additionally, current information on infant brain development has provided powerful information on the importance of early experiences (Shonkoff & Phillips, 2000).

However, a majority of the research findings from studies evaluating social-emotional development are often based on child outcomes at school age. Yet, outcomes while in infancy, developing during caregiver/infant interaction, may be the most critical time frame for social-emotional skill acquisition. Research lacks documentation of caregiver/infant behaviors that impact infant emotional regulation, communication, and attachment within interaction in a context of multiple risk factors. It is necessary to identify behaviors of the caregiver and the infant during interaction to support the development of quality elements of interaction within the dyad.

What role does culture play when evaluating interactive behaviors?

Research has not clearly established the impact of culture on caregiver/infant interaction. Constructs are not yet available from research to support understanding of the social/emotional development of children from a variety of other cultures. Although there is a presumption that developmental processes should be similar among the different cultural groups, differences can be found within individual cultures as influenced by the environment (Garcia Coll & Magnuson, 2000).

A study by Burchinal et al. (1996) indicates the influence of stress on parenting behavior regardless of culture. The amount of specific cultural

association of the caregiver may not be clear; rather the caregiver reflects an adaptation to unique socioeconomic and historical contexts. With this in mind, it remains important to demonstrate an understanding of cultural awareness and sensitivity when responding to issues of infant mental health.

Why evaluate caregiver/infant interaction in a context of multiple risk?

Researchers found that the multiple risk environment of children often remained the same, as did negative developmental outcomes, as children reached school age. Research supports the stable correlation of developmental outcomes and multiple risk factors in the environment at two different ages: 4 years and 13 years. Additional studies that focus on the early identification of interactive behaviors in the presence of four environmental risk factors of the caregiver and infant are needed to support early intervention with positive developmental outcomes.

The questions that arise from the review of the literature, concerning the impact of multiple risk as it pertains to social-emotional development in the infant, appear vital. Increasing information on caregiver and infant behaviors in a context of multiple risk may be critical to social-emotional development as maturation occurs. With the understanding of early social-emotional development within a context of multiple risk it may be possible to identify ways to intervene, leading to more positive developmental outcomes for the infant.

Purpose of Study

Caregiver/infant interaction is a context that deserves consideration to assure positive social-emotional development as the infant matures. Ensuring social-emotional skill acquisition for the infant requires recognition of both caregiver and infant behaviors during interaction. The risk factors of maternal mental health, maternal literacy level, maternal age, and maternal poverty are associated with a negative impact on caregiver/infant interaction and thus on infant social-emotional acquisition. Research does not provide a clear descriptive association between cumulative risk and caregiver/infant interaction. Additional research is needed to increase knowledge of the dyadic behaviors of caregivers and infants when at least four maternal risk factors are present. This information is critical to developing interventions that foster the dyadic relationship of caregiver and infant in a context of multiple risk.

Research Questions

The review of research indicates that environmental risk, as it impacts developmental outcomes for the infant, is linked to the risk factors of the caregiver. Further, research indicates that infant outcomes are not tied to any one risk factor of the caregiver, rather, risk factors are additive. Multiple risk factors are more likely to disrupt or interfere with the caregiver's ability to respond to the infant with interactive behaviors linked to positive developmental outcomes. The purpose of this research was to identify maternal and infant behaviors of interaction when at

least four risk factors of the caregiver are identified. Both quantitative and qualitative methods were used to identify and describe the mother/infant interactive behaviors of study participants from a public school program for adolescent mothers and their infants.

The research questions are:

1. What are the behaviors of the caregiver within caregiver/infant interaction when at least four environmental risk factors of the caregiver are identified?
2. What are the behaviors of the infant within caregiver/infant interaction when at least four environmental risk factors of the mother are identified?

CHAPTER III

METHOD

Participants

Eleven teen mothers and their children (younger than 12 months of age) participated in this study. The participants were recruited from a program for adolescent mothers. This program, serving approximately 150 teen mothers and their children, was part of a large public school district in the southwest region of the United States. When a teen attending a middle or high school program within the school district became pregnant, she had the option of attending this adolescent mother program to earn her high school diploma.

From Fall 2006 enrollment, 30% of the students were classified as Black (according to school data and terminology use), 28% were classified as Hispanic, and 17% were classified as White. The remaining 25% included one Asian student with the rest classified as multiracial.

Participant Recruitment

The researcher's ability to review demographic and educational information (i.e., name, age, child's age, race, grade level, class schedule, literacy level, eligibility for free lunch) was provided by and with permission from the school district and building assistant principal. A combination of school district data tracking sheets, provided by the data clerk, were utilized to develop a list of

potential participants. Demographic information was used to determine if the criteria of age for the mother and infant were met. A separate set of data determined eligibility according to state testing results. Finally, information from the cafeteria staff was crossed referenced with age and state reading scores to determine eligibility for free lunch and breakfast. The researcher developed a list of students who met three of the four criteria (i.e., age, income level, and literacy level) and presented the list to the assistant principal. The assistant principal made the initial contact with a potential participant to present the concept of the study. If a student was interested in study participation, she gave verbal permission to the assistant principal for the researcher to initiate contact with her. When participants met with the researcher, the study was presented again and the consent forms were read to the participant (see Appendix A). Questions were answered as they arose and then participant permission was signed by the mother for herself and her child (see Appendix B). Guardian consent forms were then sent home with the participant for a signature (see Appendix C).

A pool of 19 potential study participants was developed using demographic school data information. This potential pool was comprised of mothers who met three (i.e., age, poverty, literacy level) of the four maternal risk factor criteria. Additionally, the children of potential participants had to be less than 12 months of age. The risk factors determined from school data information are presented.

Age

All participants were less than 18 years of age. Ages ranged from 15.4 years to 17.3 years with an average age of 16.5. Five students were Black, five were Hispanic, and one was White according to school records. The number of participants, per race, was an attempt to reflect the percentage of racial diversity in the school population. Infants of mothers who participated were chronologically less than 1 year of age with ages ranging from 3 to 11 months, with an average age of 6.5 months.

Poverty

The poverty guidelines calculated by the Children's Defense Fund (2006), according to the 2005 Federal Register, place the range of poverty for a family of 2 at \$12,830 to an upper limit of \$51,320 annually, according to individual states. McLoyd (1998) purported income level versus SES is more advantageous as a unit of measurement when evaluating the effects of poverty. Since the participants lived with a guardian(s), the eligibility of the participants' guardian(s) to qualify for a free lunch (according to federal and state guidelines) determined the participants' eligibility for meeting the risk factor of living within poverty.

A free and reduced lunch program reflects the intent of Congress that healthy, nutritious meals and/or milk are available to all school children regardless of the household's ability to pay. The United States Department of Agriculture has regulations that help to meet this intent. State agencies (SAs) and school food

authorities (SFAs) enter into agreements to operate meal and milk programs to comply with United States Department of Agriculture (USDA, 2006) regulations. According to the National School Lunch Program (NSLP), households must report current income (i.e., wages, public assistance, additional sources of income) on a free/reduced lunch application. All participant guardians met the state and federal poverty guidelines and participants were eligible for free meals and beverages (breakfast and lunch).

Low Literacy Level

The third risk factor was documented by the mother's state comprehensive assessment reading score. High school students are required to pass state reading and math tests to receive a diploma. The comprehensive assessments are part of the state plan to increase student achievement as outlined by state standards. The standards are broad statements of student knowledge and skill in mathematics, science, reading, and writing.

Administered to students in grades 3 to 11, the state assessment contains two basic components: criterion referenced tests (CRT), measuring selected benchmarks in the above four areas and norm-referenced tests (NRT), measuring individual student performance against national norms. The CRT reading content areas at grades 9 and 10 include: words and phrases in context, main idea, plot, purpose, comparisons, cause and effect, reference, and research. The test format at

the 9th grade is multiple choice. Short and extended responses, as well as, multiple choice are performance tasks used to evaluate reading skills in the 10th grade.

The reading CRT is measured using a Developmental Scale Score ranging from 0-3008 (see Appendix D). This score is used to determine an Achievement Level (see Appendix E). There are five achievement levels; 1 is lowest, to 5 as the highest. Level three or higher is considered “On grade level” (personal communication, 2006). A Level 1 Achievement Level is defined as follows; “This student has little success with the challenging content of the *Standards.*” Mothers who scored at Level 1 on the CRT reading portion of the state assessment, for their grade level, were part of a possible participant pool.

Mental Health

Once the above three criteria for risk were met and participant and guardian permissions were signed, eligibility, according to the fourth risk factor, was determined by participant verbal response to a self-report depression scale, the Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D is a short, 20-item scale developed for use in the general population (Radloff, 1977). The primary focus of the CES-D is cognitive and affective symptomatology with the emphasis on depressive mood (Radloff, 1977). The 20 items on the scale include depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, loss of energy, and sleep and appetite disturbances (Radloff, 1977; Wilcox, Field, Prodromidis, & Scafidi, 1998). The items are

divided into Interpersonal, Happy, Somatic, and Depressed Affect subscales (Radloff, 1977; Wilcox et al., 1998). The CES-D includes four reverse-scored positive affect items (i.e., the degree to which the individual feels happy, hopeful, enjoys life, or feels good about themselves) (Radloff, 1977).

According to Wilcox et al. (1998), the CES-D has acceptable reliability and validity across a wide variety of demographic characteristics (i.e., age, education, geographic area, and racial, ethnic, and language groups). In the original study, Radloff (1977) determined reliability using Coefficient alpha (Spearman-Brown, split-halves) in the general population (= 0.85) and in a patient sample (= 0.90). In a later study with cancer patients, internal consistency was measured using Cronbach's alpha with the healthy comparison group (= 0.87) and the patient sample (= 0.89).

When Wilcox et al. (1998) compared the Beck Depression Inventory (BDI) to the CES-D, in a population of adolescent mothers, scores from the two measures were significantly correlated ($r = .58, p < .01$). In addition, more teen participants preferred the CES-D (75%). They indicated the CES-D was easier to understand and quicker to complete (Wilcox et al., 1998).

As in the Wilcox et al. (1998) study, the CES-D was read aloud to all potential participants in the current study. Verbal presentation provided consistency of CES-D item presentation to a population of participants already identified with low literacy skills. Scores of 16 or above on the CES-D indicate depression

(Radloff, 1991; Wilcox et al., 1998). If a participant received a score of 16 or more on the CES-D, she met criteria for the fourth risk factor and was eligible for study participation. Of the 19 potential participants, four did not qualify on the fourth criteria (i.e., score of 16 or above on the CES-D) and four potential participants returned to their home schools before videotaping was completed.

Study Participants

Mothers who participated in the study ranged in age from 16.0 to 17.3 years, with an average age of 16.5 and a median age of 16.3 years. Five participants were Hispanic and five were Black and one was White according to school data classifications. Grade levels ranged from 9th to 12th, with an average grade level of 10.2 and a median grade level of 10. All maternal participants were eligible for the free and reduced lunch program and all had Level 1 reading scores according to state assessment. The scores on the CES-D ranged from 16 to 40, with an average score of 26 and median score of 24 (see Table 1). All infant participants were first born, ranging in age from 3 to 11 months. Average age was 6.2 months with a median age of 5 months. Six of the infants were males and five were females (see Table 2).

Table 1

Participant Characteristics Maternal Characteristics Including Risk Factors

Mother	Race	Grade	Age	Poverty	CES-D Score	State Level Reading
#1	Black	10	16.5	yes	22	Level 1
#2	Black	10	16.9	yes	24	Level 1
#3	Hispanic	10	15.4	yes	20	Level 1
#4	Hispanic	12	17.3	yes	34	Level 1
#5	Hispanic	11	16.2	yes	40	Level 1
#6	Black	9	16.3	yes	26	Level 1
#7	Black	11	17.3	yes	24	Level 1
#8	Hispanic	9	17.1	yes	16	Level 1
#9	Black	11	16.1	yes	18	Level 1
#10	Hispanic	10	16.3	yes	35	Level 1
#11	White	9	16.0	Yes	27	Level 1

Table 2

Infant Characteristics

Infant's Mother	Birth Order	Age in Months	Infant Sex
#1	First	8	Female
#2	first	9	Female
#3	first	4	Female
#4	first	4	Male
#5	first	11	Female
#6	first	9	Male
#7	first	5	Male
#8	first	8	Female
#9	first	3	Male
#10	first	4	Male
#11	First	3	Male

Setting

The adolescent mother program is a 6th through 12th grade school in a separate, self-contained building. It sits among a cluster of separate buildings that house special programs offered by the school district. In the building designated for

the adolescent mothers, there are nine student classrooms and six rooms for day care.

Total enrollment for the 2005-2006 school year (including the children of the adolescent mothers) was 215 with 100-128 girls enrolled at one time. As of September 2006, there were 144 students with a child count of 87. Supporting pregnant or parenting students who want to receive their high school diploma is a program goal (personal communication, 2006). Additional goals include strengthening the bond between the teen parent and child while offering onsite child care. Finally, the program strives to delay subsequent pregnancies while increasing the number of teen mothers who graduate from high school. To reach these goals the program provides uninterrupted learning and educational experiences for expectant and parenting teens. Services at the program include transportation to and from school for teen parents and their children, child care, health care, Lamaze instruction, substance abuse education, education in Sexually Transmitted Diseases (STD), and social services. Transportation is also provided during the school day to take students and their children to appointments at medical offices or social services (personal communication, 2006).

According to the assistant principal, curricula in English, math, reading, science, and social studies, are grade level and ability appropriate. Course modification with a reduction in time is available when needed. Included in the academic curricula is a parenting curriculum that includes pre and postnatal care,

nutrition and child development. Strategies for promoting the intellectual, language, physical, and social development of children are presented through constructive play activities supervised by trained day care staff in the licensed day care program. A course in peer counseling includes instruction in self-esteem, decision making, benefits of sexual abstinence, and consequences of subsequent pregnancies. All curriculum instruction is provided in a non-threatening context of support and understanding of the physical condition of the students (personal communication, March 1, 2006).

Academic objectives include grade level scores on the state comprehensive assessment tests. A student who has earned the 24 credits required for graduation may participate in the graduation exercises held at their home school, receiving their diploma with their high school classmates. However, onsite award programs are held throughout the year to celebrate student achievement. Seniors are recognized at an annual evening program held during May.

Research Design

A descriptive research study employed both qualitative and quantitative data. Qualitative methods provided a description of mother/infant interactive patterns, as well as, similarities in the life circumstances (i.e., home and school) for a population of mothers attending a school program and identified with at least four risk factors. To provide quantitative information about the interactive behaviors of mothers and their children, when the mother was identified with at least four risk

factors, a numerical score from the *Infant Caregiver Interaction Scale (ICIS)* (Munson & Odom, 2004) was obtained.

The purpose of the descriptive design was to increase knowledge concerning mother/infant interaction within a context of maternal risk. Combining qualitative and quantitative information served the purpose of the research design. Quantitative information was critical to identifying and measuring the dyadic behaviors of mother and infant during interaction. Qualitative information moved beyond the numeric information of the quantitative research design (Wiersma, 2000). Qualitative information, obtained in the school setting, was used to increase information about the teen mothers in this particular high school program.

Triangulation, a form of cross-validation according to Gay and Airasian (2000), identified regularities and differences in the quantitative and qualitative data. For example, mother and infant interactive behaviors during feeding were videotaped and scored according to the *ICIS* and compared to interactive behaviors documented during observation. This triangulation established similarities and differences between videotaped participant interactive behaviors and observed interactive behaviors.

The qualitative and quantitative data were gathered in the following order: (a) observations, (b) demographic and educational data review, (c) initial participant introduction to the study (i.e., first school administrator and then researcher), (d) interview, and (e) videotaping. One purpose of the sequence of data

collection was to build rapport with the participant while reducing participant sensitivity to the researcher and videotaping.

Qualitative Methodology

Qualitative methodology was used to provide an understanding beyond quantitative generalizations of the experiences and histories of mothers with at least four identified risk factors. Qualitative information was developed to achieve a more complete understanding of this specific population of adolescent mothers beyond that of criteria eligibility.

According to Patton (1990), the purpose of generating and sorting qualitative data for content analysis is to facilitate a search for patterns and themes within a specific setting or specific population. The data was examined to describe a profile of mothers who were identified as having at least four factors of risk in an adolescent public high school program.

Qualitative Procedures

Observational Data

Observations were in the form of field notes with initial observations occurring in the school cafeteria. Observations in the cafeteria lasted from 10 to 35 minutes. To reduce participant sensitivity the observer was visible in the cafeteria and in the school building for six weeks prior to any data collection. Field note observations also occurred during videotaping.

Interview

After guardian permission was returned to the researcher, an interview occurred in an unoccupied classroom. This was a room with a teacher desk that resembled other classrooms used throughout the day by the students. The initial meeting with the researcher and the interviews happened at the same table set in the back of the room. Another area in the room was set up with the toys and video equipment that would be used later for videotaping interaction.

The purpose of the interview with the mother was twofold. Part of the interview process included administering the CES-D, the self reporting depression scale, to determine meeting the fourth criteria, mental health, as reported on the CES-D. Secondly, the interview generated information on the educational and familial history of the adolescent, as reported by the adolescent. To gather the educational and family experience from the mothers' point of view the researcher used a semi-structured interview (see Appendix F).

Just prior to starting the interview, the researcher indicated the tape recorder to be used during the interview. This audio recorder, a micro cassette Olympus Pearlcorde S711, the size of a cell phone, sat unobtrusively on the side of the table. The researcher explained that the information from the participant was important and use of the tape recorder ensured that nothing would be forgotten. Additionally, the researcher reminded the participant that no one else would hear or use the tapes.

This reassured confidentiality. None of the participants indicated any discomfort with the interview being recorded.

The interview questions were open-ended, designed to gain an understanding of the mother's perspective of her family and educational experiences. The open-ended formatting of the questions allowed the researcher to probe into any topic that the participant initiated on her own during the interview (Bogdan & Biklen, 2003). Respectful and gentle probing allowed the participant to talk about issues as she directed them and only for as long as she was comfortable with the topic.

The school experience questions were presented first. The majority of these questions were used informally by the researcher over a period of time in another school district setting, with positive results in student comfort during question use. The interview procedure and administration of the CES-D were pretested using one mother who did not meet the fourth criteria of depression but wanted to complete her participation in the study. The audiotape from the pretesting was not part of the study. When the interview was completed, feedback from the teen mother indicated she was comfortable with the interview questions and administration of the CES-D. Additionally, use of pretesting allowed the researcher to gain experience with probing answers to the questions during interview dialogue (Creswell, 2002). The school experience questions gradually progressed to questions about the participant's family.

Observations

Observations occurred in the school cafeteria during lunch. Eating lunch was a routine event that occurred each day for the participant. Field notes were taken during the initial observations at lunch, with some breakfast observations noted. Later, an organized observation form was completed for a feeding observation at lunch (see Appendix G). An organized (i.e., structured) format provided consistency in describing interaction behaviors of mother and infant during the feeding observation (Gay & Airasian, 2000). Each participant feeding observation lasted 10 minutes in the group setting. Two participants needed to be observed twice to validate the structured observation.

Quantitative Methodology

Demographic Information

Quantitative methods provided a limited analysis of demographic factors (i.e., age of mother, race, grade level, literacy level, eligibility for free breakfast/lunch, age of child, child birth order, child gender).

Descriptive Statistics

Descriptive statistics were used to identify behaviors for the participant dyads. Dyadic behaviors were rated from videotaped interactions using *The Infant Caregiver Interaction Scale (ICIS)*, Munson and Odom (2004), in two contexts playing and feeding.

Dependant Measure

All participant interaction during playing and feeding were videotaped. After all interactions were videotaped, the dyadic behaviors were rated using the *ICIS*, a numerical rating scale. The *ICIS* was the dependent measure for this study.

The ICIS

This *Caregiver/Infant Interaction Scale* (Munson & Odom, 2004), has a total of 32 items (three to rate environment, 15 to rate caregiver behaviors, and 14 to rate infant behaviors) (see Appendix H). Items are rated on a five-point Likert scale. The *ICIS* provides four summary scores: (a) environment, (b) caregiver, (c) infant, and (d) global (sum of environment, caregiver, and infant). The highest global score on the *ICIS* is 160 points. Total possible subscale scores are 15 for environment, 75 for caregiver, and 70 for the infant (Munson & Odom, 1995).

Validity

Development of the *ICIS* began by identifying desirable features of infant-caregiver interaction (Munson & Odom, 1995). The features were chosen from an in-depth literature review, existing behavioral rating scales and observational systems, and clinical experience. Then, items were developed from available parent-infant interaction rating scales, observational systems, and research literature. A five-point Likert scale with defined behavioral anchors was developed. Individuals with expressed interest in and knowledge of parent-infant interaction reviewed the scale and offered recommendations for revision. Following review,

the scale was revised and the original reviewers were again asked for any recommended changes. No additional changes were suggested (Munson, 1996).

According to Munson (1996), the behaviors included in the *ICIS* are those that researchers believe indicate current competence of the infant and later positive developmental outcomes. The author cautions that while these associations are correlational in nature; they do not establish a causal relationship. However, they do provide some support for the importance of the behaviors (Munson, 1996).

Setting the environment for interaction is the responsibility of the parent in the environment subscale of the *ICIS*. According to the authors, the environment subscale rates position, distracting sensory events, and necessary equipment. A distraction (e.g., noise from the television) becomes relevant if it interrupts the flow of the interaction or interferes with the occurrence of positive behaviors between the dyadic partners (Munson & Odom, 1996).

Within the caregiver subscale, the caregiver is rated for participation, predictability and consistency, sensitivity, responsiveness, turn taking, communicative intent, playful routines, imitation, and affect (Munson, 1996). Similar to the caregiver subscale, infant behaviors include participation, predictability and consistency, sensitivity, responsiveness, turn taking, communicative intent, playful routines, and affect (see Appendix H; Munson, 1996).

Internal Consistency

Cronbach's alpha was used to calculate internal consistency of the *ICIS* using a study of 60 infants 3 to 25 months of age and their mothers (Munson & Odom, 1995). Forty of the participating infants were typically developing and 20 had an environmental, biological, or established risk. Nine of those 20 infants also had a feeding problem. Interactions during playing and feeding were videotaped in the participants' home. Ratings of interactions were based upon videotaped sessions (Munson & Odom, 1995). Alphas for feeding were: (a) environment, .37, (b) caregiver, .92, (c) infant, .91, and (d) total, .94. Alphas for play were: (a) environment, .43, (b) caregiver, .85, (c) infant, .87, and (d) total, .90. According to the authors the low alphas for the environment subscale may be a function of the limited number (i.e., 3) of items.

Interrater Agreement

During the development of the *ICIS*, interrater agreement (96%) was within one point in either direction for playing and feeding. The range was 91-100% for feeding and 88-100% for play (Munson & Odom, 1995). Interrater agreement was measured on every fourth videotaped interaction plus the first and last interactions. Videotapes were observed and scored at the same time by both raters without discussion. Agreement was calculated for both feeding and playing activities and for children who were typically developing and for children who had a feeding problem and a developmental delay (Munson & Odom, 1995).

Quantitative Procedures

All dyads were videotaped in two infant/mother interactions, playing and feeding. Interactions were rated from videotaped sessions during playing and feeding. All interactions were videotaped for a minimum of 5 minutes in each context. According to Munson (1996) 5 minutes is an “established precedent” for rating videotapes of parent/infant interaction.

Agreeing with the time precedent, Burns, Chethik, Burns, and Clark (1997) used 5-minute videotaping sessions to rate parent/infant interaction ($n = 20$) in structured and unstructured play using the *Early Relational Assessment Scale (ERA)*. However, Fiese, Poehlmann, Irwin, Gordon, & Curry-Bleggi (2001) found 2 minutes of observed infant/parent interaction adequate time to determine the initial reliability and validity of a screening instrument developed to detect problematic interactions between infants and parents as part of a pediatric well baby exam (Fiese et al., 2001).

In a small scale study ($n = 5$), Kemppinen et al. (2005) compared the correlation between assessments based on short videotape recordings and in-home observations. Two of the five in-home observers were psychiatrists and three were psychologists with between 5 and 21 years of experience. Observers visited the family for one hour per week during the child’s first year (including one prenatal visit) and wrote a summary after each observation. At the end of the observation year, the observer assessed mother/infant interaction according to the *Parent-Child*

Early Relational Assessment (PCERA) developed by Clark (1985). When the child was 13 to 14 months of age, the mother/infant dyads were videotaped by one of the observers in the home. The videotaped free-play context was used for assessment as it was deemed to be the most similar to the usual unstructured situation between mother and child during the in-home observations. The videos were assessed by three trained *PCERA* raters (not the same five observers), a psychologist (rater A), psychiatrist (rater B), and a physician (rater C). Kappa was used to arrive at a video rater pair, (A) and (B), (0.413).

The authors reported limitations of the study that included a small sample size and a non-diverse (non-generalizable) participant sample (i.e., upper and middle class participants drawn from one region of the country). However, the authors also reported this study was the first comparison of the two methods (i.e., year-long in-home observations versus 5 minute in-home videotaping). According to the researchers, "...the short video recording and the 1-year observations provided very similar information about the mother/child interaction." Because Kappa statistics could not be computed in all items, proportion of agreement (4/5-5/5) as a descriptor of similarity of *PCERA* ratings was used, as well as, Kappa coefficients between video and observation raters ($k = 0.41-1.00$). Agreement was considered at least moderate in 78% of items ($n = 42$), with sufficient agreement between the video and observation raters in 65% of all items, and fair agreement in another 13% of items. Both video and observation ratings revealed the areas of

strength and the areas of concern. Most important, the authors cautioned that problems in such areas as negative affect are not likely to be seen in a short video sample of dyads with no major risk factors. Because of this, behaviors of concern observed in the dyad, "...should be taken seriously in the assessment of the interactive style of the dyad" (Kempainen et al., 2005, p. 77).

All mother/infant interactions were videotaped on the school campus. The room in which playing and sometimes feeding were videotaped was familiar to the mothers because the initial participant permission form signature and then the interview occurred in the same room. This gave the mothers several opportunities to view the set up of toys and video equipment just as it would be for videotaping play interaction.

Videotaping Play

Interaction during play was videotaped in one area of the previously mentioned room (approximately 9 feet by 9 feet), designated by a toy basket and two area rugs. The toy basket contained the same selection of toys for all participants regardless of the age of the infant. This provided a consistent number and nature of toy availability during videotaping play interaction. Toy availability for maternal use during play included: (a) one receiving blanket, (b) one rattle, (c) six blocks, (d) one block container, (e) one medium-sized rubber ball, (f) one large and one small stuffed animal, (g) two little people, (h) one musical toy, (i) one bus, and (j) a plastic basket to hold the toys.

The camera used for videotaping was a Samsung digital video camcorder (SC-D363). The camera was the size of a paperback book and sat on a short (i.e., 24 inches) tripod. The camera was not intrusive; it was part of the equipment visible in the room at all times.

For videotaping of the play interaction the mothers were asked to, "Play with your child as you normally do at home." The mothers were allowed to select any of the toys listed above. Playing was videotaped for a minimum of 5 minutes. Videotaping began when the mother was comfortable enough to start playing with her child. After visually establishing that the videotaping was meeting the needs for scoring the *ICIS*, the researcher stepped away from the camera and appeared to be busy in another part of the room (i.e., not looking directly at the mother and infant interacting). Periodically, the researcher returned to the video equipment to ensure the videotaping was proceeding as needed for data collection. This provided a comfortable context for the young mothers thus promoting more naturalistic interactions with their children.

Videotaping Feeding

All feedings were oral feedings. Infants who were bottle fed and did not accompany their mother to the cafeteria were videotaped, during feeding, in the same room and area where play was filmed. Infant bottles came from the day care setting at the child's normally scheduled feeding time. Bottle temperature was consistent with normal day care feedings. The mother was asked to "Feed your

baby as you normally do.” In the classroom setting, a chair or rugs on the floor were available and were chosen by the mother prior to videotaping.

Interaction during feeding for children eating semisolid and solid food was videotaped in the teacher’s lunch room adjacent to the student cafeteria. Mothers entered the cafeteria and selected the equipment (highchair) as was their routine. Mothers brought baby food from home since the school cafeteria did not provide any food or formula for the children of the adolescent mothers. Some mothers fed their children part of their school lunch, again following their normal routine. For videotaping, the mothers ate lunch with their child in the teacher’s lunch room. This room was usually empty or occupied with only one or two adults at a separate table. The mothers were encouraged to have a friend with them at lunch to further simulate a normal lunch time routine.

Instructions for videotaping during feeding in the cafeteria were the same for these mothers as were for mothers who bottle fed their infants, “Feed your child as you normally do.” No equipment or food choice suggestions were provided. Again, once videotaping began the researcher stepped away from the camera to promote comfortable and naturalistic interactions between mothers and children.

Interrater Agreement

Interrater agreement was calculated for both playing and feeding for infants and mothers. Agreement was calculated by summing the number of agreements and

dividing the sum by number of agreements plus number of disagreements and multiplying by 100 to yield percent of agreement (Munson, 1996).

Interrater reliability in rating behaviors using the *ICIS* was established between two research assistants with previous training on scoring. One of the research assistants was trained by Munson in 2003 (K. Murphy, personal communication, 2006). The second research assistant was trained using videotaped interactions provided by Munson. Both were trained to 90% agreement for three videotaped interactions. Prior to this project, the research assistants previously scored more than 150 videotapes in another research project. For the current study, they were blind to any of the mother's life history.

CHAPTER IV

RESEARCH ANALYSIS AND FINDINGS

Maternal and Infant Behaviors

This chapter presents qualitative analysis and then findings. For clarity, the qualitative analysis is combined for mothers and infants rather than responding to research question 1 and question 2. This analysis is the first glimpse at interactive behaviors of mothers and infants in the context of four identified maternal risk factors.

Field Notes

According to Patton (1990) field notes are the data base of qualitative research. Field notes represent ongoing data collection and contain descriptive and reflective aspects (Gay & Airasian, 2000; Patton, 1990). Patton further defined field notes as, a description of what is being experienced and observed and the observer's feelings and reactions to what is being observed. In addition, field notes include quotations from the people observed and field-generated insights and interpretations. This definition was used as a framework and sequence for field note data analysis.

Observation experiences occurred in the school cafeteria and during videotaping. The observer's role in both settings was that of nonparticipant. A nonparticipant observer, according to Creswell (2002), visits a site and records

notes but does not become involved in the activities of the participants. This researcher sat on the periphery in each setting, watching, listening, and then recording observations.

School Cafeteria: Description. All participant mothers and their infants used the school cafeteria at least once a day for lunch if the infant was four months of age or older. The cafeteria was housed in a building that was not part of the school building so the mothers had to walk with their infant about 20 yards on a covered sidewalk to reach it. The cafeteria, which served both breakfast and lunch, was also used by other special programs on the school grounds. However, the teen program mothers and their infants were the only population in the cafeteria during their assigned time for breakfast and lunch. Four to five adult staff members sat in different areas of the cafeteria during breakfast and lunch to monitor behavior and respond to any student questions.

Physically, the cafeteria was a large, approximately 35 yards by 35 yards, open beamed room which accommodated the entire teen program population. Acoustically, the cafeteria reverberated with mothers talking and calling to one another, infants crying, and the kitchen staff yelling to one another to be heard over the clanging of pots, pans, and metal serving trays. The center space of the cafeteria contained 28 oblong tables with five swivel stools attached to each long side. The swivel stools were without arms or backs and the small plastic seat sat three feet from the floor. Also, five round tables with room for eight adult chairs sat on the

periphery of the oblong tables, close to the walls on either side of the room. The front of the cafeteria included two food lines, on either side of the room, that were entered separately and a large kitchen. The back wall of the cafeteria was actually a series of four large plate glass windows that allowed natural light into the cafeteria. Thirty plastic high chairs on wheels lined three sides of the cafeteria. These high chairs, with straight backs and long leg plates and foot rests, appeared to be age appropriate for toddlers. There were no booster seats available. Except for the presence of the children of the mothers, the teen program had the activity and noise level expected in any high school cafeteria.

While initial field notes were taken during breakfast, the majority of the observations occurred during lunch. In the morning, mothers and their infants arrived on the school bus. They went directly to breakfast in the cafeteria unless they arrived at school later or by other means of transportation. During the 2005-2006 school year, some bus routes were as long as an hour to transport from home to school. Mothers entered the cafeteria quietly and slowly, some with sleeping infants in their arms.

During lunch the mothers exhibited different behaviors. They were animated and interacted with their peers. After picking up their infant from day care, the mothers moved quickly when entering the cafeteria since they had only 35 minutes to get through the food line and feed themselves and their infant.

School Cafeteria: Feelings and reactions. With the exception of a few occasions (e.g., when a mother asked me what I was doing), this researcher was ignored by the mothers except for an occasional smile or polite forms, such as “please” or “thank-you.” This appeared to be because the researcher was only one of the several adults clearly visible and available to the students.

The majority of mothers fed their infants the same cafeteria food that they ate. According to the day care director, the school cafeteria did not provide any baby food, formula, juice, or age appropriate utensils for the infants (personal communication, January 30, 2007). Mothers were responsible for providing baby food in jars and liquids from home. During one observation, breakfast consisted of fried chicken strips, biscuits, some cubed fruit and chocolate milk.

A typical lunch menu was chili with oven fries or corndog with oven-baked fries, mixed vegetables; applesauce and milk (see Appendix, I). During an observation, one mother was holding a large piece of pizza above an infant (approximately 5 months to 9 months old) so the infant could suck cheese and sauce off the pizza. Chocolate milk was given to the infants more often than white milk. In addition, mothers poured chocolate milk in their babies’ bottle to be used later.

After several observations, a pattern of peer grouping began to emerge. Mothers appeared to group themselves racially, Black, White or Hispanic (school

district terms). There were also small groups of ethnically mixed peers. There were few exchanges or noted tension among groups.

Another persistent pattern (i.e., an observation throughout the study) noted the first day of observing was the response by the babies to visual engagement. For example, if the researcher smiled at an infant, the infant responded by staring at the researcher's face for an unusually long period of time. In some cases, if the researcher changed seating positions in the cafeteria, the infant continued to visually engage after the researcher was in the new seat.

After 2 months of observing in the cafeteria, this researcher observed one mother playing patty-cake with her infant. She and her infant then shared some time playing with a doll. This was the first time the researcher had observed this kind of interaction between mother and infant since starting observation. A lack of maternal focus on interaction with the infant was a persistent pattern during feeding in the cafeteria.

Qualitative analysis included a structured observation form to more fully describe maternal and infant interactive behaviors observed during feeding. According to Creswell (2002), an observation protocol is designed by the researcher before data collection begins. The study observation protocol was developed using the *ICIS* (Munson & Odom, 2004). The protocol was focused on the environment and mother/infant interactive behaviors during lunch in the cafeteria (see Appendix H). These areas of focus provided the data for the

structured observation during feeding. During analysis patterns emerged from the similar behaviors of the participants. The specific intent of the protocol eliminated the need to reduce the patterns to a small set as all the information was pertinent in describing maternal and infant interactive behaviors observed in a context of multiple risk (Creswell, 2002).

A total of six items were observed under environment: (a) placement of infant during setup, (b) placement of infant for eating, (c) quality of equipment setup, (d) positioning to encourage interaction, (e) distractions, and (f) planning. There were 10 items under interaction behaviors (for mother and infant): (a) participation in social interaction; (b) predictability of interactions; (c) sensitivity-recognition of signal, then modification of behaviors; (d) responsiveness (within 5 seconds); (e) turn taking; (f) interpretation of communicative attempts; (g) playful routines-opportunity for interaction; (h) modification of interaction/activity (following the infant's lead, changing the activity to allow the infant success); and (i) affect-positive or negative voice (tone, words), face, touch.

Environment

Placement of infant during setup. High chairs available for participant use had wheels. Some mothers entered the cafeteria walked to the far wall and put their infant in a high chair. Then, the mother pushed the infant back through the food line. Some mothers with younger infants used strollers instead of high chairs to

maneuver through lunch. Other mothers carried their infants in their arms and gave their infants to a peer to hold as they walked through the lunch line.

While in line waiting for lunch, mothers interacted with their peers the majority of the time. From the observation notes, “Some peer pushes A. (infant) into the cafeteria, J. (mother) follows, smiling, talking loudly, and kicking peers from behind.” Mother interaction with the infant was limited.

Placement of infant for eating. One mother positioned herself in front of her infant’s stroller for feeding, without the long cafeteria table between them. Five mothers faced the middle of the lunch table, putting the infant in the high chair or stroller facing the side of the mother’s face and body. Four mothers also faced the middle of the table, placing their infant’s high chair behind them. This left the infant facing their back or the back of their shoulder.

Quality of equipment setup. The availability of high chairs and strollers meant that 100% of the participant infants were in safe and age-appropriate seating equipment during feeding at lunch time in the cafeteria.

Positioning to encourage interaction. One mother with a very young infant (4 months of age) in a stroller positioned herself so she was facing her infant. The other mothers did not place their infant in a position to encourage interaction. These mothers faced their peers, not their infants. Maternal social behaviors and exchanges focused on peers.

Distractions. The entire cafeteria was considered a distraction at lunch time. Noise, hectic movement, and shouting were the norm. However, the most disruptive element to mother/infant interaction at lunch appeared to be the peer's of the mother. Positioned to face each other, not their infants, mothers engaged in social exchanges with one another throughout the lunch period.

Planning. Only two mothers with young infants (4 months of age) fed their infants baby food from jars with baby spoons that were age appropriate. The majority of mothers fed their infants the same cafeteria food that they ate. These mothers did not plan ahead by providing any baby food, formula, juice, or age appropriate utensils for their infants.

Interaction behaviors: Participation in social interaction. The mother's attention to her infant at lunch time was focused on the feeding process. Unless feeding the baby food from a jar, the mothers cut or tore small pieces of their cafeteria lunch into bite-sized pieces and put them onto the high chair tray or handed them to the infant. The majority of the time this did not include gazing at the infant, but looking at the food on the tray to determine if more food was needed.

From observation notes, "J. (the mother) glances at A. (the infant) to check-in but does not wait for A. to glance back at her." There were few instances of hugging or kissing the infant. The majority of the time, except for wiping the

infants face, maternal interaction did not include body contact or positive verbal expression.

Predictability: Interactions are consistent and predictable. During one observation, the researcher noted an infant looking at his mother's face for a period of time. When no eye contact ensued from the mother, the infant began to look around the room at other faces. It appeared as if the infant stopped attempts at establishing eye contact with the mother since he did not look toward her face again. When she presented food, however, he turned his body toward her. This example was typical of the lack of predictability of interactive behaviors between mother and infant during lunch in the cafeteria.

Sensitivity: Recognition of signal, then modification of behaviors. If the mother positioned herself away from her infant's face, then, she was not aware of interactive signal attempts by her infant. "Mother faced ahead or responded to peers but nothing was directed toward the infant." If she did respond to a signal attempt from her infant it was often not positive in manner. On one occasion, one mother was wiping her infant's face in a manner the researcher described as "hard" in the observation notes. The mother was pushing on the infant's face, and the infant's head was leaning back. The infant moved his face in an attempt to stop the wiping. When it continued, he whimpered and the mother raised her voice loud enough for the researcher to hear, "Hey, stop it." This was said with a frown on her face.

Without attending to infant cues, modification of behavior was not often observed. One observation noted a mother moving her daughter's high chair, placed behind her, from her left side to right side. The researcher felt this was an attempt at a better position to feed the infant, even though the high chair was still placed out of the mother's visual range. One mother responded to her infant who threw his rattle onto the floor by picking it up and handing it to him (11 times). The mother's face was not positively supporting this exchange (i.e., no smile, no positive verbal feedback, no gazing at the infant's face). There was no modification of the behaviors to make it a positive routine.

Responsiveness: Within five seconds, noting if response is positive or negative. Timing and pace of interactions was not rhythmic or consistent for participant mothers during feeding interaction. For example after observing for some time, and noting the infant was initiating social cues (i.e., eye gaze, body movement) the researcher wrote, "...finally at 1:37 Mom is smiling at her infant as she feeds her, but, the infant is not looking at her!" The researcher did not note any maternal positive affect or interaction attempts again.

Turn taking. Reciprocal behaviors between mother and infant, meant to direct the behavior of the dyadic partner, were not observed at lunch. On one occasion the researcher noted, "The mothers don't look at the infants; they got into a rhythm of putting food into the infant's mouth or onto the high chair tray." The infant very rarely had an opportunity to direct their mother's behavior. During one

observation the researcher noted, under the heading “Turn taking,” “Not even when feeding, it (feeding interaction) is disjointed, not consistent.”

Communication: Attempts, joint attending. During lunch mothers were observed physically meeting their infant’s need to eat. They did not talk as they put food on the infant’s tray or in their hands. As noted thus far in the behavioral examples, no communicative attempts to interpret an infant’s behavior were observed.

Joint attending attempts, by the mother, were not noted during any feeding observations at lunch. On one occasion a mother and her infant both had their heads down looking at a cafeteria tray. The mother placed food on the tray and they continued to look at the food. Neither looked at the other before or after placement of food on the tray. This was an example of mutual gaze, not joint attending.

Interpretation of communicative attempts. There were notably few maternal verbalizations directed toward the infants. Verbalizations were not noted as mothers physically turned to feed their infants. Interpretation of the infants’ behavior, by the mother, was not noted during feeding at lunch time.

Playful routines: Opportunity for interaction (includes response time). There was one playful routine noted when an infant (in a stroller) smacked his lips while eating. The mother imitated the smacking to continue the interaction in a timely manner. While the infant continued to gaze at his mother, he did not continue the playful routine by repeating lip smacking back to his mother.

On one other occasion the researcher gave a different mother credit for one playful routine during the 10-minute observation. No other examples of playful routines were noted for participant mothers and their infants during observation at lunch.

Modification of interaction/activity (following the infant's lead, changing the activity to allow the infant success). Very few modifications to an activity, to follow the infant's lead, were noted during observations. The only exchanges that involved any consistent changes in behavior were when a mother reduced the size of food pieces she gave her infant to eat. Even when the infant, sitting behind or on the side of the mother, initiated an interaction by touching, the mothers' response was to put another piece of food in front of the infant.

Affect. Only one mother displayed consistent and positive affect toward her infant. Affect toward peers during social exchanges was, however, more consistently positive during observation. One example noted during observation, "T's (the mother) affect is flat and serious but with some moments of smiling (approximately 10% of the time)." At other times, mothers were observed displaying only negative tone, words, and facial expressions.

The number of times an infant smiled was outnumbered by the number of times no smile was noted. In general, infant affect could be described as watchful and solemn. On one occasion a participant mother was talking to an infant (not her own) with a negative ("but typical") affect, "The baby started to cry."

The final reaction associated with a pattern throughout observation, was that the infants of the participant mothers were not considered a separate population from their mothers. On one of the last observations occurring during lunch in the cafeteria, one participant mother left her table and infant to engage in a physical fight on the cafeteria floor. The administrator walked from the back of the cafeteria to the front to get two police officers to pull the girls apart. It took the officers a few minutes to separate the girls and more time to handcuff them. Finally, after some discussion between the adults, the mothers were escorted from the room. During this entire incident, the researcher could not visually locate the infant of the participant mother who was fighting. It wasn't until the adults and participant mother left the room that an officer came back into the cafeteria and appeared to be checking on the infant. The infant of the participant mother was held by another student who walked her out of the cafeteria. After the noise level that was very high in the cafeteria during the fight died down, the researcher could hear infants crying.

School cafeteria: Quotations. Observations in the cafeteria did not generate direct quotations. Periphery observing and cafeteria noise levels made it difficult to hear individual conversations. Instead, vocal levels (e.g., a raised voice or shouting), face to face exchanges, body positions, and gestures were the noted means of communication when observing mother/infant interactions during lunch. Frequently, a mother used a stern facial expression (e.g., a frown or no smiling) and harsh voice (e.g., loud) when she wanted her infant to stop an activity, rather than

demonstrate the desired behavior for the infant. Conversely, many mothers' faces were devoid of emotion with a lack of any verbal exchange with the infant. There was, however, one direct quote that was noted over the noise level of the cafeteria in full lunch mode. Just before she ran to the middle of the cafeteria to engage in a physical fight with another mother, the participant mother yelled, "Bring it on."

School cafeteria: Field-generated insights and interpretations. According to Patton (1990), insights and interpretations include ideas about the causes of observations. The above field notes indicated infrequent face-to-face or verbal exchanges between mother and infant during lunch time. Insights noted during observation become possible explanations for mother/infant interaction during lunch.

Physically, the cafeteria did not promote interaction. It was large and noisy with multiple activities occurring at the same time. With the exception of high chairs, the tables, stools, utensils, and food were not age-appropriate for all the infants who ate there. Additionally, as the infants matured the tables and swivel stools could become safety hazards. And finally, the time allowed for lunch and breakfast made eating a priority.

The final idea as to why feeding in the school cafeteria was not promoting positive interaction was an interpretation and according to Patton (1990) must be labeled as such. The adults available at lunch appeared to focus on eliminating behavior problems of the mothers. Mothers and infants being fed and getting back

to class to maintain schedules was also a priority for the adults. Positive mother/infant interaction during lunch was not a goal for the adults. Therefore, the context during lunch did not encourage positive interactive skills between mother and infant.

Videotaping

Videotaping: Description. During play, videotaping occurred in an unused classroom. Although this classroom was not part of the mothers' daily routine, it was the same size (approximately 28 feet by 16 feet) and filled with school furniture found in other classrooms that were part of the mothers' routine schedule.

Throw rugs and a chair visually delineated a triangular-shaped videotaping area approximately eight feet on two sides and nine feet across the third side or base of the triangle. All the maternal participants chose the floor for play. Three mothers who bottle fed chose the chair; the rest sat on the floor.

The toys used for the study were visible in an open weave plastic laundry basket. All the mothers chose toys from the basket when playing with their infants. The toys were new and were cleaned after each use. The researcher told each participant mother about the toys being cleaned before videotaping started.

Videotaping: Feelings and reactions. Mothers did not appear intimidated by the videotaping, but some initially stared into the camera holding their infant so the infant also faced the camera. Several mothers continued in this position so the mother and infant were not face to face during play. Others positioned themselves

so they were facing each other. As the videotaping proceeded, all participants became engaged in play and no longer focused on the camera. Mothers often glanced at the researcher during play, as if they needed reassurance they were following directions.

There was a persistent pattern with the infants during play and for those videotaped while being bottle fed. These infants tried to socially engage the researcher with eye contact and smiles. Some infants were so persistent the researcher had to put her head down or leave the area so play or feeding would continue between mother and infant.

Videotaping: Quotations. Patton (1990) considered quotations to be an emic perspective, that is, reality coming from the mother's perspective. Direct quotations and recall quotations were gathered during videotaping (Patton, 1990). The following quotations were noted during play.

During one session of videotaping play, the mother looked at the researcher and stated, "He doesn't know how to play." (her son was 4 months old). She showed her son a toy and then told him, "Play with it." Mothers frequently told their infants "No" or "No, no" during play.

Another mother, referring to her daughter, explained to the researcher during videotaping "She doesn't want to play with me." She stated this three times during the 10 minutes of videotaping. When the taping was finished, the mother

informed the researcher, “She likes to play by herself” (her daughter was 8 months old).

Videotaping: Field-generated insights and interpretations. The majority of mothers expressed a desire to be videotaped. Once videotaping started the mothers did not attend to the camera. So, the pattern of looking at the researcher during filming was interpreted as a lack of understanding what behaviors were expected during play versus discomfort with the procedure.

The mothers did not follow their infant’s lead during playing, rather, they directed the play. While directing play, the mothers appeared frustrated if their infant could not play with a toy in the manner directed. The infants also appeared frustrated when the mothers pulled toys away from them in a teasing manner or did not let them explore with their mouths.

The above insights indicated that these mothers lacked information about normal child development. Lack of normal child development was evident in maternal skills during play and in inappropriate expectations of the infants’ motor skills, particularly oral motor development. For example, an adult who does not follow a child’s lead, does not encourage turn taking and joint attending during interaction. Mothers expected their infants to manipulate and use a toy that was not age-appropriate. Additionally, the mother’s did not acknowledge the need for motor exploration by mouth as a developmental stage.

Interviews

Participant interviews were part of the descriptive research design. According to Gay and Airasian (2000), an interview allows the researcher to generate data that cannot be obtained from observation. On a continuum with increasing amounts of structure, the interview developed by the researcher was semistructured. The interview questions and order of presentation were predetermined and the questions were open-ended. Participant responses were recorded and transcribed verbatim (Gay & Airasian, 2000).

Participant responses were divided according to educational history information and family history information. The analysis procedure for the interviews consisted of chunking and then coding information from participant responses to interview questions (Creswell, 1998). Codes were reduced and chunked together to form themes (Creswell, 2002).

Educational history patterns. The first two questions of the interview were developed to build rapport and allow the participant to describe their own learning style and preferences. All participants linked their favorite class to the teacher of the class. A majority of participants associated a warm, empathetic, manner to their favorite teacher. Nice, friendly, and patient were important attributes assigned to a favorite classroom teacher and thus a favorite class.

Additionally, a majority of participants found favorite teachers could explain information so they could understand it. The ability to explain directions or

new concepts was also linked with a sensitive or empathic manner, "...if you try and ask something and some of the teachers get mad if you ask them again and they're like, 'you'd better listen,' so you know, Ms. V., she's really patient and she can explain it to you five times if you don't understand."

The participants described what a teacher would do to help them understand something that was not clear to them. Five participants found it helpful when teachers demonstrated what they needed to know. Examples included using a computer, calculator, or writing out a problem, according to participants. One participant reported, "She does it, she does an example of it" and "Well she talks to me first, like if I still don't understand she shows me some examples. Not saying what I have to do but showing me some examples." Other participants found it helpful when a teacher divided information down into multiple concepts, "He broke it down like into pieces." Another participant reported, "She break it down like 2 or 3 different ways. And the best way I understand that's the way she'll teach me."

All participants qualified for the study by meeting the criteria of a low literacy level as determined by their state assessed reading score. The next questions on the interview focused on the participants' opinion of their ability to read and ability to comprehend what they had read. For the majority of the participants, their reading ability was linked to the interest level of the written material. The higher the interest level, the easier it was for them to read. The

majority did not like to read. Three expressed liking to read, but only two read for pleasure.

Reading comprehension was also linked to interest level, “If it’s not fun I forget it, but if it’s interesting I remember.” Big words were harder for one mother to read. The meaning of words or vocabulary, and understanding of concepts impacted reading comprehension for three participants.

Nine participants had an individual strategy to help comprehend reading material. Three participants focused on words or concepts they did understand to help them with comprehension. “I try my best about it, like the words around it. And, if I don’t know, just skip it.” Some participants found asking an adult to decode a word or to explain the meaning of a word was advantageous to their reading comprehension. Two participants described taking notes as a strategy to improve reading comprehension. “Umm, I make like some note cards or flash cards and try and remember.” Four participants used re-reading information as a means to comprehend difficult reading material, “By reading it over and over and over.”

A reading question was added to the interview concerning the participant’s opinion on the importance of reading. At the end of the interview the researcher asked, “What is the most important skill for (infant’s name) to have when they go to school? What skill do you think ____ should have in school to be successful?” Three participants responded with reading in their answer, “Reading most of all, pass the (state assessment) in math.”

However, seven participants did not mention reading as an important skill linked to school success. Paying attention, speaking, being “good,” and listening to teachers was important as reported by the participants.

Familial history patterns. Transition questions moved participant responses about school into questions about family history. Fifty percent of participants reported their involvement in an after school activity (i.e., sports, clubs, music). Half reported no involvement in school activities, “I wasn’t involved.” The researcher asked, “What about any other activities like singing or drama?” “Probably wanted to but didn’t.” Half of the participants’ parents were involved in their school activities beyond parent conferences, “. . .my Dad used to always want to find out about my grades and stuff.” Other parents were not involved beyond parent conferences. When asked if her parents ever came to school to watch her play with her team, one participant responded, “No, cause she was always working.”

The next set of questions focused on how a participant’s family communicated with one another in the home. Three participants’ answers were positive feedback. These participants received positive feedback when meeting their parent’s expectations for school and behavior. As well, they received constructive, clear messages when they were not meeting their family’s expectations. “Oh yeah, you know brothers and sisters get in a lot of fights

sometimes. We had meetings to talk about things, right from wrong, all types of stuff.”

However, family communication for the majority of the participants was not positive. Home life was described as chaotic, “It was busy.” Less positive communication added to the impression of a chaotic home environment. When asked, “how did your family talk to each other, how did they communicate?” one participant responded, “By screaming, they didn’t get along.” Some parents, it appeared, were not available for consistent communication. After a negative response about how her family communicated, another participant explained, “Like we learned our stuff from school, they were always working and everything.”

Although not a direct question, the above set of questions led to information on the participant’s current living situation. Only two participants were living at home with both a mother and father (or a stepparent and biological parent). Another participant, although living in her mother and stepfather’s home with her husband, was not happy with the arrangement. She explained to the researcher, “...still like in Spanish culture if you do sex before you got married then you have to get married. Yeah, because you’re considered someone that’s just like trash. So I just got married cause I wanted to get married.” This young mother reported she was not happy with her husband’s attitude about her age, she wanted to be treated as an equal.

According to school records, another mother who was White, said her father quit speaking to her when she got pregnant at age 15. She lived with her mother, as her parents are now divorced. Her son was 3 months old and her father was still not speaking to her.

Three participants alluded to parents or a single parent who were unavailable due to long hours at work, "...cause she was always working." Participants described a less than stable home environment. One participant asked the researcher to help her gain access into a nonprofit home for adolescents who become pregnant while in the foster care system. The participant was living with her Godmother after she had to leave her mother's house due to becoming pregnant. Her mother was living in ... (a Caribbean island) at the time of the interview. When asked how long ago her mother left, she replied, "Well not that long, I was with her during 9th grade. Like half of my 9th grade, I had to move out when I got pregnant. And I found out I was pregnant in December and then I had to move out." Her interview occurred in October when her infant was 5 months old.

Another participant also reported a home life that was characterized by frequent moves, "I was like four, I was with my grandparents and then my Granddaddy died so we moved in with my auntie. And then my Mom left us cause she was on drugs so we went to stay with my stepdad, my sister's Dad, and we've been with him ever since." When asked how many brothers and sisters she had, this participant responded, "I have four sisters and like seven brothers." When the

researcher asked if some of the bothers and sisters were from a different mother or father, the participant explained, “Well, two of my brothers is the same mom and my one sister is the same mom and the other kids are like on my father’s side.”

Participants reported confusing home situations, “Well I live with my Dad since I was 3. Since I was 3 to 16, I lived with my Dad. I lived with my Mom mostly when I was a baby until 2. And me and my sister had the same Mom and Dad. So, ummm, she’s 19 now and I’m 17 so we just 2 years apart. I just growed with her. I stayed in ... and for a long time, about last year, I moved to” The researcher asked, “So you were in ...?” and the participant responded, “From like...from 3 years old to like 16. And then I moved to my Dad’s house.” The researcher then asked, “So your Dad moved here as well?” and the participant responded, “No, I moved in with my stepmother.” This participant was missing the sister she said she grew up with, “...she moved out of my Dad’s house when I was 5th grade and she was in 8th grade. She moved to the people she living with now and like I really don’t talk to her. I haven’t talked to her in a long time and I don’t know...ummm...she was my best friend but...”

Another participant reported her father was in jail, “We get along, my Mom and my Daddy don’t really talk any more, I don’t know why but they don’t really talk but we get along.”

One participant reported having three siblings but, “I didn’t know my Dad.” This participant shared, “I had problems when I was a little girl.”(the participant is

now 16 years old). The researcher asked her what kind of problems and she stated, "Personal problems." The researcher then asked, "Do you think you are over them?" and the participant shook her head "no."

The next question had to do with the participants' view of how they were going to parent. The researcher told the participant, "I know you love your parents and they did a good job of parenting but are there some things you are going to do differently? Some things you might want to do differently with your infant?" Four did not have any ideas for how they might parent differently from their parent(s), "Yeah, but I don't know what." When prompted, one participant said she would, "Be more responsible and be more mature than I already is." Not as sure, one participant mother said, "I guess the same way," when asked if she would parent differently.

The rest of the participants' responses fell into two areas (i.e., communication and availability) for parenting differently. The participants were adamant that their parenting would include more communication with their children. "I'm going to make sure to talk to her every day about school and how important it is to not talk to strangers and never do nothing like be a young mother like I was cause it's kinda hard." And "I want him, I don't want to scream at him when he does something wrong, I want to talk to him. And I want to hear what he has to say." Concerning availability to their children, the participants stated, "Try and be there more and like, ...not to spoil him but try to teach him better than my

Mom was but my Mom was never there so it was almost always my Dad.” Another participant responded, “Make sure I be in her life and teach her right from wrong...”

Qualitative Results

In the following section, patterns that emerged from the data are discussed. First, the patterns from field notes are presented. Then, patterns that emerged from the videotaping are discussed. The patterns are structured by maternal behaviors and infant behaviors. Finally, patterns from the interviews are presented.

Field Notes

School cafeteria. Results of field note observations in the cafeteria are presented using the persistent patterns that emerged during observation. The following persistent patterns, developed from observation insights and interpretations lead to possible explanations concerning the difficulties with mother/infant interactions at lunch time.

Persistent pattern: Infant visual engagement. On one of the first occasions in which a long period of visual engagement by an infant was noted, it was also noted that his mother was wearing headphones and had her face turned. This position did not allow her to be available to the infant. The infant was not attempting to search his mother’s face, choosing instead to socially engage with other adults. He even followed the researcher’s face as the researcher moved to other parts of the cafeteria.

A disturbing trend was noted during the Fall of the 2006-2007 school year. The oblong tables used by the majority of mothers and infants during lunch were not conducive to engagement between mother and infant because they promoted sitting side by side instead of face to face. Four to five mothers positioned their infants in high chairs behind their backs while they ate. The mothers turned periodically to put bite-sized pieces of food on the infant's high chair tray and then turned back to face their peers. During one observation, an infant, approximately nine months of age, patted his mother's back in what appeared to be an attempt to gain her attention. The mother did not respond to the patting on her back. Instead, the peer next to her responded by putting more food on the infant's tray. She then turned her back to the infant to talk with peers.

Observed interaction noted an absence of face-to-face social exchanges between mothers and infants. A lack of maternal sensitivity, associated with harsh facial and vocal expressions, was frequently noted. Limited, fleeting, mutual gaze was noted around food by both mother and infant (i.e., the mother would put food on the tray and the infant would look at it, so, for a few seconds both would look at the food). There was no eye gaze toward the dyadic partner before or after the mutual gaze. With one exception as noted above, joint attending was not observed in the dyads.

Infants and toddlers did not appear to be visually seeking information from their mother's faces. Infants were observed protesting to receive more food or to

increase social interaction with their mother. However, while protesting was a positive communicative skill, it was frequently absent. In response to an infant's protesting, mothers often responded with food but without an increase in social interaction. In some cases, protesting was not used by the infant, even when the infant appeared to be hungry.

Persistent pattern: Safety concerns for infants. The cafeteria was not geared to the infants of the adolescent mothers, with the exception of high chair availability. The scale of the tables and swivel stools were for high school students and could become a hazard as infants matured. Cafeteria food and utensils were geared for an adolescent population. One infant sat and stuffed pieces of fried chicken strips into her mouth until she choked and then spit out the entire mouthful she had not been able to chew. The cafeteria did not provide child-sized cups or small cups with lids that promoted learning to drink from a cup. Mothers gave the infants liquids by suctioning up the liquid through a straw, covering the end of the straw and putting the straw into the infant's mouth and releasing the end of the straw to get the liquid into the infant's mouth. Other observations noted mothers opening small cartons of milk and pouring liquid from the carton into the infant's mouth. Regulating liquid flow and amount was difficult with both methods. Utensils were pointed sporks (i.e., a plastic utensil that replaces a spoon and fork), too sharp and awkward for infant's trying to learn to eat with a spoon or a fork.

Persistent pattern: Schedule logistics for staff and mothers. School personnel had 35 minutes to get 137 mothers and their children in and out of the cafeteria and back into the school building. The mothers were also aware of the time limits, understanding they must get through the cafeteria line to feed themselves and their infants. Often, mothers were late for the class period following lunch.

The initial impression of the young mothers during breakfast was they were withdrawn and subdued, not talking to each other or to their infants. The difference between maternal behaviors during breakfast (e.g., subdued and quiet) versus lunch (e.g., loud and talkative) could be the mothers' schedule at school and at home. Mothers and infants left home early and had a long bus ride to school, using that time to sleep.

Finally, lunch was the only social gathering during the school day for these young mothers. They were scheduled into classes the rest of the day so lunch was the only time they saw a friend with whom they did not have classes. The mother's focus was to eat, socialize, and feed their infant, all within 35 minutes. For most of these young mothers using this time period to engage with their infant did not appear to be a goal.

Persistent pattern: Maternal behaviors of interaction. Patterns of interactive behaviors emerged between mothers and infants during feeding. Maternal patterns indicated mothers were not facing their infants during lunch. Mothers were not

available to read infant cues and therefore were less likely to modify their behavior to follow the infant's lead. Predictability and consistency of maternal responses to infant cues was limited. Maternal behaviors of communication in the context of joint attending, labeling an infant's behavior, were also missing. Lack of positive maternal communication was also reflected in maternal affect. Maternal affect toward the infant, during feeding at lunch, was typically flat and serious, lacking smiles and positive vocal tone during interaction.

Persistent pattern: Infant behaviors of interaction. Infant interactive behavior patterns were also noted during lunch. Infants were not exposed to, nor expected, consistent, timely, sensitive, responses from the mother. In turn, infant initiation and responses to maternal cues were inconsistent. This lack of sensitivity and consistency impacted turn taking and joint attending opportunities and development. Infant affect was solemn and watchful, also lacking in the number of smiles observed.

Videotaping results, persistent pattern: Infant visual engagement. Infants attempted to visually engage the researcher during videotaping, especially during bottle feeding. Mothers were not observed using bottle feeding as a time to gaze into their infant's face to establish mutual gaze. During a 10-minute segment of videotaping bottle feeding, one mother sat and stared at the wall across from her chair, glancing down at her infant's face for a few seconds then staring back at the wall. Toward the end of videotaping the infant's eye gaze and the mother's met and

a time of mutual eye gaze ensued. The mother appeared to be uncomfortable during the interaction. When the baby smiled, she said “Quit laughing,” after that mutual eye gaze was broken and the interaction was gone.

Additionally, a lack of maternal verbalization (i.e., talking, singing, or humming) was noted during bottle feeding. The mothers did not appear to use bottle feeding as a time to participate in a social interaction with their infant. The lack of maternal mutual gaze and verbalizations directed toward the infant could be an explanation for the infants’ attempts to socially engage the researcher.

Persistent pattern: Lack of social interaction during play. Generally, the mothers appeared to lack sensitivity during play. For example, several mothers held a toy out to their infant but then removed the toy when the infant attempted to reach for it. The mothers who told their infant “No” as they attempted to explore a toy with their mouth also appeared to lack maternal sensitivity as the infants protested or cried. However, these mothers may have lacked information on normal child development (e.g., oral motor exploration).

Maternal knowledge of child development as it pertained to play also appeared lacking as mothers held out a toy and told their infants to “play with it,” then sat back and waited. The majority of mothers did not follow their infant’s lead which limited mutual gaze and turn taking opportunities for the infant.

Interviews

The researcher transcribed all interviews, verbatim, from the tape recordings. Total number of interview pages for all eleven participants was 52. As the researcher listened to the taped responses and then read and reread the interviews, similarities began to emerge. Similarities in responses were then reduced to patterns.

Triangulation was then used to confirm the researcher's identification of patterned regularities from the interviews. A second reader, with no knowledge of the population or specific demographics of the participants, was enlisted to read each participants typed interview. The second reader was a Parent Trainer in a nonprofit, residential treatment facility for teen mothers in the Pacific Northwest. For the past 20 years, this woman worked in the capacity of parent trainer for mothers in the treatment facility. As parent trainer, she administered the state licensed day care housed in the treatment facility. In addition, she was a colleague of this researcher, co-teaching a parenting class for the teen mothers who lived there.

After she read the transcripts, a phone conference was arranged with the researcher. Comparisons were made between themes gleaned from the patterns by this researcher and those of the second reader. The pattern headings are in the words of the second reader (T. Sanchez, personal communication, January 23, 2007).

Results Persistent Patterns: Education

“Nobody was passionate about reading.” Only a few participants read for pleasure. Some mothers found the books assigned for English or Reading class to be of high interest. They were animated and excited about these books, and able to remember titles and story plots. However, other than the above examples, reading seemed laborious for the majority of participants, “...they read because they had to.” Additionally, a majority of participants could describe strategies to help them decode words and concepts, but the strategies also appeared to be laborious and context specific (i.e., in reading class).

Reading comprehension was linked to reading ability. As with reading ability, comprehension ability was connected to written text with a high interest level for the participant. Also reported as helpful to reading comprehension was the participants’ knowledge of vocabulary within a text. Knowledge of content vocabulary appeared to increase the participant’s ability to understand meaning without knowing all the words in a reading passage.

“Not focused on reading.” Reading was not the first choice of skills the participants would wish for their infant, to prepare them for success. Only two of the mothers talked about reading to their infants during the interview process. With the reading difficulties of the participant mothers it is not surprising that reading may not be a focus or consistent routine as their infant matures.

“Low communication skills: Not explaining things well.” Both readers felt the majority of participants had difficulty expressing themselves when answering the interview questions. Expressive language difficulties could be a second language issue. However, nine of the participants were born in this country, starting kindergarten in English speaking classrooms. It is more likely that they have language ability issues in their first, as well as, any second language. As one participant told the researcher, “I can’t speak that well, like I don’t know how to say things that well.” Two of the mothers had special education classes as part of their schedule at the time of study participation.

Comprehension could be the reason participants had a preference for teachers who could and would take extra time to explain new information or directions. Reading comprehension difficulties were also reported by most participants. It is likely these participants’ language skills were linked to the receptive language skills needed for classroom and reading comprehension.

Results Persistent Patterns: Family

“Lots of chaos.” The researcher and the second reader shared the same interpretation of the participant’s living situation, tenuous and unstable. Participants were living with godmothers, aunts, and stepfathers. Biological parents were in jail, lost to drugs, and out of the country. The impression of the participants living in “huge families” was actually brothers and sisters brought into the participants

family by a step parent. Often, just a few or none of the extended family were actually living in the same household as the participant.

“Lack of communication.” A family’s ability to communicate with the participant or other family members was, for the majority, an area of concern. The parent(s) had not modeled positive communication skills for listening or providing consistent feedback when pleased or displeased with a participants’ progress or behavior. Family communication was described as yelling in many of the participant interviews.

“Lack of parental support.” Work commitments may have interfered with a guardian’s ability to be available to the participant. Guardians were often described as “working all the time.” Consistent support was not available as described in the following participant quote, “Like we learned our stuff from school, they were always working and everything.”

The second reader and the researcher agreed on the themes that developed from the participant interview responses. Educational histories indicated ongoing difficulty with reading and communication skills. Family histories revealed large, unstable family constellations that lacked support for these young mothers. Guardians were described as unavailable and lacking communication skills.

Quantitative Results

Interrater Agreement

Interrater agreement for total *ICIS* scores (i.e., environment, caregiver/infant behaviors) during feeding and playing was measured on all ($n = 11$) videotaped interactions. Interrater agreement was achieved within one point, in either direction for feeding, playing, and the environment for all 11 participants. On the initial rating of the videotaped interactions the range was 78-100%. A second review of the videotape for feeding with the 78% agreement resulted in 88%-97% agreement between raters, for that tape (K. Murphy, personal communication, 2007).

Interrater agreement for playing and feeding for caregivers and infants ranged from 88-100%. The mean was 95%. The range for interrater agreement for caregiver and infant during feeding was 88-100%. The mean was 86%. Interrater agreement for caregiver and infant during playing was 94-100%. The mean was 88%.

The ICIS

The *ICIS* was scored based upon a five-point numerical scale. One (1) indicated the mother or infant sometimes participated in the desired behaviors (i.e., least desired for positive interaction) and five (5) indicated the mother or infant always participated in the desired behavior (i.e., most desired behavior). Three (3), midpoint of the scale, indicated the mother or infant participated in the desired

behavior some of the time. Possible range for a single participant item score was 1 to 5.

Descriptive statistics were used to identify individual mother and infant behaviors on the *ICIS* for all videotaped participant dyads. Then, results were examined to determine any behavioral trends that emerged when infants and their mothers, identified with at least four risk factors, interacted during playing and feeding. Any item with a mean rating less than 3.0 formed a subset of items indicating less desirable or missing behaviors during mother/infant dyadic interaction.

Table 3 presents the 9/15 maternal interactive behaviors during feeding with a mean rating of less than 3.0. Range of raw scores during feeding, was 1 – 5.

Table 3

Mean Behavior Ratings < 3.0 and Standard Deviation for Mothers During Feeding

<i>ICIS</i> Behavior	<i>M</i>	<i>SD</i>
Initiates Interaction	2.55	.52
Recognizes Signals/Modifies Behaviors	2.91	.70
Takes Turns	1.0	0
Directs Intentional Communication	2.36	.50
Interprets Behavior as Communicative	2.82	.75
Provides Playful Routines	1.45	.52
Modifies Activity to Encourage	1.64	.67
Imitates Behavior	1.27	.47
Displays Positive Verbal	2.73	.65

Table 4 presents the 3/15 maternal interactive behaviors during playing with a mean rating of less than 3.0. Range of raw scores for all participant mothers ($N = 11$) during playing, 1 – 5.

Table 4

Mean Behavior Ratings < 3.0 and Standard Deviation for Mothers During Playing

<i>ICIS</i> Behavior	<i>M</i>	<i>SD</i>
Takes Turns	1.36	.67
Imitates Behavior	1.82	.75
Displays Positive Verbal	2.36	1.10

The Environmental (i.e., Positions for Interaction, Adapts Sensory Events, Provides Equipment), aspects, of Caregiver behaviors on the *ICIS*, had no mean rating score of less than 3.0.

Table 5 presents the 7/14 infant interactive behaviors during playing with a mean rating of less than 3.0. Range of raw scores on the *ICIS* for all participant infants ($N = 11$) during feeding, 1 – 5.

Table 5

Mean Behavior Ratings < 3.0 and Standard Deviation for Infants During Feeding

<i>ICIS</i> Behavior	<i>M</i>	<i>SD</i>
Initiates Interaction	2.64	.81
Takes Turns	1.0	0
Attempts Communication	2.91	.70
Persists in Communicative	2.73	1.0
Attempts to Participate	1.82	1.47
Displays Variety of Playful Behaviors	2.09	.77
Imitates Behavior	1.27	.47
Expresses Positive Verbalizations	2.64	.67

Table 6 presents the 3/14 infant interactive behaviors during playing with a mean rating of less than 3.0. Range of raw scores on the *ICIS* for all participant infants ($N = 11$) during playing, 1 – 5.

Table 6

Mean Behavior Ratings < 3.0 and Standard Deviation for Infants During Playing

<i>ICIS</i> behavior	<i>M</i>	<i>SD</i>
Initiates Interaction	2.73	.90
Takes Turns	1.27	.47
Imitates Behavior	1.82	.98

Rating scores, from the *ICIS* during playing, resulted in three behaviors of concern for mothers, compared to nine during feeding. Three behaviors of concern were also found for infants during playing compared to eight for feeding. Scores indicated maternal and infant behaviors were more positive during playing than feeding.

Playing and Feeding

To provide a more complete picture of maternal behaviors during interaction, raw scores rated during play were combined with raw scores rated during feeding. Means and Standard Deviations for the sum of the combined scores (i.e., 30 items) were calculated. Maternal combined scores for playing and feeding that fell below 3.0 are presented in Table 7. The raw scores during playing and feeding were then combined for the infants (i.e., 28 items). Means and Standard

Deviations were calculated and infant combined scores that fell below 3.0 are also presented in Table 7.

Table 7

*Mean Behavior Ratings <3.0 and Standard Deviation for Combined Scores
(Playing and Feeding)*

Mother Behaviors	<i>M</i>	<i>SD</i>
Takes Turns	1.18	.50
Directs Intentional Communication	2.91	.87
Provides Playful Routines	2.45	1.18
Modifies Activity to Encourage	2.32	.89
Imitates Behavior	1.55	.67
Displaying Positive Verbal	2.55	.88
Infant Behaviors	<i>M</i>	<i>SD</i>
Initiates Interaction	2.69	.84
Takes Turns	1.14	.35
Attempts to Participate	2.82	1.43
Displays Variety of Playful Behaviors	2.91	1.17
Imitates Behavior	1.98	.80

These combined scores were rank ordered for the mothers and then for the infants. Ordering of scores went from those scores with the lowest mean rating below 3.0 (i.e., 1.18 for mothers) to those scores with the highest mean rating below 3.0 (i.e., 2.91 for mothers). The ranking was then divided into thirds. The first three scores represented the most concern, the next third represented moderate concern, and the final third represented mild concern. Table 8 presents *ICIS* items that indicated deficits in interactive behaviors of mother and infant in a context of multiple maternal risk factors.

Table 8

Profile of Concerns: Maternal and Infant Interactive Behaviors

<i>Profile of Concerns Maternal Interactive Behaviors</i>
<i>Most concern</i> Takes Turns Imitates Behavior
<i>Moderate concern</i> Modifies Activity to Encourage Provides Playful Routines
<i>Mild concern</i> Displays Positive Verbal Directs Intentional Communication
<i>Profile of Concerns Infant Interactive Behaviors</i>
<i>Most concern</i> Takes Turns Imitates Behavior
<i>Moderate concern</i> Initiates Interaction Attempts to Participate
<i>Mild concern</i> Displays Variety of Playful Behaviors

CHAPTER V

DISCUSSION

The purpose of this descriptive study using mixed methods was to increase information on the interactive behaviors of caregivers and infants when at least four maternal risk factors (i.e., maternal mental health, literacy level, age, poverty) were present. Within research question 1, information from observations and interviews provided a deeper understanding of cumulative risk as it pertained to this unique population of teen mothers in a public school program. Interactive behaviors of mothers and infants were observed and described within the program. Additionally, interactive behaviors of mothers and infants were videotaped and rated to obtain a numerical score using the *Infant Caregiver Interaction Scale (ICIS)* (Munson & Odom, 2004). This section combines the results from both methods to discuss limitations, implications, recommendations for practice, future research and a conclusion.

Qualitative Discussion

The qualitative discussion first describes maternal interactive behaviors as observed during playing and feeding. Infant interactive behaviors during observation are then discussed. Lastly, additional findings associated with cumulative risk are discussed.

Maternal Interactive Behaviors

Social-emotional development for the infant is nurtured in quality aspects of interaction (Balbernie, 2002; Cripe et al., 1993). Responsive dyadic exchanges between the infant and caregiver (i.e., mother) determines the quality of the interaction (Berk, 2001). During observations of playing and feeding, maternal and infant interactive behaviors linked to later positive development were missing.

Maternal affect was flat and negative (i.e., lacking smiles, warm vocal tones, gentleness) (Guralnick & Neville, 1997). This finding for participant mothers who were identified as living in poverty, mirrored the findings by Dodici et al. (2003) who reported low-income caregivers lacked sensitivity during interaction. This was associated with negative child outcomes for later language and literacy development.

Beginning at birth, the infant is particularly responsive to the mother's voice and face (Owens, 2005). However, mothers with multiple risk factors were found to avoid interaction with their infants (Gelfand & Teti, 1990; Greenspan, 1990). The current study also found an absence of face-to-face social exchanges between mothers and their infants during observation.

Positive maternal behaviors of interaction were associated with predictable and consistent responses to infant cues (Beckwith, 1990; Guralnick & Neville, 1997). However, mothers with multiple risk factors were found to lack consistency in responding to their infants (Gelfand & Teti, 1990; Greenspan, 1990). The current

study found similar results. When interactions were noted, mothers did not respond to or initiate behaviors to continue social exchanges with their infants in a timely predictable manner. Beckwith (1990) described maternal responses that were gratifying to the infant included, talking, smiling, laughing, making eye contact, and touching. However, these positive maternal responses to infant cues were lacking during observations.

Limited mutual eye gaze was noted. There was little eye contact toward the infant before or after the mutual gaze occurred. Without eye contact, reciprocity (i.e., directing social behavior to the dyadic partner) was absent. Two participations, or turns, for mother and infant were absent during interaction. Therefore, observation of synchrony and turn taking were limited maternal interactive behaviors. Current findings support an earlier study by Barnard and Kelly (1990) who found high dyadic synchrony scores were related to large amounts of dyadic interaction occurring in relation to maternal and infant interactive efforts.

The maternal interactive behavior of joint attending was missing. When the mother attends to the infant's affect and follows the infant's gaze to an object of interest, an opportunity is created to expand the interaction by affective cues and commenting on the shared object (Baron-Cohen, 1995; Seifer & Dickstein, 1993). Pan et al. (2005) found mothers identified with low literacy skills had fewer joint attending interactions with their infants. These findings support concerns about the

lack of joint attending within interaction demonstrated by participant mothers, all identified with low literacy levels.

Also missing were positive maternal interactive behaviors during playful routines that included gazing at the infant with positive facial expressions (e.g., laughing) and positive physical routines (e.g., soft tickling) (Munson, 1996). Mothers with negative affect during play have been associated with infants diagnosed with mental health issues (Chatoor, Egan, Getson, Menville, & O'Donnell, 1988). Also supporting study findings, mothers with depressive symptoms were found to play less frequently with their infants and were less likely to produce positive interactive behaviors during play (McLearn, Minkovitz, Strobino, Marks, Hou, 2006; Osofsky & Thompson, 2000).

Maternal behavior of following the infant's lead to continue play was missing, even in novel play situations. Mothers were less likely to modify their behavior or change an activity to allow their infant success during an interaction. This supports earlier findings that mothers who are depressed were controlling during interactions with their infants (Cassidy, Zoccolillo, & Hughs, 1996).

Teen mothers and mothers who are depressed are associated with fewer verbalizations during interaction (Koniak-Griffin & Verzemnieks, 1991; Osofsky & Thompson, 2000). Rather than giving elaborated responses or statements to their children, comments from teen mothers are characterized by short commands or disciplining statements (Osofsky & Thompson, 2000). The present study also noted

lack of frequency for positive maternal verbalizations and verbal elaboration, during interaction observations. Additionally, there was less verbal labeling during interaction in the present study.

Infant Interactive Behaviors During Observation

Infant interactive behaviors were also of concern. Infant affect was described as serious and withdrawn during feeding. A similar description of infant affect was reported for infants of mothers who were depressed (Jones et al., 2001; Pickens & Field, 1993). These infants were described as passive and withdrawn in behavior and affect.

Although visual gaze toward this researcher was noted, infants were not persistent or consistent with their mothers in initiating social cues. Infants did not appear to be visually seeking information from their mother's face. Hernandez-Reif et al. (2002) found 50% of infants whose mothers were depressed, versus 10% of mothers who were not depressed, showed no visual preference for their mother's face and voice compared to a female stranger's face or voice.

As with participant mothers, some infant mutual gaze was noted. Again, however, there was no eye gaze toward the dyadic partner before or after looking at the object. Thus, lack of infant turn taking behaviors was a concern in the present study. Murray et al. (1996) reported similar findings for infants whose mother's were depressed. Those infants were more likely to display disruptive behaviors

during dyadic interactions by stopping an interaction and becoming somber and still, effectively stopping reciprocity as needed for taking turns.

Few infant verbalizations were noted during observations. Infants of mothers identified with multiple risk factors have been linked to lower verbal intelligence scores. Mothers with low literacy skills have been linked to children with less vocabulary production starting at 1 year of age (Pan et al., 2005). During observation, children protested when a physical exchange was harsh (e.g., taking away a toy) or when seeking to meet a physical need met (e.g., more food). Some young children learn to regulate interaction with their communicative attempts; this was considered positive (McCune, Kalmanson, Fleck, Glazewski, 1990).

Multiple Risk

Participants were identified with four risk factors (i.e., mental health, literacy level, age, and poverty). In 1987, Sameroff et al. reported four or more risk factors constituted high risk, resulting in a higher probability of negative impact to child development. More recently, Sameroff and Fiese (2000) designated seven risk factors as the upper limit of the moderate range for cumulative risk. More important, these authors reported a large decline in positive outcomes for the infant as the number of environmental risk factors increased.

While the participants in the current study qualified by having four risk factors, additional factors were identified during interviews. Data analysis identified at least three areas of stress that could be considered additional factors of

risk for mothers. Those factors were social support, relationship conflict, and communication skills.

Social support. An unexpected theme, lack of social support, was evident when participants reported their current living situation. A few mothers discussed seeking alternative living situations compared to their current arrangements. This finding is, however, in agreement with Meisels and Wasik (1990) who found unstable settings were linked to adolescent mothers. Barnet, Joffe, Duggan, Wilson, & Repke (1994) found lack of social support associated with an increase in depressive symptoms. Lack of social support and depression can result in unresponsive maternal interaction and poor cognitive outcomes for children (Barnet et al., 1996).

Many of the teen mothers, and their infants, lived with extended family members who were not biological parents. Biological parents were described as living outside the country, in jail, or often unavailable. With a few exceptions, mothers did not describe one person associated with consistent support.

One mother who was married talked about the father of her baby. However, the majority of the mothers did not mention the father of their infant. The word “we” was not used when describing care of the infant or support within the home setting. Fathers were also missing when mothers spoke of future parenting.

The focus on peer socialization at lunch, rather than focus on the infant, also could be an indicator of the need for social support. The mothers sat in groupings in

the cafeteria that provided positive social interaction for themselves. This was indicated by positive affect and laughter within each grouping. Additionally, peers helped each other with child needs during lunch.

Conflict stress. Inability to sustain positive relationships is a risk factor often linked to teens who are mothers (Hanna, 2001; Pomerleau et al., 2003). Relationship conflict can be stressful for a teen mother. Reporting conflict with someone (e.g., father of the baby) by the mother was associated with higher depression scores (Barnet et al., 1996). Participants reported conflict with parents who did not approve of their pregnancy. For one participant, there was a delay in videotaping by the researcher (approximately 3 or 4 times) because of suspension for a week due to a conflict with a teacher or peer. Some of these were due to physical conflict.

Communication abilities. During the interview, participants needed clarification for many of the interview questions. In addition, comprehension was reported as difficult by a majority of participants when reading or understanding verbal instructions. Conversely, expressive language skills appeared limited as noted during the interview process. The second reader of the interviews also noted expressive language difficulties (T. Sanchez, personal communication, January 23, 2007). Hart and Risley (1995) reported expressive word use and conversations were found to occur less often in low-income families compared to families with higher income levels.

Quantitative Discussion

Quantitative findings also provided information concerning the interactive behaviors of mothers and infants when at least four maternal risk factors (i.e., maternal mental health, literacy level, age, poverty) were present. Deficit ratings for maternal and infant *ICIS* items represented behaviors during dyadic interaction that became a profile of concerns. The profile of concerns for interactive behaviors of the mother responded to the first research question.

The following discussion provides examples of specific maternal behaviors that were limited or missing during interaction (i.e., playing and feeding). Any behavior with a mean rating less than 3.0 formed a subset indicating less desirable behaviors during mother/infant interaction. Maternal behaviors with a mean rating less than 3.0 are presented and discussed according to the three levels of concern (i.e., most, moderate, mild) (i.e., Table 8). Descriptions of interactive behaviors of concern are from the *ICIS* (Munson & Odom, 2004).

Maternal Concerns

For participant mothers, the interactive behaviors of most concern were in turn taking and imitating their infant's behavior while interacting. The *ICIS* defined turn taking as interactions where the dyadic partners alternate directing social behavior to the other partner. This involves reciprocity, demonstrated by two interactive turns for each dyadic partner. Reciprocity was missing. Additionally, mothers were not imitating their infant's behavior. With the lack of imitation,

mothers were not expanding or elaborating on infant behavior. Imitating can be verbal or gesture, but neither form was displayed consistently. Osofsky and Thompson (2000) and others (i.e., Pan et al., 2005) found similar dyadic behavior deficits for mothers with multiple risk factors and mothers identified with low literacy levels.

Within moderate concerns, mothers were not consistently modifying their behaviors or activities to encourage playful routines with their infants. This included the positive maternal behavior of following the child's lead. Mothers did not promote opportunities for interaction nor allow infant response time, behaviors needed to develop playful routines. These behaviors support previous findings for mothers who are depressed (McLearn et al., 2006; Osofsky & Thompson, 2000).

Finally, of mild concern, mothers did not display enough positive verbalizations to give an emotional or comforting response to their infant's cues. Mothers did not display communication skills that allowed them to interpret the communicative intent of the infant. Current findings supported Osofsky and Thompson (2000), who reported mothers who were teens generally initiated verbal interaction less often and were less responsive to their infants compared to mothers who were older. Similar behaviors were also found for mothers identified with low literacy skills and depressive symptoms or both (McLearn et al., 2006; Osofsky & Thompson, 2000). The current study included maternal negative behavior of

directing communication to a third party (i.e., a peer) versus the infant (Munson & Odom, 2004).

Infant Concerns

To respond to the second research question, a profile of concerns for interactive behaviors of the infant was developed. Descriptions and definitions of interactive behaviors were also from the *ICIS* (Munson & Odom, 2004). Behaviors with a mean rating less than 3.0 were structured according to the three levels of concern (i.e., most, moderate, mild).

Interactive behaviors of the most concern for infants, as rated on the *ICIS*, were turn taking and imitating behaviors. Turn taking for the infant is defined, as it is for the mother, as directing social behavior to the other dyadic partner. In the dyadic context, mothers and infants attend to each other and take turns initiating cues and responding to each other. If interaction is available with the mother, the infant should take advantage of the opportunity to take turns within the dyad. However, opportunities to take turns within the dyad were minimal. This concurs with Murray et al. (1996) and Osofsky and Thompson (2000) who found infants of mothers who were teens or mothers with depressive symptoms were less likely to take advantage of reciprocity within the dyad. Imitating and turn taking skills are vital to positive infant development of communication and social skills. These skills are critical to fostering joint attending within the dyad and joint attending is pivotal to pre-literacy development.

Imitation is defined as the infant's ability and frequency in imitating a dyadic partner's behavior. These behaviors of interaction were infrequent or missing according to rating scores. Previous findings for infants whose mothers were depressed support current study findings for infants (Hernandez-Reif et al., 2002).

Initiating interactions and attempts to participate in a playful routine were at the moderate level of infant behavior deficit. Infants can initiate an interaction with a caregiver by voice, eye gaze, or touch. However, there must be engagement between mother and infant for the infant to initiate an interaction. Engagement with mothers was infrequent and inconsistent for the infant. An attempt to participate, for the infant, was not part of a playful routine. The infant must be observed initiating a routine continued by the dyadic partner but it does not require the element of turn taking. Limited maternal availability for engagement also reduced the opportunities for the infant to make an attempt to participate in a routine with the mother. Current findings are in agreement with those by Murray et al. (1996) for infants of depressed mothers.

At a mild level of concern was the infant's inability to display a variety of playful routines. However, as noted above, playful routines were missing or inconsistent for mother and infant during interaction. Current findings are in agreement with those of McLearn et al. (2006) that mothers with depressive symptoms play less often with their infants.

Comparing Behaviors in Two Contexts

Mother and infant interactive behaviors in observation were compared to interactive behaviors in videotaped segments to reveal patterns of similarities and differences. Analysis results indicated more similarities than differences (i.e., mothers 11/15, infants, 12/14) when comparing observation and videotaped deficit behaviors during mother/infant interaction. Current study findings support Kemppinen et al. (2005), who found agreement between 5 minute video and observation ratings of mother/child interaction. Both methods revealed areas of strength and areas of concern within the participant dyads.

Triangulation between data collection methods focused on mother/infant interactive behaviors during feeding. The structured observation was compared to mean scores from the *ICIS* ratings. Similarities and differences of interactive behaviors are presented for the mothers, followed by infant information. Environmental scores are discussed in the section on differences.

Similarities in maternal behaviors during feeding. Collection methods were in agreement that mothers did not initiate interactions through visual, auditory, olfactory, or tactile input. They did not take advantage of opportunities to initiate interaction with their infant.

There was agreement between data sources that mothers did not recognize infants' signals to modify their own behavior. Modification was defined as responding to the cues of the infant by changing a behavior to encourage

interaction. Behaviors needed to modify distress in the infant included, timing, pace, awareness of interactive attempts, and sensitive verbal or physical response. Awareness of infant signals was minimal. When mothers did respond, it was described as lacking warmth. Timing and pace of responding to infant cues was inconsistent and unpredictable. In addition, these behavior deficits impacted turn taking between mother and infant. The reciprocal directing of social behaviors in turn taking was missing in both methods of data analysis.

Positive maternal communication behaviors were lacking during interaction. Maternal attempts to interpret infant communicative signals were missing. Mothers did not follow infant gaze toward an object or action. Mutual gaze was limited and joint attending was absent. In addition, maternal expressive language, so often noted during mutual gaze and joint attending, was missing.

Although feeding allowed for fewer playful routines during interaction, feeding did provide a context in which playful routines between dyadic partners can develop (Munson, 1996). Playful routines however, were not noted during feeding. Mothers did not present food in a playful manner. Modification of maternal behaviors to encourage playful routines was therefore limited as well. Mothers did not change their behavior to follow their infant's lead.

Within the aspect of affect, maternal positive verbals were missing. Mothers infrequently used positive words or positive tone of voice during an activity with their infant. Additionally, positive behaviors of imitation were not noted during

vocal, gestures, or facial expressions. Thus, maternal ability to imitate behaviors of the infants was an interactive area of concern.

Differences in maternal behaviors during feeding. When rating maternal participation in social interactions, differences were noted. Mothers rarely participated in social interactions with their infant in the cafeteria, compared to the *ICIS* mean rating (i.e., 3.09).

Maternal predictability and consistency were not deficit behaviors during interaction when rated using the *ICIS* (i.e., mean rating 3.45). However, in the cafeteria the researcher noted predictability and consistency as areas of concern. During observation mothers did not appear to accurately read and interpret the behaviors of the infant in a predictable or consistent manner.

Additionally, mothers did not appear responsive within 5 seconds to infant behavior cues during observation. However, this was not a deficit area as scored on the *ICIS* (i.e., mean rating 3.27). Observation indicated timing and pacing of maternal interaction, aside from putting food within infant reach, was not rhythmic or consistent.

Finally, the researcher found positive nonverbal maternal affect (i.e., smiling) missing during structured observation. This was not an area of concern as rated on the *ICIS* (i.e., mean rating 3.09). The mother's affect was often neutral (i.e., flat) during interaction, but frowns were noted more often than smiles during structured observations at lunch.

Similarities in infant behaviors of interaction. Agreement between rating methods was closer for infant behaviors (i.e., 12/14) than maternal ratings. Infant initiation of an interaction with their mother was frequently missing during videotaped segments or observation. Infants lacked eye gaze and touch in directing the behaviors of their mother. Infants were observed using protest in an attempt to stop a maternal behavior or to fulfill a need for more food or liquid during lunch.

Turn taking was a behavioral concern for the mother and hence was a concern for the infant as well. Infants did not have the opportunity to direct their mother's behaviors. Rhythms were not established so two turn taking exchanges per dyadic partner were not noted in either method of data collection.

With the exception of protesting, communicative intent was an interactive behavior that was deficient for the infants. Infant communication attempts using eye gaze, gesture, or vocalization were inconsistent or missing during interaction. Infants appeared to have given up on persisting in attempts to communicate with their mothers. At least partially due to lack of maternal response, these infants did not meet the criteria of two or more communicative attempts within the dyad.

Infants did not participate or continue playful routines with their mothers as noted by observation and rated on the *ICIS*. One infant was observed smacking his lips but did not continue the exchange with his mother to demonstrate a playful routine. Positive playful behaviors of smiling, pointing, vocals, or body movement were not noted for infants during lunch.

As noted with their mothers, infants did not imitate their dyadic partner. Therefore frequency of imitating was also a deficit behavior noted during interaction. Similar to a mother's interactive behavior, infants also lacked positive verbalizations during interaction. Infants were not observed laughing or expressing positive vocals during feeding. More often they appeared quiet or protesting.

Differences in infant behaviors during feeding. Participation in interaction was rare for the infants during feeding, as noted during structured observations. On the *ICIS*, infants scored a mean rating of 3.0 for interaction participation. Infants were not tuned into their mother, as she was not available to interact with them during lunch. Like their mothers, the infants did not display nonverbal positive affect (i.e., smiling) while being observed. This compares to a mean score of 3.0 on the *ICIS* for infant expression of positive nonverbal affect.

Environment. All mean rating scores for Environment were above 3.0 during feeding. Positioning of both infant and mother to provide opportunity for interaction had a mean rating of 4.0. Rating for sensory events not interfering with the interaction was 3.91. And not interrupting the interaction to obtain equipment was 4.91. During observation the researcher noted concerns for maternal and infant positioning to promote interaction. This was critical for other interactive behaviors as interactive opportunities with the mother were limited by not facing the infant.

Six mother/infant interactive behaviors of 29 were not in agreement when observation ratings were compared. One of three Environmental areas was not in

agreement. One explanation for this disagreement is that structured observations were in the natural school setting of the cafeteria used daily by mothers and infants when they attend school. Videotaped segments were not within the area of the cafeteria normally used by the mothers when eating lunch. Instead, a small teacher room with an open door visible to the larger eating area was used to videotape feeding for mothers who were not bottle feeding. This room had six round tables that seated six to eight people per table. Mothers were physically closer to their infants at the round tables than they were at the longer and larger oblong tables in the cafeteria, making interaction easier. Additionally, these mothers were aware they were being videotaped. Observation in the regular lunch setting made it easier for the researcher to be unobtrusive, with mothers unaware they were being observed for interactive behaviors during lunch.

Limitations

This was a small study ($N = 11$) with participants gathered from a unique and limited population. The public school program for teen mothers is part of one school district. The small number of participants and geographic limitation of the population hamper the generalizability of this study to other populations of mothers and infants. However, similar programs for teen mothers can be found throughout the country. For example, many similarities were noted between the participant mothers and the mothers housed in the treatment facility in The Pacific Northwest (T. Sanchez, personal communication, January 2007).

Although an attempt was made to reflect the ethnic diversity of this unique school population (i.e., 45% Black, 45% Hispanic, 10% White), the study is not generalizable to a specific culture or ethnic group. McDermott and Varenne (1995), report that cultural adaptation is a cultural continuum, not static but highly variable and changing dependent upon the environment. With the majority of mothers born in this country and the unstable home setting, it would be difficult to determine impact of ethnicity on interaction and cumulative risk. The purpose and scope of the current study did not allow investigation as to where the participant fell on a cultural continuum for their ethnicity.

Researcher bias is considered in the limitation section as it can be a threat to the validity of any qualitative study. According to Gay and Airasian (2000), observer bias refers to invalid information that results from the perspective the researcher brings to the observations. Perspective includes experience, preferences, and attitudes that effect personal reflections and interpretations.

The researcher walked into the school setting with more than 12 years of experience in a residential treatment facility for teen mothers. The researcher, a Speech and Language Pathologist within the public school setting, progressed from being an Early Intervention team member to co-teaching parenting class as part of a grant awarded to the nonprofit residential program. The researcher viewed the observation sites with an understanding of the importance of mother/infant interaction to the social and emotional development of the infant. Additionally, the

researcher was familiar with the potential impact maternal risk factors could have on positive interactive behaviors of mother and infant.

To reduce observer bias, no notes were taken the first few visits to the setting. Field notes, used to describe mother or caregiver/ infant interaction, were taken over a period of 11 months in two separate school years (i.e., 2006-2007). This strategy, staying in the field for a longer period of time, is recommended by Gay and Airasian (2000) to reduce observer bias.

Another strategy to reduce bias was to recognize teen parenting program preferences and to be honest in reviewing any personal biases during observations (Gay & Airasian, 2000). The researcher found a state of objectivity as more contact time was spent with adults and mothers. Researcher field notes focused on mother or caregiver interactive behaviors with an infant, versus, program comparisons.

The use of a tape recorder and verbatim transcriptions were another set of strategies to minimize observer bias. The addition of another reader in reviewing the transcripts provided triangulation to validate qualitative analysis findings from the interviews. Use of a different data source to confirm research findings protected against the occurrence of observer bias while increasing study validity (Gay & Airasian, 2000).

Implications and Recommendations for Practice

Findings and the discussion led to broader concerns about adult understanding of the importance of nurturing interaction skills and program needs

for the dual population of mothers and infants. Additional concerns around service needs, as they pertain to multiple risk, were found for the infant and mother populations. Implications with recommendations are organized as follows: (a) develop positive interactions between mothers and their infants, (b) utilize videotaped interactions, and (c) increase focus on multiple risk populations.

Develop Positive Interactions Between Mothers and Their Infants

Mother/infant interactions were viewed in the school cafeteria and in a classroom during videotaping. The resulting picture was the same for each program setting. Quality aspects of interaction were missing in mother/infant dyads. These findings could put the infant on a negative trajectory for social-emotional developmental outcomes.

A high school program for teen mothers that focuses only on maternal study may miss the opportunity to foster developmentally appropriate relationship experiences for infants and toddlers (White, Graham, & Bradford, 2005). The program required infant and toddler attendance in the on-site day care as part of the teen mother's educational program. Quality early child care environments, besides meeting the daily needs of the infant or toddler, can develop and strengthen the parent-child relationship. "An infant mental health framework in the child care setting can support fragile relationships and provide a secure base for attachments to flourish" (White et al., 2005, p. 42). However, child care in a school program for teen mothers often misses opportunities to nurture the mother/child relationship

(White et al., 2005). Missed opportunities for strengthening the interaction between a teen and her child were noted throughout observations.

With the recommendation for supporting the infant and mother relationship across program settings, infant social-emotional development would be nurtured. Additionally, a common goal of increasing positive interactive behaviors would create a common language, including key concepts, across settings and staff (i.e., relationship building). Common goals would link programs already existing in the high school (i.e., lunch, day care, and in the classroom), reducing the number of missed opportunities to nurture positive interactive behaviors.

Cafeteria. The infants of the teen mothers were not considered a separate population. This was especially evident during lunch in the school cafeteria. Adults on-site focused on maintaining positive behaviors of the mothers in the large group setting. There was not a goal or focus for supporting mother/infant interaction during lunch.

With a program goal of supporting the mother/infant relationship, lunch time could provide an opportunity to model positive interaction skills by the adults available in the cafeteria. By viewing the infants as a population, nutrition and motor development would become relevant in the lunch setting. Availability of age-appropriate utensils and food choices would support oral motor development. On-site adults could monitor infant goals in the same way they monitored the behavior of the mothers during lunch.

Utilize Videotaped Interactions

Interactive behaviors were not being measured for mothers or infants in the school program. Yet, participant mothers appeared excited about being videotaped during playing and feeding with their child for this study. Copies of individual videotaped interactions were important to the mothers who requested them from the researcher. Analysis of videotaped segments indicated specific behaviors problematic to mother and infant dyads. These behaviors of concern were compared to interaction observation results. Triangulation of data methods found more similarities than differences (i.e., 26/32) between observations of mother/infant interactive behaviors compared to ratings from videotaped interactions. In the school setting, videotaping interaction was a viable means to determine specific behaviors of mother and infant during interaction.

Further, any program that provides services to a population of infants whose mothers can be identified with multiple factors of risk should evaluate mother/infant interaction. The use of videotaping to capture caregiver/infant interaction proved an efficient method to analyze specific mother/infant interactive behaviors. Additionally, Kemppinen et al. (2005) reported that any interactive behavioral concerns during interaction (i.e., expression of negative affect) are not expected in a short videotaped segment. Yet, in this study, such behaviors were evident in the five-minute videotaped interactions during feeding and playing. Therefore, such concerns should be taken seriously in the assessment of the dyad.

Use of a rating tool is vital in developing a profile of specific behavioral concerns for the mother and infant in a context of multiple risk. Burns et al. (1997) reported videotaping and then analyzing interaction, using a rating instrument (e.g., *ICIS*) provides a more precise definition of deficit behaviors. A profile of behavioral concerns for mothers and infants confirms the need for program focus and goals to strengthen interactive behaviors. Behaviors of concern then become a baseline for judging effectiveness of program intervention.

Increase Focus on Multiple Risk Populations

Participation criterion for this study was based on identification of four maternal risk factors. Sameroff and Fiese (2000) found an inverse association between low child social-emotional scores and a high number of environmental risk factors (i.e., 4 to 8). Seven maternal risk factors would be usual for this population with the three additional risk factors identified by participant response to the interview questions. The exponential nature of multiple risk indicates an increase in the number of risk factors also increases disproportionately harmful impact on infant development (Sameroff & Chandler, 1975; Sameroff & Fiese, 2000; Sanson et al., 1991). Service providers need not only to identify the multiple risk factors of the population (i.e., mothers and infants), but also provide services as appropriate. Implications for practice and recommendations are presented in this section for infants and then for mothers.

Infants. The infants of the mothers were not recognized as a separate population in need of services beyond what was provided for the teen mothers. Because the infants were not recognized as a separate population, they were underserved. Due to the importance of social-emotional development to positive outcomes for the infant, it is critical to evaluate this developmental domain (Wittmer et al., 1996). Viewing the children of the teen mothers in the high school program as a separate population would drive evaluation and appropriate services for these children who are maturing in a context of multiple risk.

Implementation of a process by which educational staff could identify social-emotional and other developmental concerns to ensure access to early intervention services is critical. Therefore, the first recommendation for this infant population is to screen all domains of development (i.e., social-emotional, gross and fine motor, communication, adaptive, and cognitive), to ensure optimum skill attainment. For example, use of the Ages and Stages Questionnaire (ASQ) (Bricker & Squires, 1999) would provide age-appropriate infant screenings. The ASQ could also serve as a tool to teach mothers about child development.

Programs that serve infant populations susceptible to poor social-emotional developmental outcomes, should also provide curriculum goals to reduce the deleterious effects of maternal environmental risk factors. For example, curriculum goals based on strengthening development of positive interactive behaviors would support positive social-emotional development as the infant matured. Viewing the

children of the teen mothers as a separate population would drive positive and appropriate services for these infants who are maturing in a context of multiple risk.

Mothers. Opportunities to nurture positive maternal behaviors of interaction were missing. The mothers, identified with multiple risk factors would also benefit from a program focus on relationship building with their infants. Modeling and encouraging positive behaviors of interaction could take place in every setting of the teen program. With a focus on positive qualities of interaction, playful routines between mother and infant would increase and strengthen. Following the child's lead, turn taking, joint attending, and positive physical routines would be fostered within positive behaviors of interaction. Playful routines would encourage and then strengthen the interactive behaviors between caregivers and infants.

Use of a parenting program that focuses on increasing quality aspects of interaction for teen mothers is recommended. Identification and rating of videotaped interactions could be used as a baseline. More important, the teen mothers could use their own videotapes as a learning tool in conjunction with a parenting program.

Although the school program focuses on the educational needs of the mother, additional school services could support current goals for high school graduation. Multiple risk factors should be used as an indicator of service needs to mitigate the negative impact of multiple risk factors. Documentation of the number

of maternal risk factors, including social support and relationship conflict, could justify a request for an increase in school services. An increase in school social work services and number of counselors could reduce the impact of multiple risk for mothers and infants. Additional services might be available in the community. For example these young mothers would benefit from a volunteer mentoring program.

Focus on language abilities of mothers. The low language abilities associated with participant mothers may be the result of expressive and receptive language skill ability versus another participant criteria (i.e., maternal depression). The expressive language ability of the participants increased the researchers need for clarification of the participants' answers to interview questions. Previous experience of the researcher as a licensed Speech and Language Pathologist, discussed in the limitations section, indicated receptive and expressive language difficulties are usual in a teen parenting population. The researcher concern about maternal language abilities was validated by the second reader who also expressed concern about the language abilities of the participants (T. Sanchez, personal communication, January 23, 2007).

One participant mother reported receiving Speech and Language services in elementary school. Special Education services were part of the education program, but a Speech and Language therapist was not part of the school staff. Identification of language issues could result in more services for these teens in a school setting.

Services that increased the mother's receptive and expressive abilities could enhance social skills, reducing potential conflict stress. Literacy skills could be enhanced through increased language abilities.

More important, increasing maternal language abilities could benefit the quality of mother/infant interaction within the dyad. Maternal understanding of the importance of verbal input to the infant could increase maternal verbalizations and quality of verbal expression to the infant. The increase in verbalizations could increase the frequency of initiation and participation in social exchanges between mothers and infants.

In summary, the purpose of this study was satisfied by information concerning mother/infant interaction when the caregivers were identified with four factors of risk. Interactive behaviors of mothers and infants pointed to concerns about adult understanding of the importance of nurturing positive interactive behaviors in a context of maternal multiple risk. Cumulative risk factors prompted additional concerns around service needs for the dual population of mothers and infants.

Future Studies

Multiple Risk

The findings of this study suggest a need for additional information about infant social-emotional development within caregiver/infant interaction in a context of multiple risk. For example, does the cumulative nature of risk mean three

factors, instead of four, constitute a threshold of concern for a population because additional factors will be found upon further investigation?

Future studies with populations of different ethnicity could offer additional diversity information on caregiver/infant interaction and how culture affects and is affected by multiple risk. Additional studies using a larger number of participants, across school programs for teen mothers in multiple geographical areas, would increase knowledge about this population, as it pertains to multiple risk and interaction. Such a study would require consideration of the many factors (e.g., country of birth, cultural practices in the home) that determine identification of ethnicity and culture.

High School Programs for Teen Mothers

Are the services at this adolescent school program reflective of other teen programs? Future research into operations and program offerings in other high school programs for teen mothers is important to positive outcomes for the infant population. Findings from those studies could also increase information on service needs for mothers and their infants in a context of multiple risk. Research in this area could identify programs that focus on both mother and infant and provide information for interventions.

Longitudinal studies. While this study provided a rich description of mothers and infants in the school program, it was less than one year long. A long-term study of mother and infant outcomes, in a context of multiple risk, would

benefit the research literature. A long-term study linking negative and positive outcomes to program variables would be beneficial for both populations.

Infants

Research on implementation of Early Intervention services for infant populations developing in a context of multiple risk could provide additional information on the impact of intervention for infant social-emotional development. Future studies that rate interactive behaviors, with the use of videotaped segments and an interaction scale, would benefit all infant populations living in a context of multiple risk. Additionally, future research on staff and parent training as it pertains to multiple risk and increasing positive caregiver/infant interaction would benefit program development for this under served infant population.

Mothers

Finally, future research to determine language levels and skills of teen mothers is recommended. This research would have the potential to increase services for this population, benefiting mothers and infants. Future research on community programs, such as mentoring with professional women, has the potential to buffer the negative impact of multiple risk.

Conclusion

Social-emotional development of the infant is nurtured in caregiver/infant interaction. Maternal and infant behaviors during interaction were described within a context of maternal multiple risk (i.e., maternal age, income, mental health,

literacy level). Findings provide evidence of behaviors problematic to early interaction between mothers with multiple risk factors and their infants. Identification of specific behaviors of concern was found with qualitative and quantitative methods.

Analysis of qualitative information described additional stressors (i.e., lack of social support, relationship conflict, and low language abilities) or risk factors of the mother in addition to criteria for participation. With identification of seven factors of risk, the potential for negative outcomes for infant development increases. Recognition of the impact of maternal multiple risk to infant development should drive evaluation and service needs for this under served population. Videotaping interaction during playing and feeding, then rating mother/infant behaviors would provide a baseline that allowed measurement of skill development in infants and mothers. Consistent program goals across settings would nurture relationship development between adults and infants. With the understanding of early social-emotional development within a context of multiple risk it may be possible to identify methods to intervene, thus leading to more positive developmental outcomes for infants.

REFERENCES

- Balbernie, R. (2002). An infant in context: Multiple risks, and a relationship. *Infant Mental Health Journal*, 23(3), 329-341.
- Barnard, K. E., & Kelly, J. E. (1990). Assessment of parent-child interaction. In S. J. Meisels & J. P. Shonkoff (Eds.), *Handbook of early childhood intervention* (pp. 278-302). New York: Cambridge University Press.
- Barnet, B., Joffe, A., Duggan, A.K., Wilson, M. D., & Repke, J. T. (1996). Depressive symptoms, stress, and social support in pregnant and postpartum adolescents. *Archives of Pediatric Adolescent Medicine*, 150, 64-69.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press.
- Barton, M. L., & Robins, D. (2000). Regulatory disorders. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 332-349). New York: Guilford Press.
- Beckwith, L. (1990). Adaptive and maladaptive parenting: Implications for intervention. In S. J. Meisels & J. P. Shonkoff (Eds.), *Handbook of early childhood intervention* (pp. 53-77). Cambridge, MA: University Press.
- Beckwith, L. (2000). Prevention science and prevention programs. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 439-456). New York: Guilford Press.
- Bendersky, M., & Lewis, M. (1994). Environmental risk, biological risk, and developmental outcome. *Developmental Psychology*, 30, 484-494.
- Benham, L. A. (2000). The observation and assessment of young children including use of the infant-toddler mental status exam. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 332-349). New York: Guilford Press.
- Benoit, D., & Parker, K. (1994). Stability and transmission of attachment across three generations. *Child Development*, 65, 1444-1456.

- Berk, L. E. (2001). *Development through the lifespan* (2nd ed.). Boston: Allyn and Bacon.
- Berk, L. E. (2002). *Infants and children: Prenatal through middle childhood* (4th ed.). Boston: Allyn and Bacon.
- Berlin, L. J., Brady-Smith, C., & Brooks-Gunn, J. (2002). Links between childbearing age and observed maternal behaviors with 14-month-olds in the early head start research and evaluation project. *Infant Mental Health Journal*, 23, 104-129.
- Bogdan, R. C., & Biklen, S. K. (2003). *Qualitative research for education: An introduction to theories and methods* (4th ed.). Boston: Allyn and Bacon.
- Bowlby, J. (1982). *Attachment and loss: Vol. 1. Attachment* (2nd ed.). New York: Basic Books.
- Brennan, P. A., Hammen, C., Andersen, M. J., Bor, W., Najman, J. M., & Williams, G. M. (2000). Chronicity, severity, and timing of maternal depressive symptoms: Relationships with child outcomes at age 5. *Developmental Psychology*, 36, 759-766.
- Bricker, D., & Squires, J. (1999). *Ages and stages questionnaire: A parent-completed, child monitoring system* (2nd ed.). Baltimore: Brookes Publishing Co., Inc.
- Buchholz, E., & Korn-Burszty, C. (1993). Children of adolescent mothers: Are they at risk for abuse? *Adolescence*, 28, 361-383.
- Burchinal, M. R., Follmer, A., & Bryant, D. M. (1996). The relations of maternal social support and family structure with maternal responsiveness and child outcomes among African American families. *Developmental Psychology*, 32, 1073-83.
- Burchinal, M. R., Roberts, J. E., Hooper, S., & Zeisel, S. A. (2000). Cumulative risk and early cognitive development: A comparison of statistical risk models. *Developmental Psychology*, 36, 793-807.
- Burns, K. A., Chethik, L., Burns, W. J., & Clark, R. (1997). The early relationship of drug abusing mothers and their infants: An assessment at eight to twelve months of age. *Journal of Clinical Psychology*, 53(3), 279-287.

- Buss, A. K., & Goldsmith, H. H. (1998). Fear and anger regulation in infancy: Effects on the temporal dynamics of affective expression. *Child Development, 69*, 359-374.
- Butterfield, P. M. (1996). The partners in parenting education program: A new option in parent education. *Zero to Three, 17*(1), 3-10.
- Campbell, S., Cohn, J., & Meyers, T. (1995). Depression in first-time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology, 31*(3), 349-357.
- Carlson, E. A., & Sroufe, L. A. (1995). Contribution of attachment theory to psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and method* (pp. 3-22). New York: A Wiley-Interscience Publication.
- Carnegie Corporation. (1996). *Great transitions: Carnegie Council on adolescent development* (abridged version). New York: Author.
- Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. *Monographs of the Society for Research in Child Development, 59*, 228-249.
- Cassidy, B., Zoccolillo, M., & Hughs, S. (1996). Psychopathology in adolescent mothers and its effects on mother-infant interactions: A pilot study. *Canadian Journal of Psychiatry, 41*(6) 379-384.
- Causby, V., Nixon, C., & Bright, J. (1991). Influences on adolescent mother-infant interactions. *Adolescence, 26*, 619-630.
- Chamberlin, R. W. (1994). Primary prevention: The missing piece in child development legislation. In R. J. Simeonsson (Eds.), *Risk, resilience and prevention* (pp. 33-52). Baltimore: Paul H. Brooks Publishing Co.
- Chatoor, I., Egan, J., Getson, P., Menville, E., & O'Donnell, R. (1988). Mother-infant interactions in infantile anorexia nervosa. *Journal of American Academy of Child and Adolescent Psychiatry, 27*, 535-540.
- Chazan-Cohen, R., Jerald, J., & Stark, D. (2001). A commitment to supporting the mental health of our youngest children. *Zero to Three, 22*, 4-12.

- Children's Defense Fund. (2006). *National data: Federal poverty levels*. Retrieved December 10, 2006, from <http://www.childrensdefense.org/>
- Chu, L., & Powers, P. A. (1995). Synchrony in adolescence. *Adolescence*, 30, 453-459.
- Cicchetti, D. (1990). A historical perspective on the discipline of developmental psychopathology. In J. Rolf, A. Masten, D. Cicchetti, K. Nuechterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 2-28). New York: Cambridge University Press.
- Cicchetti, D., & Cohen, D. J. (1995). Perspectives on developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and method* (pp. 3-22). New York: A Wiley-Interscience Publication.
- Clark, R. (1985). *Parent-child early relational assessment manual*. Madison: University of Wisconsin Medical School, Department of Psychiatry.
- Clarke-Stewart, A. (1975). Interactions between mothers and their young children: Characteristics and consequences. *Monographs of the Society for Research in Child Development*, 38.
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. London: Sage Publications.
- Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Cripe, J., Slentz, K., & Bricker, D. (1993). *AEPS curriculum for birth to three years*. Baltimore: Paul H. Brookes Publishing Co.
- Crockenberg, S., & Leerkes, E. (2000). Infant social and emotional development in family context. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 332-349). New York: Guilford Press.
- Daly, T. C. (2005). Reading enrichment: Creating a love of books that lasts a lifetime. *Zero to Three*, 26(1), 19-25.

- DeTemple, J. M., & Tabors, P. O. (1994). *Styles of interaction during a book reading ask: Implications for literacy intervention with low-income families*. Paper presented at the National Reading Conference Annual Meeting, San Diego, CA. (ERIC Document Reproduction Service No. ED 379 615)
- DeWolf, M. S., & van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*(4), 571-591.
- Dodge, K. A. (2000). Conduct disorder. In A. J. Sameroff, M. Lewis, & S. M. Miller (Eds.), *Handbook of developmental psychopathology* (2nd ed., pp. 447-466). New York: Plenum Publishers.
- Dodici, B., Draper, D. C., & Peterson, C. A. (2003). Early parent-child interactions and early literacy development. *Topics in Early Childhood Special Education, 23*(3), 124-136.
- Duncan, G. J., Brookes-Gunn, J., & Klebanov, P. K. (1994). Economic deprivation and early childhood development. *Child Development, 65*, 296-318.
- Edmondson, R., & Smith, T. (1994). Temperament and behavior of infants prenatally exposed to drugs: Clinical implications for the mother-infant dyad. *Infant Mental Health Journal, 15*, 368-379.
- Eisenberg, N., & Losoya, S. (1997). Emotionality and regulation predict social competence, problem behavior. *Brown University Child and Adolescent Behavior Letter, 13*, 1-3.
- Emde, R. N., & Robinson, J. (2000). Guiding principals for a theory of early intervention: A developmental-psychoanalytic perspective. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 160-278). Cambridge, MA: University Press.
- Erikson, E. (1950). *Childhood and society*. New York: Norton.
- Fewell, R. R., & Wheeden, C. A. (1998). A pilot study of intervention with adolescent mothers and their children: A preliminary examination of child outcomes. *Topics in Early Childhood Special Education, 18*, 18-26.

- Field, T. M. (1980). Interactions of preterm and term infants with lower- and middle-class teenage and adult mothers. In T. M. Field, S. Goldberg, D. Stern, & A. M. Sostek (Eds.), *High-risk infants and children* (pp. 113-132). London: Academic Press.
- Field, T. M. (1998). Maternal depression effects on infants and early intervention. *Preventative Medicine, 27*, 200-203.
- Field, T., Diego, M., Hernandez-Reif, M., Schanberg, S., Kuhn, C., Yando, R., et al. (2002). Prenatal depression effects on the fetus and neonate in different ethnic socio-economic status groups. *Journal of Reproductive and Infant Psychology, 30*, 149-157.
- Fiese, B., Poehlmann, J., Irwin, M., Gordon, M., & Curry-Bleggi, E. (2001). A pediatric screening instrument to detect problematic infant-parent interactions: Initial reliability and validity in a sample of high- and low-risk infants. *Infant Mental Health Journal, 22*(4), 463-478
- Florida Department of Education. (n.d.). *Just read Florida!* Retrieved November 6, 2005, from <http://www.justreadflorida.com/>
- Francasso, M. P., Lamb, M. E., Scholmerich, A., & Leyendecker, B. (1997). The ecology of mother-infant interaction in euro-American and immigrant Central American families living in the United States. *International Journal of Behavioral Development, 20*, 207-217.
- Garcia Coll, C., & Magnuson, K. (2000). Cultural differences as sources of developmental vulnerabilities and resources. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 94-114). Cambridge, MA: University Press.
- Gay, L. R., & Airasian, P. (2000). *Educational research* (6th ed.). Upper Saddle River, NJ: Prentice-Hall.
- Gelfand, D. M., & Teti, D. M. (1990). The effects of maternal depression on children. *Child Psychology Review, 10*, 329-353.
- Greenspan, S. I. (1990). Comprehensive clinical approaches to infants and their families: Psychodynamic and developmental perspectives. In S. J. Meisels & J. P. Shonkoff (Eds.), *Handbook of early childhood intervention* (pp. 150-173). New York: Cambridge University Press.

- Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotional regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development, 67*, 928-941.
- Guralnick, M. J. (1997). Second-generation research in the field of early intervention. In M. J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 3-23). Baltimore: Paul H. Brooks.
- Guralnick, M. J., & Neville, B. (1997). Designing early intervention programs to promote children's social competence. In M. J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 549-576). Baltimore: Paul H. Brooks.
- Hann, D., Osofsky, J., & Culp, A. (1996). Relating the adolescent mother-child relationship to preschool outcomes. *Infant Mental Health Journal, 17*, 302-309.
- Hanna, B. (2001). Negotiating motherhood: The struggles of teenage mothers. *Journal of Advanced Nursing, 34*(4), 456-465.
- Hart, B., & Risley, T. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brooks.
- Hernandez-Reif, M., Field, T., Diego, M., & Largie, S. (2002). Depressed mothers' newborns show longer habituation and fail to show face/voice preference. *Infant Mental Health Journal, 23*, 643-653.
- Howes, C., & Wishard, A.G. (2004). Linking shared meaning to emergent literacy: Looking through the lens of culture. *Zero to Three, 25*(1), 10-15.
- Im, J., Merrill, S., Osborn, C., Martins, J., Striniste, N., Sanchez, S., et al. (2004). Stories change a person's heart: Zero to three's literacy, learning, and life initiative. *Zero to Three, 25*, 23-28.
- Isabella, R. (1993). Origins of attachment: Maternal interactive behavior across the first year. *Child Development, 64*, 605-621.
- Ispa, J. M., Fine, M. A., & Thornburg, K. R. (2002). Maternal personality as a moderator of relations between difficult infant temperament and attachment security in low-income families. *Infant Mental Health Journal, 23*, 130-144.

- Izard, C. E., & Harris, P. (1995). Emotional development and developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1: Theory and method* (pp. 3-22). New York: A Wiley-Interscience Publication.
- Johnson, H. L., & Rosen, T. S. (1990). Mother-infant interaction in a multirisk population. *American Journal of Orthopsychiatry*, *60*(2), 281-297.
- Jones, N. A., Field, T., Fox, N. A., Davalos, M., & Gomez, C. (2001). EEG during different emotions in 10-month-old infants of depressed mothers. *Journal of Reproductive and Infant Psychology*, *19*, 295-312.
- Kelly, J. F., & Barnard, K. E. (2000). Assessment of parent-child interaction: Implications for early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 258-289). Cambridge, MA: University Press.
- Kelly, S. A., & Jennings, K. D. (2003). Putting the pieces together: Maternal depression, maternal behavior, and toddler helplessness. *Infant Mental Health Journal*, *24*(1), 74-90.
- Kemppinen K., Kumpulainen, K., Rasanen, E., Moilanen, I., Ebeling, H., Hiltunen, P., et al. (2005). Mother-child interaction on video compared with infant observation: Is five minutes enough time for assessment? *Infant Mental health Journal*, *26*(1), 69-81.
- Kennedy, C. H., & Itkonen, T. (1996). Social relationships, influential variables, and change across the life span. In L. K. Kogel, R. L. Kogel, & G. Dunlap (Eds.), *Positive behavioral support* (pp. 54-75). Baltimore: Paul H. Brookes.
- Kochanska, G. (1995). Children's temperament, mother's discipline, and security of attachment: Multiple pathways to emerging internalizations. *Child Development*, *66*, 597-615.
- Koniak-Griffin, D., & Verzemnieks, I. (1991). Effects of nursing intervention on adolescents' maternal role of attainment. *Issues in Comprehensive Pediatric Nursing*, *14*, 121-138.
- Lester, B. M. (1992). Infants and their families at risk: Assessment and intervention. *Infant Mental Health Journal*, *13*, 54-66.

- Lewis, M. (2000). Toward a development of psychopathology: Models, definitions, and prediction. In A. Sameroff, M. Lewis, & S. Miller (Eds.), *Handbook of developmental psychopathology* (2nd ed., pp. 3-21). New York: Plenum Publishers.
- Lewis, M., & Ban, P. (1977). Variance and invariance in the mother-infant interaction: A cross-cultural study. In P. H. Leiderman, S. R. Tulkin, & A. Rosenfeld (Eds.), *Culture and infancy: Variations in the human experience* (pp. 329-355). New York: Academic Press.
- Lyons-Ruth, K., Easterbrooks, M. A., & Cibelli, C. D. (1997). Infant attachment strategies, infant mental lag, and maternal depressive symptoms: Predictors of internalizing and externalizing problems at age 7. *Developmental Psychology*, 33, 681-692.
- Lyons-Ruth, K., & Zeanah, C. H., Jr. (1993). The family context of infant mental health: Affective development in the primary caregiving relationship. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (pp. 14-37). New York: Guilford Press.
- MacWhinney, B. (1991). *The Childes project: Tools for analyzing talk*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- McCullum, J. A., & Hemmeter, M. L. (1997). Parent-child interaction intervention when children have disabilities. In M. J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 549-576). Baltimore: Paul H. Brooks.
- McCormick, M. C., Grimacer, S. L., & Snobol, A. M. (1991). Very low birth weight children: Behavior problems and school difficulty in a national sample. *The Journal of Pediatrics*, 117, 687-693.
- McCune, L., Kalmanson, B., Fleck, M. B., & Glazewski, J. S. (1990). An interdisciplinary model of infant assessment. In S. J. Meisels & J. P. Shonkoff (Eds.), *Handbook of early childhood intervention* (pp. 219-245). New York: Cambridge University Press.
- McDermott, R., & Varenne, H. (1995). Culture as disability. *Anthropology and Education Quarterly*, 26, 324-348.
- McLane, J. B., & McNamee G. D. (1991). The beginnings of literacy. *Zero to Three*, 7(10), 1-8.

- McLaughlin, B., August, D., & Snow, C. (2000). *Vocabulary knowledge and reading comprehension in English language learners*. (Final performance report Award No. R306F60077-97). Submitted to the Executive Office of Educational Research and Improvement U.S. Department of Education. Washington: DC. (ERIC Document Reproduction Service No. ED 457 696)
- McLean, L. (1990). Communication development in the first two years of life: A transactional process. *Zero to Three, 11*, 13-19.
- McLearn, K., Minkovitz, C., Strobino, D., Marks, E., & Hou, W. (2006). Maternal symptoms at 2 to 4 months post partum and early parenting practices. *Archives of Pediatric Adolescent Medicine, 160*, 279-284.
- McLeod, J. D., & Shanahan, M. J. (1996). Trajectories of poverty and children's mental health. *Journal of Health and Social Behavior, 37*, 207-220.
- McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61*, 311-346.
- McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53*(2), 185-204.
- Meisels, S., & Fenichel, E. (Eds.). (1996). *New visions for developmental assessment*. Arlington, VA: National Center for Clinical Infant Programs, Zero to Three.
- Meisels, S., & Wasik, B. A. (1990). Who should be served? In S. J. Meisels & J. P. Shonkoff (Eds.), *Handbook of early childhood intervention* (pp. 605-632). New York: Cambridge University Press.
- Munson L. J. (1996). Parent-infant interaction during play and feeding for infants who are typically developing and for infants who have a feeding problem, and a developmental delay (Doctoral dissertation, Vanderbilt University, 1996). *Dissertation Abstracts International, 51*, 11.
- Munson, L. J., & Odom, S. L. (1995). *Infant-caregiver interaction scale (ICIS) manual*. Unpublished manuscript.
- Munson, L. J., & Odom, S. L. (1996). Rating scales measure parent-infant interaction. *Topics in Early Childhood Special Education, 16*(1), 1-25.

- Munson, L. J., & Odom, S. L. (2004). *Infant-caregiver interaction scale (ICIS) manual* (Rev. ed.). Unpublished manuscript.
- Murray, L., Fiori-Cowley, A., Hooper, R., & Cooper, P. (1996). The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcome. *Child Development, 67*, 2512-2526.
- Nolen-Hoeksema, S., Wolfson, A., Mumme, D., & Guskin, K. (1995). Helplessness in children of depressed and nondepressed mothers. *Developmental Psychology, 31*, 377-387.
- O'Connor, M., Sigman, M., & Kasari, C. (1992). Attachment behavior of infants exposed prenatally to alcohol: Mediating effects of infant affect and mother-infant interaction. *Development and Psychopathology, 4*, 243-256.
- Osofsky, J., & Thompson, M.D. (2000). Adaptive and maladaptive parenting: Perspectives on risk and protective factors. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 54-75). Cambridge, MA: University Press.
- Owens, R. E. (2005). *Language development: An introduction* (6th ed.). Boston: Allyn and Bacon.
- Pan, B. A., Rowe, M. L., Singer, J. D., & Snow, C. E. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76*(4), 763-782.
- Parker, S. J., & Zuckerman, D. S. (1990). Therapeutic aspects of the assessment process. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (pp. 350-370). Cambridge, MA: University Press.
- Parlakian, R. (2004). Early literacy and very young children. *Zero to Three, 25*(1), 37-44.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Newbury Park, CA: Sage Publications.
- Phinney, J. S. (1993). A three-stage model of ethnic identity development in adolescence. In M. E. Bernal & G. P. Knight (Eds.), *Ethnic identity: Formation and transmission among Hispanics and other minorities* (pp. 61-79). Albany, NY: State University Press.

- Pickens, J., & Field, T. (1993). Facial expressivity in infants of depressed mothers. *Developmental Psychology, 29*, 986-988.
- Pomerleau, A., Scuccimarri, C., & Malcuit, G. (2003). Mother-infant behavioral interactions in teenage and adult mothers during the first six months postpartum: Relations with infant development. *Infant Mental Health Journal, 24*(5), 495-509.
- Prizant, B. M., Wetherby, A. M., & Roberts, J. E. (2000). Communication problems. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 282-297). New York: Guilford Press.
- Raag, T., Malphurs, J., Field, T., Pelaez-Nogueras, M., Martinez, A., Pickens, J., et al. (1997). Moderately dysphoric mothers behave more positively with their infants after completing the BDI. *Infant Mental Health Journal, 18*, 394-405.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Journal of Applied Psychological Measures, 1*(3), 385-401.
- Radloff, L. S. (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149-165.
- Ramey, C. T., & Ramey, S. L. (1992). Effective early intervention. *Mental Retardation, 6*, 337-345.
- Randolph, S. M., & Koblinsky, S. A. (2001). The sociocultural context of infant mental health. *Zero to Three, 22*, 29-38.
- Riverside Publishing. (n.d.). *Reading first*. Retrieved November 6, 2005, from <http://www.riverpub.com/nclb/readingfirst.html>
- Robinson, J. L., & Emde, R. N. (2004). Mental health moderators of early head start on parenting and child development: Maternal depression and relationship attitudes. *Parenting Science and Practice, 4*(1), 72-97.
- Rosenkoetter, S. E., & Knapp-Philo, J. (2005). Learning to read the world: Literacy in the first 3 years. *Zero to Three, 25*(1), 4-9.

- Rothbart, M. K. (1996). Social development. In M. J. Hanson (Ed.), *Atypical infant development* (pp. 273-310). Austin, TX: Pro-Ed.
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: *Origins and outcomes*. *Journal of Personality and Social Psychology*, *78*, 122-135.
- Rothenberg, A. (2005). Bryan's first 2 years: Mom, a group foster care home, and an IFSP. *Zero to Three*, *25*(4), 22-29.
- Rouse, C., Brooks-Gunn, J., & McLanahan, S. (2005). Introducing the issue. *The Future of Children*, *15*(1), 5-13.
- Ryan, R. M., Deci, E. L., & Grolnick, W. S. (1995). Autonomy, relatedness, and the self: Their relation to development and psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and method* (pp. 3-22). New York: A Wiley-Interscience Publication.
- Sameroff, A. J., & Chandler, M. J. (1975). Reproductive risk and the continuum of caretaking casualty. In F. D. Horowitz (Ed.), *Review of child development research* (pp. 187-244). Chicago: University of Chicago.
- Sameroff, A. J., & Fiese, B. H. (2000). Transactional regulation: The developmental ecology of early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 135-159). Cambridge, MA: University Press.
- Sameroff, A. J., & Seifer, R. (1990). Early contributors to developmental risk. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 52-66). Cambridge, MA: University Press.
- Sameroff, A. J., Seifer, R., Barocas, R., Zax, M., & Greenspan, S. (1987). IQ scores of 4-year-old-children: Social-environmental risk factors. *Pediatrics*, *79*, 343-350.
- Sanson, A., Oberlaid, F., Pedlow, R., & Prior, M. (1991). Risk indicators: Assessment of infancy predictors of pre-school behavioral maladjustment. *Journal of Child Psychology and Psychiatry*, *32*, 609-626.

- Seifer, R., & Dickstein, S. (1993). Parental mental illness and infant development. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (pp. 120-142). New York: Guilford Press.
- Seifer, R., & Dickstein, S. (2000). Parental mental illness and infant development. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 145-160). New York: Guilford Press.
- Shaw, D. S., & Vondra, J. I. (1995). Infant attachment security and maternal predictors of early behavior problems: A longitudinal study of low-income families. *Journal of Abnormal Child Psychology*, *23*, 335-357.
- Shaw, D. S., Winslow, E. B., Owens, E. B., Vondra, J. I., Cohn, J. F., Bell, R. Q., et al. (1998). The development of early externalizing problems among children from low-income families. *Journal of Abnormal Child Psychology*, *26*, 95-108.
- Shiono, P. H., & Berhman, R. E. (1995). Low birth weight: Analysis and recommendations. *The Future of Children*, *5*, 4-19.
- Shonkoff, J. P., & Marshall, P. C. (2000). The biology of developmental vulnerability. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 35-53). Cambridge, MA: University Press.
- Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Stern, D. (1985). *The interpersonal world of the infant*. New York: Basic Books.
- Strickland, D. S. (1990). Emergent literacy: How young children learn to read and write. *Educational Leadership*, *47*, 18-23.
- Strickland, D. S., & Shanahan T. (2004). Laying the groundwork for Literacy. *Educational Leadership*, *61*, 74-77.
- Tarullo, L. B., DeMulder, E., Ronsaville, D., Brown, E., & Radke-Yarrow, M. (1995). Maternal depression and maternal treatment of siblings as predictors of child psychopathology. *Developmental Psychology*, *31*, 395-405.

- Teti, D. M., Gelfand, D. M., Messinger, D. S., & Isabella, R. (1995). Maternal depression and the quality of early attachment: An examination of infants, preschoolers, and their mothers. *Developmental Psychology, 31*, 364-376.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. New York: Brunner/Mazel.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development, 59*(Serial No. 240), 25-52.
- Tjossem, T. D. (1976). Early intervention: Issues and approaches. In T. D. Tjossem (Ed.), *Intervention strategies for high risk infants and young children* (pp. 3-33). Baltimore: University Park Press.
- United States Department of Agriculture. (2006). *National School Lunch Program*. Retrieved January 3, 2007, from <http://www.usda.gov/>
- Webster-Stratton, C., & Reid, M. J. (2004). Strengthening social and emotional competence in young children: The foundation for early school readiness and success. *Infants and Young Children, 17*, 96-113.
- White, B. A., Graham, M., & Bradford, S. K. (2005). Children of teen parents: Challenges and hope. *Zero to Three, 25*(4), 42-48.
- Wiersma, W. (2000). *Research methods in education: An introduction* (7th ed.) Boston: Allyn and Bacon.
- Wilcox, H., Field, T., Prodromidis, M., & Scafidi, F. (1998). Correlations between the BDI and CES-D in a sample of adolescent mothers: Beck depression inventory, Center for Epidemiologic Studies Depression Scale. *Adolescence, 4*, 241-250.
- Wittmer, D., Doll, B., & Strain, P. (1996). Social and emotional development in early childhood: The identification of competence and disabilities. *Journal of Early Intervention, 20*, 299-318.
- Wolery, M. (2000). Behavioral and educational approaches to early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 54-75). Cambridge, MA: University Press.

- Wright, C. A., George, T. P., Burke, R., Gelfand, D. M., & Teti, D. M. (2000). Early maternal depression and children's adjustment to school. *Child Study Journal, 30*, 153-169.
- Yoshikawa, H. (1995). Long-term effects of early childhood programs on social outcomes and delinquency. *The Future of Children, 5*, 51-57.
- Zahn-Wexler, C., Cummings, E. M., McKnew, D. H., Davenport, Y. B., & Radke-Yarrow, M. (1984). Aggression and social interaction in young children with a manic depression parent. *Child Development, 48*, 555-562.
- Zeanah, C. H. (Ed.). (2000). *Handbook of infant mental health*. New York: Guilford Press.
- Zeanah, C. H., & Boris, N. W. (2000). Disturbances and disorders of attachment in early childhood. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 353-368). New York: Guilford Press.
- Zeanah, C. H., Mammen, O. K., & Lieberman, A. F. (1993). Disorders of attachment. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (pp. 332-349). New York: Guilford Press.
- Zeanah, C. H., & Zeanah, P. D. (2001). Towards a definition of infant mental health. *Zero to Three, 22*(1), 13-20.

APPENDIX A

INFORMED CONSENT FORM FOR THE TEEN MOTHER

Informed Consent Form for the Teen Mother

BE PART OF AN IMPORTANT PROJECT

I am Deidre (De) Winder, a doctoral student at Portland State University, doing a study on teen mothers and their children. What you have to say is important and could help other schools provide services for mothers and their children.

What Will I Have To Do?

If you decide to take part in this project I will interview you at school. That means I will ask you to talk with me about two main topics;

- * what you like and don't like about school and
- * about growing up in your family when you were a little girl. This interview should take about 45 to 60 minutes depending on how long you feel like talking.
- * also, you will be asked to answer a survey (read to you) that contains about 20 questions.

I would also like to videotape you:

- (1) while playing with your child
- (2) feeding your child lunch

This videotaping will happen at two separate times and each time should take about 15 minutes.

Are There Any Risks?

Sometimes talking about school or experiences that happened growing up can be very personal. You do not have to take part in this study. If you agree to take part you may feel uncomfortable, like angry or sad, because of some memories that come up as you talk to me. You don't have to answer any questions you don't want to, or talk about any thing you don't want to talk about. And at any time if you don't feel like going on we will stop. If you are upset after the interview and need to talk with someone, you can ask to see your school counselor.

What Will I Get In Return?

1. A gift certificate for taking part in the study.

You'll receive a gift certificate after you are finished participating in the study, no matter at what point in the study you decide to stop. The money is a way of saying thank-you for your time. You will get a \$10 gift certificate for trying to participate in the study. You will get a \$25 gift certificate if you finish all the parts of the study (interview and two videotapings).

2. Knowing you may be helping others.

We can learn from you by what you have to tell us. This may make it easier and provide better services for other mothers who are teens and going to school. Many people feel good when they know what they did may help others.

What Are You Doing To Protect Me?

Your privacy is very important. I have done many things to protect you:

- * I won't tell anyone if you take part in the study or not.
- * You will be interviewed alone. What you tell me will be kept private, even from your family and friends.
- * Your name and all the names of your family and what you tell me in the interview will be kept private to the extent allowed by law. Kept private means that the names of people who take part in the study will not be given to anyone else. No names will be seen on any papers or videos. It also means that I will write everything in such a way that no one can guess or know what you and I talked about. If I see or hear any information about abuse or neglect, that means any harm to you or your child, I am ethically required to report it to your school counselor to keep you safe.
- * Your name and other personal information, which I need to know in order to keep track of who I talk to, will be kept in a locked file cabinet or in a locked file on the computer so that no one will be able to see it. For example this form (which has your name on it) will be kept in a locked file cabinet.
- * When I write or talk about what I have learned in this study, I will leave things out so no one will be able to tell who I am talking about.

Any Questions?

If you have any questions about this study, this form, or the interview, you can talk to your interviewer (Deidre Winder at 390-2094). You can also contact the Chair of the Human Subjects Committee of Portland State University about your rights as a research participant (someone who takes part in a study). Hours are (9:00 a.m. to 5:00 p.m. The office is located at Portland State University, Cramer Hall, Room 111, 1721 SW Broadway, Portland, OR 97201. The telephone number is (503) 725-4288, or send an e-mail to: hsrrc@lists.pdx.edu.

If I Sign What Does It Mean?

This is a consent form, Your signature below means that:

- * You have read (had read to you) and understand what this form says.

- * You are willing to take part in the study by talking with me in an interview, answering survey questions and being videotaped with your child during playing and feeding.
- * You know that you do not have to take part in this study. And even if you agree, you can change your mind and stop at any time. No problem.
- * You know that taking part in this study has nothing to do with the care you get at LAMP. If you agree to take part or if you say no, staff will not know and if they did it won't matter. They will treat you just the same.
- * You know the school may share some information contained in your cum folder with me.
- * You will get a copy of this form to keep for yourself.

Participant Signature

Date

Participant name, printed

Interviewer Signature

Date

Interviewer name, printed

APPENDIX B

INFORMED CONSENT FORM FOR THE INFANT FROM
THE TEEN MOTHER

Informed Consent Form for the Infant from the Teen Mother**Infant (name)** _____**Mother Consent Form-If I sign, what does it mean?**

This is a consent form and signature below means that:

- * You have read and understand what this form says.
- * You are giving permission for your child to take part in this study by being videotaped by the researcher (De Winder) while playing and being fed by you.
- * You know that your child does not have to take part in this study. And that even if you consent, you can change your mind at any time.
- * You know that taking part in this study has nothing to do with the care or services either you or your child receives at LAMP. If you do not participate or change your mind about participating LAMP will treat you and your child just the same as all other mothers and children.
- * You will get a copy of this form to keep for yourself.

Mother Name (Printed): _____

Mother Signature _____ Date _____

APPENDIX C

INFORMED CONSENT FORM FOR THE GUARDIAN
OF THE TEEN MOTHER

Informed Consent Form for the Guardian of the Teen Mother

Guardian Consent Form

Student (name) _____

BE PART OF AN IMPORTANT PROJECT

Deidre (De) Winder, a doctoral student at Portland State University, is doing a study on teen mothers and their children. What your daughter (student) has to say is important and could help other schools provide services for mothers and their children.

What Will My Daughter Have To Do?

If you decide your daughter can take part in this project De will interview her at school. That means she will talk with your daughter about two main topics;

- * what she likes and doesn't like about school and
- * about growing up. This interview should take about 45 to 60 minutes depending on how long she feels like talking.
- * she will be asked to answer a survey (read to her) that contains about 20 questions.

De would also like to videotape her:

- (1) while playing with her child
- (2) feeding her child lunch

This videotaping will happen at two separate times and each time should take about 15 minutes.

Are There Any Risks?

Sometimes talking about school or experiences or growing up can be very personal. Your daughter does not have to take part in this study. She does not have to answer any questions about any thing she does not want to talk about. And at any time if you or your daughter don't feel like going on with the study we will stop.

What Will She Get In Return?

1. A gift certificate for taking part in the study.

She will receive a gift certificate after she is finished participating in the study, no matter at what point in the study she decides to stop. The money is a way of saying thank-you for her time.

2. Knowing she may be helping others.

We can learn from your daughter by what she has to tell us. This may make it easier and provide better services for other mothers who are teens and attending school. Many people feel good when they know what they did may help others.

What Are You Doing To Protect Her?

You and your daughter's privacy is very important. I have done many things to protect you:

- * I won't tell anyone if she takes part in the study or not.
- * She will be interviewed alone. What she tells me will be kept private.
- * Your name and all the names of your family will be kept private to the extent allowed by law. Kept private means that the names of people who take part in the study will not be given to anyone else. No names will be seen on any papers or videos. It also means that I will write everything in such a way that no one can guess or know what she and I talked about. If I see or hear any information about abuse or neglect, that means any harm to her or her child, I am ethically required to report it to the school counselor.
- * Names and other personal information, which I need to know in order to keep track of who I talk to, will be kept in a locked file cabinet or in a locked file on the computer so that no one will be able to see it. For example this form (which has your name on it) will be kept in a locked file cabinet.
- * When I write or talk about what I have learned in this study, I will leave things out so no one will be able to tell who I am talking about.

Any Questions?

If you have any questions about this study, this form, or the interview, you can talk to your interviewer or to the person leading the project in Portland (Deidre Winder at 390-2094). You can also contact the Chair of the Human Subjects Committee of Portland State University about your rights as a research participant (someone who takes part in a study). Hours are (9:00a.m. to 5:00 p.m. The office is located at Portland State University, Cramer Hall, Room 111, 1721 SW Broadway, Portland, OR 97201. The telephone number is (503) 725-4288, or send e-mail to: hsrrc@lists.pdx.edu.

If I sign, what does it mean?

This is a consent form and signature below means that:

- * You have read and understand what this form says.
- * You are giving permission for your child to take part in this study by being videotaped by the researcher (De Winder) while playing and feeding with her child. In addition, De will tape record your child's interview in order to remember what she said.
- * You know that the school will be sharing some information with De (name, age, free and reduced lunch, and reading scores).
- * You know that your child does not have to take part in this study. And even if you consent, you can change your mind at any time.
- * You know that taking part in this study has nothing to do with the care or services either you or your child receives at LAMP. If you do not participate or change your mind about participating, LAMP will treat your child and her child just the same as all other mothers and children.
- * You will get a copy of this form to keep for yourself.

Mother Name (Printed): _____

Mother Signature _____ Date _____

APPENDIX D

READING ACHIEVEMENT LEVELS: SCALE AND

DEVELOPMENTAL SCALE SCORES

Reading Achievement Levels

Reading Achievement Levels

Scale Scores

Grade	Level 1	Level 2	Level 3	Level 4	Level 5
3	100 - 258	259 - 283	284 - 331	332 - 393	394 - 500
4	100 - 274	275 - 298	299 - 338	339 - 385	386 - 500
5	100 - 255	256 - 285	286 - 330	331 - 383	384 - 500
6	100 - 264	265 - 295	296 - 338	339 - 386	387 - 500
7	100 - 266	267 - 299	300 - 343	344 - 388	389 - 500
8	100 - 270	271 - 309	310 - 349	350 - 393	394 - 500
9	100 - 284	285 - 321	322 - 353	354 - 381	382 - 500
10	100 - 286	287 - 326	327 - 354	355 - 371	372 - 500

Reading Achievement Levels

Developmental Scale Scores

Grade	Level 1	Level 2	Level 3	Level 4	Level 5
3	86 - 1045	1046 - 1197	1198 - 1488	1489 - 1865	1866 - 2514
4	295 - 1314	1315 - 1455	1456 - 1689	1690 - 1964	1965 - 2638
5	474 - 1341	1342 - 1509	1510 - 1761	1762 - 2058	2059 - 2713
6	539 - 1449	1450 - 1621	1622 - 1859	1860 - 2125	2126 - 2758
7	671 - 1541	1542 - 1714	1715 - 1944	1945 - 2180	2181 - 2767
8	886 - 1695	1696 - 1881	1882 - 2072	2073 - 2281	2282 - 2790
9	772 - 1771	1772 - 1971	1972 - 2145	2146 - 2297	2298 - 2943
10	844 - 1851	1852 - 2067	2068 - 2218	2219 - 2310	2311 - 3008

Achievement Levels

APPENDIX E

ACHIEVEMENT LEVELS: DEFINITIONS

CAT Achievement Levels

The Comprehensive Assessment Test (CAT) measures student performance on selected benchmarks in reading, mathematics, writing, and science that are defined by the State Standards (SS). The SS articulate *challenging content* that students are expected to know and be able to do. The SS were developed in seven content areas and were adopted by the State Board of Education in May 1996. All public schools are expected to teach students the content found in the SS.

Achievement levels describe the success a student has achieved on the State Standards tested on the CAT Reading and Mathematics (Grades 3-10). Achievement levels will be established for CAT Science in spring, 2006, and for CAT Writing+ in spring 2007.

Achievement levels range from 1 to 5, with Level 1 being the lowest and Level 5 being the highest.

Achievement Level Definitions	
Level 5	This student has success with the most challenging content of the <i>State Standards</i> . A student scoring in Level 5 answers most of the test questions correctly, including the most challenging questions.
Level 4	This student has success with the challenging content of the <i>State Standards</i> . A student scoring in Level 4 answers most of the test questions correctly, but may have only some success with questions that reflect the most challenging content.
Level 3	This student has partial success with the challenging content of the <i>State Standards</i> , but performance is inconsistent. A student scoring in Level 3 answers many of the test questions correctly but is generally less successful with questions that are the most challenging.
Level 2	This student has limited success with the challenging content of the <i>State Standards</i> .
Level 1	This student has little success with the challenging content of the <i>State Standards</i> .

Achievement Levels

APPENDIX F

SEMI-STRUCTURED INTERVIEW FOR THE MOTHERS

Semi-structured Interview for the Mothers

Researcher: "I know you are a student, but I want to understand how you learn. For example, what you do when you want to learn new information? To do that I'm going to ask you some questions about things you like and don't like about school. You can answer the questions if feel like it, but you don't have to answer if you don't want to."

1. Describe a class or teacher you especially liked.
2. How do you like teachers to present new information?
3. Is it easy for you to read?
4. Is it easy to remember what you've read?
5. Was school fun most of the time?
6. Did you play any sports at school, have any activities after school?
7. Did your parents ever go to school to talk to your teachers? Did your parents ever go to school to watch you in an activity?
8. Please tell me about your family. What was it like when you were a little girl?
9. How did your family talk to each another?
10. How did your parents let you know when you were doing things right? How did you know when you were doing things wrong?
11. Are there some things you will do differently as a parent?

APPENDIX G

DINING ROOM OBSERVATION DOCUMENT

OBSERVATION Date: _____

Code #: _____

Observation setting: _____

Environment

Placement of child during setup

Placement of child for eating

Quality of equipment setup: age appropriate _____ safe _____

Positioning to encourage interaction

Distractions

Planning

Interaction Behaviors

Mother _____ Behavior _____ Child

Participation in social interaction

MotherBehaviorChild

Predictability-interactions are consistent and predictable

Sensitivity-recognition of signals, then modifications of behaviors

Responsiveness-within 5 seconds, note if response positive or negative

Turn taking

Mother

Behavior

Child

Communication-attempts, joint attending

Interpretation of communicative attempts

Playful routines-opportunity for interaction (includes response time)

Modification of interaction/activity (following child's lead, changing activity to allow child success)

MotherBehaviorChild

Affect-positive or negative voice (tone, words), face, touch

APPENDIX H

ICIS COMPONENTS

Draft

INFANT-CAREGIVER INTERACTION SCALE (ICIS) COMPONENTS**ENVIRONMENT**

1. **Positioning** - Position for optimal interaction for both infant and caregiver are considered.
2. **Distractions** - Sensory events that distract from the interaction for either infant or caregiver are present in the environment.
3. **Planning** - Necessary equipment/materials for the activity are provided before beginning the activity thus not interrupting the interaction.

CAREGIVER

1. **Participation** - Caregiver participates in social interaction.
2. **Directiveness** - Caregiver does not interrupt, interfere, or restrict infant when infant is appropriately engaged, interacting with caregiver, or participating in feeding.
3. **Initiation** - Caregiver initiates or begins an interaction with infant.
4. **Predictability** - Caregiver's behaviors within the interaction are consistent and identifiable.
5. **Sensitivity**-Caregiver recognizes infant signals and modifies behavior.
6. **Responsiveness**-Caregiver responds to infant's social behavior in the activity (play or feeding) within five seconds.
7. **Turn-taking** - Caregiver takes turns with the infant when the opportunity is available.
8. **Communication** - Caregiver directs intentional communication (verbal or signs) to the infant during the activity (play or feeding).
9. **Interpretation** - Caregiver interprets the infant's behavior as having communicative intent.

ICIS Components 2

10. **Playful routines** - Caregiver provides playful routines and opportunities for interaction.
11. **Caregiver modifications** - Caregiver modifies activity to a level that encourages playful routines.
12. **Imitation** - Caregiver imitates infant.
13. **Verbal** - Caregiver uses positive words and/or tone of voice during the activity.
14. **Nonverbal** - Caregiver frequently smiles during the activity.
15. **Physical** - Caregiver touches infant in an affectionate manner.

INFANT

1. **Participation** - Infant participates in social interaction.
2. **Initiation** - Infant initiates or begins interactions with caregiver.
3. **Predictability** - Infant's behaviors are consistent and identifiable. The infant's behaviors do not cause the caregiver to exhibit surprise or confusion. The caregiver clearly understands and interprets the infant's cues.
4. **Sensitivity** - Infant attends to caregiver's presence.
5. **Responsiveness** - Infant responds to caregiver's social initiations when there is an opportunity.
6. **Turn-taking** - Infant takes turns with caregiver.
7. **Communicative attempts** - Infant attempts to communicate with the caregiver. Attempts at communication may include eye gaze, gesture, crying, vocalization, open mouth at presentation of food, or smile at presentation of a toy.
8. **Persistence** - Infant persists in communicative attempts. Persistence is defined as two or more attempts.

9. **Routines** - Infant participates in playful routines.
10. **Play behaviors** - Infant exhibits a variety of playful behaviors.
11. **Imitation** - Infant imitates caregiver when the opportunity is present.
12. **Verbal** - Infant laughs or expresses positive vocalizations.
13. **Nonverbal** - Infant frequently smiles during the activity.
14. **Physical** - Infant touches caregiver in an affectionate manner.

APPENDIX I

FEBRUARY SCHOOL DISTRICT MENU

FEBRUARY 2007

SCHOOL DISTRICT

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

Reading food labels helps make you a smarter shopper. By checking out the nutrition facts on the food labels you can find out if the food is a good source of fiber, calcium, iron and vitamin C. You can also compare similar foods to find out which is lower in fat, calories and sodium. So, look for foods that are lower in saturated fat and trans fat. The best place to start is to check the serving sizes. Look at the serving size and number of servings in the package. If the serving size listed is one cup and you eat two cups, you are getting twice the calories, fat and other nutrients listed. Be aware of the Daily Values Listed. They are average levels of nutrients for a person eating 2,000 calories a day. Not everyone should eat 2,000 calories per day.

			1 Breaded Chicken Sandwich OR Mexican Pizza Green Beans Tossed Salad Chilled Peaches Milk	2 Macaroni & Cheese OR Chicken Fajita Whole Wheat Roll Tossed Salad Frozen Fruit Bar Milk
Cheese Pizza OR Hamburger on a Bun Tossed Salad Hash Brown Patty Fresh Fruit Milk	6 Lasagna with Italian Bread Slice OR Grilled Chicken Nuggets with Italian Bread Slice Carrot Coins Apple Slices Milk	7 Hot Dog on a Bun OR Nachos with Meat & Cheese Tater Tots Steamed Broccoli Chilled Pears Milk	8 Baked Chicken OR Chef Salad Steamed Rice Green Beans Applesauce Milk	9 Grilled Cheese Sandwich OR Burrito Hash Brown Patty Whole Kernel Corn Mixed Fruit Milk
Pepperoni Pizza OR Cheeseburger Carrot Sticks Tater Tots Orange Smiles Milk	13 Breaded Chicken Nuggets with Italian Bread Slice OR Spaghetti with Italian Bread Slice Whole Kernel Corn Fruit Cocktail Milk	14 Chili with Oven Fries OR Corn dog Oven Baked Fries Mixed Vegetables Applesauce Milk	15 Breaded Chicken Sandwich OR Mexican Pizza Green Beans Tossed Salad Chilled Peaches Milk	16 Macaroni & Cheese OR Chicken Fajita Whole Wheat Roll Tossed Salad Frozen Fruit Bar Milk
<i>Presidents' Day</i>	20 Lasagna with Italian Bread Slice OR Grilled Chicken Nuggets with Italian Bread Slice Carrot Coins Apple Slices Milk	21 Hot Dog on a Bun OR Nachos with Meat & Cheese Tater Tots Steamed Broccoli Chilled Pears Milk	22 Baked Chicken OR Chef Salad Steamed Rice Green Beans Applesauce Milk	23 Grilled Cheese Sandwich OR Burrito Hash Brown Patty Whole Kernel Corn Mixed Fruit Milk
Pepperoni Pizza OR Cheeseburger Carrot Sticks Tater Tots Orange Smiles Milk	27 Breaded Chicken Nuggets with Italian Bread Slice OR Spaghetti with Italian Bread Slice Whole Kernel Corn Fruit Cocktail Milk	28 Chili with Oven Fries OR Corn dog Oven Baked Fries Mixed Vegetables Applesauce Milk	<p>Meal Prices:</p> <p>Elementary \$1.60 Middle/High \$1.85 Extra Milk \$0.40</p>	

174A