

CHAPTER I

Introduction

The effects of maternal depression, both during pregnancy and during a child's early development, have been intensively investigated within the last twenty years. Due to growing evidence that the offspring of depressed mothers show significant developmental differences when compared to children of non-depressed mothers, maternal depression has become a meaningful construct for researchers seeking to understand its contribution to the trajectory of child development. Marked by dysregulated affect and affective distress, depression is relatively common with prevalence rates for women in the general population resting at approximately 8-10%, rising to 8-12% for mothers (Cambell & Cohn, 1991; O'Hara, 1986; Weissman, Leaf, & Bruce, 1987). Although rates for depression in the year following childbirth do not exceed those found in the non-child-bearing populations (Cooper, Campbell, Day, Kennerly, & Bond, 1988), there is a significantly elevated rate of onset in the first three months following childbirth (Cooper, Murray, & Stein, 1991). Maternal depression represents a salient developmental concern as it has been found to disturb mother-child relationships during the first years of life, a developmental period which has become increasingly accepted as laying the foundation for the future development of self-regulatory, cognitive and social competencies (Brooks-Gunn, Berlin, Fuligni, 2000).

Depression, which is typically marked by feelings such as hopelessness, fatigue, irritability, and self-absorption, may manifest among mothers in the form of less sensitive and responsive parenting, as well as higher maternal negativity, impaired communication, and diminished emotional involvement. These parenting qualities, in turn, place children at risk for a myriad of developmental problems including poorer regulation of negative affect, less reciprocity and mutual positive affect, lower rates of compliance, lower levels of vocalization

and activity, and less interest in interacting with inanimate objects (Ashman & Dawson, 2002; NICHD Early Child Care Research Network, 1999). In addition, the effects of maternal depression on child development seem to be amplified for mothers and children who live under economically disadvantaged circumstances, perhaps due to a number of factors that make parenting more difficult such as single parenthood, lower levels of social support, and inability to afford services that might alleviate stress (Field, 1992; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Petterson and Albers (2001) found that affluence seems to buffer children from the negative consequences of maternal depression, a finding attributable to the greater resources (social, educational, and material) that may, perhaps, help mothers to maintain higher quality interactions with their children.

Not only does poverty seem to intensify the impact of maternal depression on child development, but it also seems to increase the sheer percentages of mothers who are affected by depressive symptomology (Orr & James, 1984). Maternal depression has been reported to co-occur with poverty status at elevated rates and to be, perhaps, the most critical mediator of the quality of mother-child interactions observed in early life (Aber, Jones, & Cohen, 2000). In evaluating data from the Infant Health and Development Program, Liaw and Brooks-Gunn (1994) found that whereas 17% of non-poor mothers reported high depression scores, a full 28% of poor mothers indicated elevated levels of depressive symptomology. In a study published in 2001, the Administration on Children, Youth and Families, found that primary caregivers for children enrolled in Head Start programs, which are designed to serve economically disadvantaged children, had a mean score on the CES-D depression scale which fell into the mildly depressed range (United States Department of Health and Human Services, 2001). Furthermore, Lyons-Ruth, Connell, Grunebaum, and Botein (1990) found in a study that offered

intervention services to low-income, high-risk mother-child dyads, that maternal depression was the strongest and most specific predictor of lower cognitive attainment and attachment insecurity. Finally, infants born into poverty have been documented to have more medical illnesses and to be at greater risk of having temperaments which promote difficulties with affect regulation (Shonkoff & Phillips, 2000), thus compounding the challenges that mothers face in interacting with their offspring. The combined effect of multiple disadvantages, like those faced by low-income children of depressed mothers, has been described as operating in a synergistic manner, impairing developmental outcome to a greater extent than that would be suggested by a simple additive effect (Cicchetti, Rogosch, & Toth, 1998; Liaw & Brooks-Gunn, 1994).

Both depression and poverty have been linked to less responsive, harsher parenting and less than optimal developmental outcomes. Researchers studying both phenomena agree that the developmental deficits seem to arise primarily from disturbances in the transactional processes between parent and child (Brooks-Gunn, 2003; Cicchetti, et al., 1998). Because poverty and maternal depression are co-morbid and impact child development in strikingly similar ways, it is pertinent to explore whether children of depressed mothers are contributing disproportionately to the differences in developmental outcomes found between higher and lower SES levels (Lyons-Ruth, et al., 1990). Supporting the assertion that process, rather than socioeconomic level, may be at the root of developmental deficit, Bronfenbrenner and Ceci (1994) note that under conditions of high levels of mother-child interaction, social class differences in problem behavior become much smaller. If it is established that a significant portion of the developmental deficits attributed to low income are actually attributable to the sequelae of maternal depressive symptomatology, rather than to poverty per se, it is then important to evaluate which types of

interventions are most productive in realizing positive developmental outcomes within that subgroup of the population.

The challenge, therefore, for researchers and for those who develop programming and interventions targeting healthy development among low-income children of depressed women, is to examine the relations among maternal depression, poverty, and child development, and to then think critically about which intervention components are most important to maximizing optimal development. Governmental expenditure for childcare for welfare and working poor families has dramatically increased in the last few years (Shields & Behrman, 2002) bringing intense societal scrutiny to the “cost effectiveness” of social programs. It is therefore imperative that developmentalists be able to clearly articulate which aspects of intervention produce the greatest cost to benefit ratio.

Timing and longevity are components of intervention that have become an increasing focus of both researchers and practitioners alike, and may be particularly salient factors in interventions targeting maternal depression. The developmental span between six and eighteen months of age appears to represent a period of development that is particularly vulnerable to the effects of maternal depression and parenting behavior, perhaps due to the rapid development of the frontal lobe over that period of time (Chugani, 1994; Field, 1992). The frontal lobe is believed to be key to the development of emotional expression and regulation (Ashman & Dawson, 2002; Dawson, Panagiotides, Grofer-Klinger, & Hill, 1992), and infant frontal electrical brain activity has been found to be associated with variations in infant behavior, particularly behaviors involved in the expression of positive affect, as well as the expression and regulation of negative emotion (Dawson, et al., 1999). Concordant with the hypothesis that there are ages more highly sensitive to unresponsive parenting, maternal depression when a child was

14 months old was found to be associated with behavior problems at 42 months of age, even when the mother was no longer depressed at the second evaluation (Wolkind, Zajicek-Coleman, & Ghodsian, 1980). In addition, Coghill and colleagues found that maternal depression during the first 12 months of life was associated with decrements in cognitive ability at age four, whether or not the mother was still exhibiting symptoms of depression (Coghill, Caplan, Alexandra, Robson, & Kumar, 1986). Even cooperation with peers in preschool children has been associated with a mother's responsiveness and cooperative interchanges experienced during the first year of life (Zahn-Waxler, Denham, Iannotti, & Cummings, 1992).

Despite mounting research evidence that high-quality adult-infant transactional processes are critical to the subsequent development of self-regulation and later cognitive abilities, as well as the evidence that these processes are often lacking in low socioeconomic families, particularly those with a depressed caregiver (Ramey & Ramey, 1998), the vast majority of intervention programs in this country continue to begin service at three or four years of age (Barnett, 1995). Is it possible that the full potential of intervention is not being realized because early opportunities to shape development are not being utilized to the greatest advantage? Would earlier intervention afford infants in non-optimal parent-child relationships the opportunity to experience the responsivity and nurturance necessary for maximizing their developmental potential? Is earlier intervention critical to realizing optimal development in families with a depressed primary caregiver?

Much is known about the benefits of early intervention. Ramey and Ramey (1998) cite the Centers for Disease control and Prevention as estimating that over 300,000 individuals in the United States under the age of 21 suffer from severe cognitive deficits ($IQ < 70$) that could have been prevented through early and continuing education, and that this cognitive risk is highest for

children from the lowest socioeconomic strata. It has been found that earlier entry and/or greater longevity of early childhood care resulted in a larger effect on reading scores than fewer years in care for children from homes below the poverty line (Caughy, DiPietro, & Strobino, 1994). Additionally, in his review article of 36 model interventions, Barnett (1995) found that positive IQ effects persisted the longest among the children who participated in the two experimental studies that enrolled them as infants in full-day care programs, as compared to programs with older ages of entry. This finding led Barnett to suggest that larger effects on cognitive development may be obtained through full-day, year-round programs that begin during infancy (Barnett, 1998). Furthermore, children from the families with the lowest levels of economic resources and education consistently show the greatest benefits from early intervention (Brooks-Gunn, Gross, Kraemer, Spiker, & Shapiro, 1992; Liaw & Brooks-Gunn, 1993; Ramey & Ramey, 1998) and many of these benefits have been shown to be long-term (Barnett, 1995, 1998; Ramey, Campbell, & Blair, 1998). The size of the effect produced by the intervention seems to be positively correlated with the intensity, breadth, and level of involvement with the children and their families (Bryant & Ramey, 1987; Ramey, Bryant, & Suarez, 1985). Finally, effects have been shown to be strongest for children who would have been cared for in mother-only care, relative care, or family child-care had the early intervention not been offered (Hill, Waldfogel, & Brooks-Gunn, 2002).

Although intervention beginning within the first two years of life would seem highly desirable for children living with a depressed parent, the issue of the availability of high-quality daycare beginning in infancy is an issue facing non-depressed mothers living in poverty as well (NICHD Early Child Care Research Network, 1997b). With the welfare reform of the late 1990's, there has been a sharp rise in the number of young children who have mothers in the

work force (Seccombe, 1999; Shields & Behrman, 2002). The proportion of single, never married mothers with children under age 6 who are in the work force has surged from under 50% in 1990 to 67% in 1998 (U.S. Census Bureau, 1999) and over half of all mothers with infants under one year hold jobs outside the home (Zigler, 1994). The existence of high-quality, affordable, full-time early childcare programs is crucial to the development of the children of low-income working mothers, particularly those that may face the additional burdens of maternal depression. Furthermore, it appears in general, that in the absence of government subsidies, there is a positive correlation between SES and the quality of childcare obtained (Hayes, Palmer, Zaslow, 1990). While there is evidence that maternal employment contributes to better child-outcomes in low-income families (Zaslow & Emig, 1997), there are reasonable concerns about the care low-income children receive while their mothers are at work. In an argument for providing full-day Head Start services to working, low-income mothers, Zigler suggested that many women who have returned to the labor force due to welfare requirements may be placing their children in sub-optimal, unregulated daycare which potentially compromises their development (Zigler, 1994). In fact, among a sample of welfare mothers who reported being employed at least part-time, approximately two thirds indicated that they depended on informal care (Bowen & Neeman, 1993).

Regardless of whether high quality care is needed because of maternal employment or due to sub-optimal, in-home caregiving from a depressed mother, it has been found that mothers who were living in poverty and whose infants were in full time, high quality child care were observed to interact more positively with their children than those raising their children at home or who were using lower quality daycare (Shonkoff & Phillips, 2000). Finally, higher quality childcare, as compared to sub-optimal care, has been repeatedly found to lead to enhanced

cognitive and social development both while still in childcare and during their first few years of school (Barnett, 1995). Although these studies did not focus specifically on low-income children whose mothers suffered from depression, it could be hypothesized that maternal depression would only intensify the need for high quality childcare that affords responsive, nurturant care.

Despite evidence that the cost to society for the failure to provide a minimum of two years of quality early childhood care and education for every child born into poverty in America is approximately \$100,000, or \$400 billion total for all children who were under age 5 in 1995, the United States government has been suggested to embrace policy that “underinvests” in both the amount and the quality of early childcare available to the millions of Americans living in poverty (Barnett, 1995). Given what is known about the necessity of responsive, consistent care to the development of self-regulation in infants, theory would suggest that high-quality intervention in the first two years of life would be critical to the subsequent cognitive and social development of children living in poverty, particularly those with mothers who show impaired responsibility due to depressive symptomology. Research has indicated that equivalent effects on brain development can result in varying effects on cognitive and social development contingent on the age at which they take place (Kolb & Fantie, 1989). Intervention may produce larger effects on subsequent development when they are provided at an earlier age. Furthermore, it has generally been established that most programs reporting positive effects on childhood outcomes are center-based, with home visiting programs reporting very little in the way of positive effects on achievement (Brooks-Gunn, 2003).

The hypothesis that earlier intervention should have larger effects is confirmed by cross-study comparisons, but has received little support to date from within-study comparisons (Barnett, 1995). Barnett (1995) suggests that existent within-study comparisons have primarily

looked at the difference in effects of programs beginning at either three or four years of age, an age differential that may not be large enough to produce a significant difference in effect size. Perhaps the more salient differences would be found by evaluating the differences in the effect sizes of interventions that begin either in infancy or several years later at preschool age (Barnett, 1995). Because infants and toddlers require much smaller staff to child ratios than preschoolers, leading to higher intervention cost, it is imperative to evaluate the cost/benefit ratio of “early entry” intervention. As stated by Brooks-Gunn (2003), “If early childhood interventions were equally effective whether they were started when the child was 6 or 18 or 24 months of age, then policy might favor serving toddlers rather than infants.”

Making the observation in 1974 that developmental research was “the study of the strange behavior of children in strange situations for the briefest possible period of time,” Bronfenbrenner argued that development should be studied in its ecological context, that is, in the actual environments in which human beings live their lives, with the results of research being more directly linked to public policy (Bronfenbrenner, 1974; Bronfenbrenner & Morris, 1998). There is a clear need for research that examines the role of “age of entry” in evaluating the developmental outcomes of low-income children, being raised by both depressed and non-depressed caregivers, observed within their own ecological context, who receive equivalent intervention services beginning at different developmental stages. Responsive, nurturing caregiving within the first two years of life has been clearly established within the literature as critical to optimal cognitive and social development. Equally well established in the literature is the fact that poverty and maternal depression are correlated constructs and that each has been independently associated with impaired parenting. In this study, it is hypothesized that earlier intervention within low-income populations leads to more optimal developmental outcomes than

later intervention, and that this effect is the greatest for children whose lives are touched not only by poverty, but by the interwoven sequelae of maternal depression as well.

The Present Study

The present study seeks to contribute to the body of knowledge regarding maternal depression, its developmental impact, and the relative efficacy of early childhood intervention. Although there are vast literatures addressing the constructs of maternal depression, the effects of early intervention, and poverty, there is a paucity of studies that have utilized all three concurrently. The following hypotheses shaped the design of the study:

- 1) *Child age of entry into Head Start moderates the effect of maternal depressive symptomology on child developmental outcome through a moderation effect.*

Example: A high level of maternal depressive symptomology will be more strongly associated with lower child developmental outcome for children with an older age of entry into Head Start than for those with a younger age of entry. A high level of maternal depressive symptomology paired with a child's early entry into Head Start will result in better developmental outcome than a high level of maternal depressive symptomology paired with a late entry into Head Start.

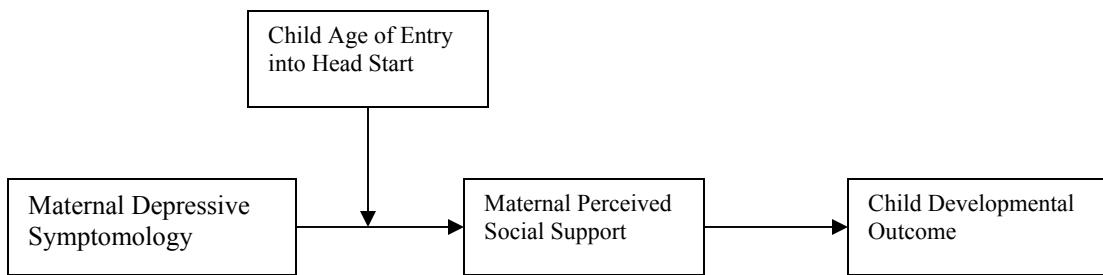
- 2) *Maternal perceived social support mediates the child age of entry into Head Start by maternal depressive symptomology moderation effect on child developmental outcome through a mediated moderation effect. (Holmbeck, 1997).*

Example: Mothers high in depressive symptomology who have children with early age of entry into Head Start will report higher perceived social support. Perceived social support, in turn, is linked to high child developmental outcome. Therefore, depressive symptomology and the moderation effect of age of entry to Head Start both influence the perceived social support variable, which in turn affects child outcome.

In addition, the following hypotheses exist, but are subsumed by the two hypotheses above:

- 3a) *Maternal depressive symptomology is related to child developmental outcome.*
- 3b) *Maternal perceived social support is related to child developmental outcome.*
- 3c) *Maternal depressive symptomology is related to maternal perceived social support.*

If all of the above associations are found, then maternal perceived social support mediates the relation between the interaction of child age of entry and maternal depressive symptomology and child developmental outcome. That is, the relation between the interaction of child age of entry-maternal depressive symptomology and child developmental outcome (3a) is attenuated when maternal perceived social support is considered. Thus, the age of entry- maternal depressive symptomology interaction affects child outcome only by way of maternal perceived social support (mediation effect).



Working from a bioecological perspective that recognizes that mothers living within poverty and with depression are faced with many challenges to their parenting efficacy, and utilizing an underlying model of mutual regulation as proposed by Tronick and colleagues (Tronick & Cohn, 1989; Tronick & Weinberg, 1997), the present study sought to examine whether age of entry to early, continuous daycare, offered through a governmentally funded program, utilized by mothers living in poverty, moderates the impact of maternal depressive symptomology, as measured by the CES-D (Radloff, 1977), on the cognitive and social development of children. In addition, the mediating role of perceived support for mothers with and without depressive symptomology, as measured by the Perceived Support Scale (Procidano & Heller, 1983) was examined (see Hart, Atkins, & Fegley, 2003 for a discussion of mediation and moderation in the context of Head Start Research). Child developmental outcomes were measured using the PPVT (Dunn & Dunn, 1997), a measure of receptive language ability and two working memory tasks. Furthermore, social development was measured utilizing two teacher questionnaires that inquired about a child's social competence and problem behaviors (United States Department of Health and Human Services, 2001). Any knowledge generated from such a study can and should be used to impact policy that benefits a population that cannot easily speak for itself.

CHAPTER II

Literature Review

Children of Depressed Mothers

From a very early age, the developmental trajectories of children of depressed mothers, in both the cognitive and social realm, seem to be different than that of the children of "well" mothers (for a review see Goodman & Gotlib, 1999, 2002). Infants born to depressed mothers tend to be less active, more withdrawn, less socially responsive, show lower levels of positive affect, and cry more than those born to "well" mothers. (Field, 1992; Field, et al., 1988; Field, et al., 1985). In addition, Field found that very young infants of depressed mothers showed higher stress levels when interacting with their mothers than at baseline, as evidenced by higher heart rates and salivary cortisol levels, whereas the infants of well mothers showed opposite physiological patterns. It appears, therefore, that the presence of the mother is physiologically soothing to infants in well mother-child dyads, while this same presence generates stress reactions in the infants of depressed mothers (Field et al., 1988).

Infants of depressed mothers have difficulty sustaining attention and demonstrate lower levels of persistence when faced with challenging tasks (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Zahn-Waxler, McKnew, Cummings, Davenport, & Radke-Yarrow, 1984). By one year of age, cognitive and language delays have been observed in the children of depressed mothers (Radke-Yarrow, et al., 1995; Zahn-Waxler, Cummings, Iannotti, Radke-Yarrow, 1984). Interestingly, the infants of psychologically unavailable mothers showed a drastic decline in their scores on the Bayley developmental quotient between 9 and 24 months of age as compared to children of more psychologically available mothers from the same socioeconomic background leaving them with significantly lower scores at 24 months of age

(Egeland & Sroufe, 1981). Additionally, Sharp and colleagues (1995) found that the presence of maternal depression specifically in the first year of life was pivotal to their finding that four year old boys of postnatally depressed mothers showed lower cognitive functioning than did boys with non-depressed mothers.

In the realm of social competence, it has been found that two year old children of depressed mothers displayed more “out of control” aggression when interacting with their peers and were rated higher on externalizing problems at age 5 (Zahn-Waxler, Iannotti, Cummings, & Denham, 1990; Zahn-Waxler, Kochanska, Krupnick, & McKnew, 1990). In a study evaluating behavior among low-income children of depressed mothers, the percentage of children of chronically depressed mothers rated above the cut off score for deviant behavior on a teacher rating scale was four times the rate of “deviance” in children of never depressed, low-income mothers. In addition, these same children appeared to have difficulty with attention and coordination as well (Alpern & Lyons-Ruth, 1993). Prosocially, school-age children of depressed parents have been judged by both teachers and peers to have sub-optimal peer relations and difficulty in interacting in the classroom (Zahn-Waxler, et al. 1992).

A Bioecological Perspective

In thinking critically about the contribution that maternal depression makes to a child’s developmental trajectory, it is important to consider both the role of transactional processes and reciprocity between parent and child in relation to subsequent outcome. Depression does not exist within the confines of the afflicted individual, but rather expresses itself within a social and environmental context that often includes the context of parent-child relationships (Hammen, 1992, 2002; Radke-Yarrow, et al., 1985).

Bronfenbrenner's conceptual model, which he termed the bioecological model, clearly articulates a structure which is useful in interpreting the complex relationships between maternal depression, poverty and child development. Bioecological theory focuses on the interplay between individual characteristics, environment, and the transactional processes that occur between the two (Bronfenbrenner & Ceci, 1993,1994; Bronfenbrenner & Morris, 1998.)

Defining development as stability and change in the biopsychological characteristics of human beings over the life course and across generations, (Bronfenbrenner & Morris, 1998, p. 995), Bronfenbrenner builds on his original conceptualization of the environment as composed of a nested series of systems (micro-, meso-, macro-, exo-) (Bronfenbrenner, 1979), by delineating a stronger role for *process*. Calling direct interactions between an organism and its immediate environment that operate over time, *proximal processes*, Bronfenbrenner argues that it is these processes, in fact, that are the primary mechanism through which genetic capacities for *effective* psychological functioning are realized, thus driving human development (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998). Furthermore, proximal processes vary systematically as a function of the environmental context, both immediate and more remote (Bronfenbrenner & Morris, 1998).

Making a clear distinction between the environment and process, Bronfenbrenner notes that there are six features of proximal processes important to his conceptualization of development. First, in order for development to take place, the individual must engage in activity. In addition, in order to be effective, the activity must be regularly engaged in over an extended period of time to allow for the interactions to become "increasingly more complex." Furthermore, developmentally effective proximal processes must be transactional with influence flowing in both directions and occur with objects and symbols as well as with people. Finally,

Bronfenbrenner asserts that as children grow older and their developmental capacities increase, activities should be adjusted and prolonged to provide for the future achievement of individual potential. Importantly, while the person with whom a child interacts most frequently is generally a parent, as the child grows older, other people such as siblings, caregivers, and peers begin to function more frequently in that role (Bronfenbrenner & Morris, 1998).

Pertinent to this discussion of maternal depression, poverty and child development, bioecological theory postulates that the quality of proximal processes vary systematically as a combined function of environmental and “person” characteristics, with the effects of proximal processes having more influence on development than the environmental contexts in which they transpire. Similar to discussions of parent-child relationships under conditions of poverty or maternal depression, it appears to be the transactional processes, rather than the actual environment or diagnosis, that seems to be most influential on emergent development (Campbell, Cohn, & Meyers, 1995; Bronfenbrenner & Morris, 1998).

Noting that proximal processes are unable to function effectively in environments that lack stability and predictability over time, the bioecological conceptual framework is predicated on the notion that biological factors and evolutionary processes both set limits on development and establish environmental requirements necessary for the full realization of human potential. When critical environmental components are lacking, full potentials will remain undeveloped (Bronfenbrenner & Ceci, 1993, 1994; Bronfenbrenner & Morris, 1998). Further, similar to the stance of Cicchetti et al (1998) regarding the accumulation of risk from multiple disadvantages, Bronfenbrenner asserts that multiple unstable characteristics of connected systems, such as lack of income, unresponsive parenting, and irregular childcare, appear to have a synergistic quality

tending to reinforce each other and generating cumulative effects that are likely to jeopardize the course of development (Bronfenbrenner & Morris, 1998).

Several qualities related to depression seem to lay the foundation for sub-optimal patterns of interaction, or proximal processes, between depressed mothers and their children. Depressed mothers have been found to be more likely to express negative views of themselves as parents, to see themselves as having less control over their child's development and as possessing less ability to make a positive impact on their children, and to be more hesitant to confront their children's opposition (Kochanska, Kuczynski, Radke-Yarrow, & Welsh, 1987; Kochanska, Radke-Yarrow, Kuczynski, & Friedman, 1987). In interactions with their offspring, depressed mothers showed more sad and irritable affect, were less positive and more punitive, and engaged in more angry, intrusive, and hostile behaviors, or lax undercontrol (Campbell, Cohn, Flanagan, Popper, & Meyers, 1992; Goodman & Gotlib, 1999). In addition, mothers with depression may struggle to provide contingent responses and optimal levels of stimulation (Field et al., 1985; Field, Healy, Goldstein, & Guthertz, 1990). Zahn-Waxler and colleagues suggested that the lack of responsiveness characteristic of some forms of maternal depression may lead to child behaviors which elicit negative parental attention and more coercive parent-child interaction (Zahn-Waxler, Iannotti, Cummings, & Denham, 1990).

One way in which the sequelae of insensitive and unresponsive parenting may manifest itself among the offspring of depressed mothers is in the form of insecure attachment. Cicchetti et al. (1998) found in one low risk population that 43.5% of the children of depressed mothers were insecurely attached as compared to 18.2% of their counterparts who had non-depressed mothers. In particular, disorganized-disoriented attachments were present three to four times

more often amongst the children of depressed mothers than in children of well mothers (Teti, Gelfand, Messinger, & Isabella, 1995).

Attachment status is felt to be critical to optimal development for several reasons. Secure attachment has been found to promote flexibility, enthusiasm in approaching problems, and resilience, while anxious attachment patterns have been found to be associated with a wide range of adjustment problems (Cummings & Davies, 1994). As early as the toddler years, differences in the degree of orientation towards peers can be found between securely and insecurely attached children (Weinfeld, Sroufe, Egeland, & Carlson, 1999). It has been suggested that mothers who foster secure attachment, also foster greater interaction with peers. Goodman and Gotlib (1999) postulate that toddlers and preschool children need their caregivers to provide the external support necessary in order to develop an accurate understanding of social and emotional situations. Depressed mothers were significantly less likely to involve their toddlers in formal or informal peer groups with other children (Zahn-Waxler et al., 1992), perhaps leading to limited opportunities for the children to gain social skills from interaction. Furthermore, Cicchetti et al. (1998) found that attachment was directly related to reported behavior problems with mothers of insecurely attached toddlers citing their children as having more internalizing and externalizing problems than did mothers of securely attached children. Finally, Crandell and Hobson (1999) found that insecure attachment was associated with later cognitive deficits, and explained this effect by suggesting that maternal responsiveness and sensitivity in early childhood promotes attention regulation, which in turn predicts IQ scores in childhood and adolescence.

Mutual Regulation Model

One model, which proves useful in examining the intricate relationships among maternal mental health, parenting behaviors and child developmental outcomes is Tronick's Mutual Regulation Model (MRM). Encompassed by Bronfenbrenner's broader bioecological theory, Tronick's model focuses specifically on the proximal processes that occur between child and caregiver during infancy, both in depressed and non-depressed mother-child dyads. Because there are many mother-child dyads who develop along standard trajectories despite maternal depression, it is necessary to give a description of the process of development of the children of depressed mothers that accounts for a wide range of outcomes, ranging from severe impairment to normalcy (Tronick, 1986; Tronick & Weinberg, 1997).

In the Mutual Regulation Model, normal social development occurs when infants are helped by caregivers to develop effective strategies to coordinate their actions with those of their interactional partners in a mutually satisfying manner. Two important assumptions of MRM, similar to those postulated by Bronfenbrenner regarding proximal processes in the bioecological model, are that infants are motivated to communicate with others, or in Tronick's words to "establish intersubjective states", and that they are motivated to act on the physical world of objects around them (Tronick, 1989; Tronick & Weinberg, 1997). Tronick and Weinberg suggest that motivated action on the inanimate world requires the establishment of intersubjective relationships, as it is postulated that children can only generate meanings in collaborative states with others. Therefore, children who are able to successfully communicate with others, creating dyadic states of consciousness, develop normally. Children who are unable to establish dyadic states of consciousness with others, no matter what the cause, will not develop normally (Tronick & Weinberg, 1997). Paralleling Bronfenbrenner's assertion that

proximal processes not only lead to higher levels of developmental functioning, but actually serve as a buffer against the effects of disadvantaged environments (Bronfenbrenner & Morris, 1998). Tronick and Weinberg's model establishes *process* as the key variable to optimal development, regardless of environmental challenge.

Within this model, a child's ability to create meaning with others depends upon three factors: a child's ability to organize and control his/her physiological states and behavior, the integrity of an infant's communication system, and a caregiver's ability to appropriately read and respond to an infant's communication. A child's ability to successfully engage with the objects and people in his/her environment is dependent on the ability of the child-caregiver communication system to further a child's intentions. The process of mutual regulation is composed of the capacity of both the child and the adult to make their intentions known, the ability of each to be aware of the partner's intentions and, finally, the ability of each to scaffold interactions in a way that allow for the meeting of the other's goals (Tronick & Weinberg, 1997). In this way, caregiver behavior becomes an external regulator of young infants' states.

Early models of maternal-child relationship described a dance of 'synchrony': mothers and infants reciprocally matching behavioral states and exhibiting high levels of positive emotions. In these early models, the mother was the active interactant and created the unilaterally regulated structure of mother-infant interaction (Brazelton, Koslowski, & Main, 1974). Surprisingly, when Tronick and Cohn intensively observed mothers and their infants in the 1980's, however, they found that in actuality, mothers expressed positive affect only approximately 42% of the time, while an infant's affect was considered positive only 15% of the time (Cohn & Tronick, 1987; Tronick & Cohn, 1989). Instead, what they observed was that healthy mother-infant interactions moved from coordinated states to miscoordinated states and

back again continuously over a wide affective range. They termed this process of moving from a miscoordinated state back to a coordinated state an “interactive repair” and found that, among mother-infant dyads these repairs occurred at the rate of every three to five seconds and that, regardless of age during the first year, mother-child coordination is found in only about 30% or less of the face-to face interactions (Tronick & Cohn, 1989).

Early in an infant’s life, a mother’s role appears to be to initiate and provide a social framework for interaction. In the early months, the focus of the interaction is on the interchange between the mother and child themselves. As a child becomes older, he/she becomes a more active initiator of interaction and by about 9 months the physical world becomes the focus of interaction with the mother-infant dyad sharing joint attention towards an object (Tronick & Cohn, 1989). Tronick and Weinberg (1997) hypothesized that it is the process of interactive repair that is the critical component of normal interactions that predicts developmental outcome and a child’s subsequent self-regulatory capabilities (Tronick & Cohn, 1989). Children learn to successfully express and regulate emotion through ongoing interactions with significant others in their lives (Denham, 1998) and this self-regulation, in turn, has been associated with prosocial behavior and the ability to respond empathically to others (Eisenberg, et al., 1996).

While mothers may originally do the vast majority of interactive repair, infants come to know which communications and strategies are most effective in producing reparation. By around one year, infants are aware of their own and their partners’ intentions, thus establishing “intersubjectivity.” (Tronick, Als, & Adamson, 1979). Through the ability to repair interactions, infants learn to see themselves as effectively contributing to relationship and they come to see the caretaker as reliable and trustworthy (Tronick & Weinberg, 1997), qualities that are suggested to contribute to secure attachment. It is through the experiences of dyadic regulation

that an infant makes the transition from mutual regulation to self-regulation (Sander, 1975).

When repair does not work, as in the case of a non-responsive caregiver, infants experience negative affect (Tronick & Weinberg, 1997). It is, perhaps, within this process of interactive repair that depression wields its powerful effect on development.

It has been suggested in the literature that depression compromises a mother's and then subsequently, a dyad's ability to mutually regulate interactions as the presence of a sensitive caregiver who adjusts his/her behavior to match the affective state of the child appears to be key to achieving mutual regulation. Due to the symptomology of depression, depressed mothers are likely to be less able to recognize subtle changes in their children's attentional focus and they may be more intrusive and lack flexibility in shifting attention to a child's new goal. In addition, a depressed mother may interpret a child's withdrawal from a joint activity more personally and may react in a negative way (Fox & Gelfand, 1994). Interestingly, mothers and children were found to display matching rates of repair. If a mother had a high rate of interactive repair, so did her child, while mothers with low rates of interactive repair had children with accordingly low rates of repair (Jameson, Gelfand, Kulcsar, & Teti, 1997). In summary, without mutual regulation, a child's ability to learn to self-regulate is impaired.

This difficulty demonstrated by depressed mothers in achieving mutual regulation may contribute to the plethora of presenting problems displayed by their children. Cohn, Matias, Tronick, Connell, and Lyons-Ruth (1987) found that infants in structured interactions with their "intrusive" depressed mothers spent about 70% of the time looking away as opposed to engaging in joint attention. Importantly, Ruff and Rothbart (1996) found that active, focused involvement with toys, like those that would be encouraged in mutually regulated maternal-child dyads, has been associated with later cognitive development. In addition, it has been found that non-

depressed mothers and children maintain high rates of interactive coordination, while depressed mothers show less prolonged and less well integrated interactions, (Jameson, et al., 1997) often punctuated by each partner periodically withdrawing into separate activities (Jameson et al., 1997). Furthermore, depressed mothers have been found to initiate and terminate their children's attention to objects more frequently, rather than encouraging more sustained attention (Breznitz & Friedman, 1988). Finally, Egeland, Pianta, and O'Brien (1993) suggested that the externalizing problems and failure to self-regulate exhibited by the children of depressed mothers may be one manifestation of the initial failure to mutually regulate.

Impact of Poverty

Parenting by depressed mothers appears to be most heavily impacted when it occurs in conjunction with other life challenges (Cummings & Davies, 1994; Shonkoff & Phillips, 2000). Factors such as elevated stress, perceived lack of social supports, dysfunctional family relationships, and discordant marriage have been found to be present at an elevated rate in families having a depressed caregiver (Cicchetti, et al., 1998). One very salient challenge, important to any discussion of maternal depression, is that of living in poverty. Poverty has been found to lead to an exposure to a greater number of risk factors, including maternal depression, for poor families as compared to those with greater financial resources (McLoyd, 1990). It repeatedly has been found that depression occurs at higher rates among women living in poverty than among those who are financially more secure (Petterson & Albers, 2001). In addition, research has shown that stressful life events and lack of social support, common factors within low income families, are correlated with rates of anxiety and depression among pregnant women in middle and late pregnancy (Balcazar, Harnter, & Cole, 1993; Cunningham & Zayas, 2002).

For those children of depressed mothers living within poverty, there may be a great number of stressors that co-vary with maternal depression. When classified using federal poverty levels, it has been found that poor families received lower scores on the HOME inventory, a measure of the caregiving environment, than nonpoor families (Watson, Kirby, Kelleher, & Bradley, 1996). In addition, risk factors related to neighborhood poverty may include such things as poor schools, lack of basic services and more threatening environmental health risks (Aber et al., 2000). It has been hypothesized that parental depressive symptomology is a primary mechanism through which economic circumstances influence parenting behaviors, and indirectly, child outcome variables (Conger, et al., 1992; Jackson, Gyamfi, Brooks-Gunn, & Blake, 1998), with low-income, psychologically healthy parents providing more stable, nurturant environments, despite economic hardships, than those suffering from depression. Alternatively, life stressors may exacerbate parental depression resulting in a continuous cycle of increased maladaptive parenting and enhanced contextual risk, which in turn perpetuates the existent depressive symptomology (Cicchetti, et al., 1998).

Income level has been shown to be associated with a child's cognitive development, exhibited behaviors, and achievement during the preschool years, with these associations becoming evident around age 2 and continuing through at least age 8, with the most pronounced impact being among those children living in deep or prolonged poverty (Brooks-Gunn, 2003). Poverty has been associated with diminished school achievement and high levels of behavior problems (Duncan & Brooks-Gunn, 1997) as well as being associated with a gradual decline in intellectual performance across the span of the preschool years punctuated by a sudden "dip" in the scores between 18 and 24 months of age when the tests become predominantly verbal (Belsky & Steinberg, 1978; Etaugh, 1980). For the cognitive development of preschoolers,

income seems to be pertinent because of its impact on the "richness" of the home environment for learning as evidenced in such qualities as the warmth of mother-child interactions and the physical condition of the home (Duncan & Brooks-Gunn, 1997).

Interestingly, Duncan and colleagues found that income in the very youngest years of life predicted high school completion rates, while income during the early adolescent years did not (Duncan, Brooks-Gunn, Yeung, Smith, 1998). Young children (under age 6) and their mothers have the highest poverty rates of any age group in the United States (Shirk, Bennett, & Aber, 1999), a statistic that is important to note as economic stress experienced early in life, especially extreme poverty, appears to be more detrimental to a child's subsequent development than that experienced later in life (Duncan & Brooks-Gunn, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994). Therefore, statistically speaking, it is common for a child of a depressed mother to be confronted not only with issues related to maternal depression, but also with those factors with which all children living within poverty must inevitably contend.

In thinking about the role of socioeconomic status in determining the trajectory of child development, it has become clear that SES is not a sufficient measure of environmental quality. Many proximal environmental contextual factors, such as the quality of mother-child interaction, the availability of toys and enriching materials, as well as the amount of support available for parents vary considerably within any given socioeconomic level (Bendersky & Lewis, 1994) and it may be difficult to disentangle the effects due to poverty from those due to other disadvantageous circumstances common in poor families (Aber, Bennett, Conley, & Li, 1997). In fact, in their 1993 study of young children of low-income mothers with chronic depressive symptoms, Alpern and Lyons-Ruth (1993) established that low-income status per se did not provide sufficient explanation for the substantially increased level of hostile behavior problems

at school and at home observed among the children of depressed mothers. Socioeconomically similar children of non-depressed mothers in the study sample did not show elevated rates of hostile behavior, nor did control children within the same classrooms. In addition, other demographic variables associated with poverty did not account for the variance associated with maternal depressive symptomology, leading the researchers to conclude that the elevated rates of child hostile behavior within the low-income samples appeared to be due to the elevated rates of chronic maternal depression that occur within low socioeconomic portions of the population, not low-income itself (Alpern & Lyons-Ruth, 1993; McLoyd, 1990; Orr & James, 1984).

Concordant with the findings of Alpern and Lyons-Ruth (1993) were those of McLeod and Shanahan (1993) who found that “the direct effects of current poverty on internalizing and externalizing symptoms [in children] are not significant, while the indirect effects are significant and positive. The harsh, unresponsive behaviors of currently poor mothers create high levels of symptoms among their children” (McLeod & Shanahan, 1993, p. 359). Furthermore, studies which have attempted to distinguish which features of the home environment are most strongly related to child developmental status have found that certain aspects, such as parental responsiveness and the availability of stimulating play materials, were more closely associated with child outcome than more global measures of environmental quality such as SES (Bradley, et al., 1989). Continued study of the salient contextual factors which co-mingle in the world of poverty producing widely recognized and accepted child developmental deficits may well reveal that relationship process, perhaps from depressive symptomology rather than poverty itself, may be culpable for the observed non-optimal developmental outcomes.

The role of Social Support

A key tenet of bioecological theory is that an individual develops within a nested series of social networks, or environments. With the developing child and his/her closest environmental conditions and interactions making up the microsystem, the series of networks expands to include the inter-relationships amongst the many settings that directly include the individual (meso-system), the formal and informal social structures which impact that individual's life (exosystem), and finally, the value system of the greater society (macrosystem) (Bronfenbrenner, 1979). One aspect of the environment that has been found to have a significant impact on the interactions between a parent and child, as well as on subsequent developmental outcome, is that of parental social support.

The construct of social support, which is defined as activities and exchanges of an affective and/or material nature that occur between members of the immediate family and those outside of the household (Cochran & Brassard, 1979), has traditionally been thought to include several dimensions: emotional empathy and understanding, instrumental assistance, and information provision provided by one individual to another (Crnic & Greenberg, 1987). Sources of support may include family, friends, neighbors, and professionals that interact with the family, as well as formalized services. Friends appear to provide more support on a short-term basis, while family members appear to provide assistance, particularly financial assistance, over longer periods of stress (Colletta & Lee, 1983). Furthermore, it has been suggested that relationships within a kin, or family, network are more closely associated with parenting adequacy than are relationships with friends and/or neighbors (Giovanni & Billingsley, 1970). Finally, it has been established that satisfaction with one's support is a better indicator of emotional well-being than the actual size of the support network (Barrera, 1981).

In the literature, social support has been associated with a variety of parenting behaviors and attitudes. Quality of support has been found to be related positively to child competence (Pianta & Ball, 1993), to have a negative association with levels of maternal rejection (Colletta, 1981), to be a significant predictor of the quality of maternal interaction with infants (Colletta, 1981; Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983; Crnic, Greenberg, Robinson, & Ragozin, 1984) and to be clearly associated with the security of mother-infant attachment (Crockenberg, 1981). In addition, the greater the number of people on which parents felt they could rely for informal assistance, the less likely parents were to report problematic behavior (Hashima & Amato, 1994), and for single parents, the amount of support that mothers receive with parenting tasks has been associated with increased child compliance to parental requests (Weinraub & Wolfe, 1983). Crnic and Greenberg (1990) reported that social support appears to moderate the effects of daily hassles of parenting. Furthermore, inadequate social support has been associated with psychological distress and the use of less effective parenting practices (Simons, Beaman, Conger, & Chao, 1993), while parental social isolation has been found to correlate with impaired family functioning (Crittenden, 1985). In multiple studies, neglectful mothers have been found to be significantly more isolated from family and neighbors and to have less support available from informal networks than did a comparable group of nonneglectful mothers (Giovannoni & Billingsley, 1970; Polansky, Gaudin, Ammons & Davis, 1985). In his discussion of the interaction of proximal processes and child development, Bronfenbrenner suggests that the establishment of increasingly complex interactions between a caregiver and a child depend to a substantial degree on the active involvement of an alternative adult who supports, aids and positively encourages the caregiver (Bronfenbrenner & Morris, 1998).

Although all individuals require supportive networks in order to function effectively, it has been suggested that such networks are particularly crucial to successful survival within very low-income settings (Stack, 1974). Because social support is most beneficial to those individuals who may be in need of assistance from others, it has been suggested that parents living in poverty, or under greater conditions of stress, may have a more substantive need for support than parents who are economically well off as low-income parents cannot "purchase" services, but must instead, rely primarily on others in their environments for assistance (Hashima & Amato, 1994).

Despite a greater reliance upon informal networks of support for survival, research has shown that, in actuality, people living in poor neighborhoods tend to have less social capital, or fewer social relations that provide them with access to resources (Coleman, 1990), perhaps due to factors such as high residential mobility and ethnic heterogeneity (Aber, 1994). Furthermore, Jackson and colleagues (2000) found a sizeable indirect relationship between a lack of instrumental support and maternal depression within a low-income population, suggesting that support might mediate the impact of economic strain on maternal psychological functioning (Jackson, Brooks-Gunn, Huang, & Glassman, 2000).

In looking at interactions between mothers and infants, Crockenberg found that support had its strongest impact on mothers who had irritable babies, suggesting that the availability of social support is particularly important when a family is under stress (Crockenberg, 1981). Furthermore, in their study of kindergarten children and their mothers, Pianta and Ball (1993) found that parental social support had virtually no relationship to child outcomes when the entire sample was utilized for analysis. Rather, levels of social support were found to be significantly related to competent child behavior in school when separate analyses were conducted for

subsamples of the population in which the parenting system was substantially challenged by stressful circumstances.

Social support is commonly conceptualized as impacting child developmental outcome through the “buffering effect”, whereby support is related to well-being primarily for individuals under stress, as the support protects the person from the stressors’ potentially negative influence (Belsky, 1984; Cohen & Wills, 1985). In this conceptual model, Belsky suggests that parenting is multiply impacted by contextual stress and support, the parents’ psychological well-being, and child characteristics. The resources provided by external social networks which provide emotional, instrumental, and informational support (Pianta & Ball, 1993), may serve to mediate parental stress associated with low income or child temperament (Belsky, 1984), or perhaps, even, maternal depression. It is generally accepted that one is more able to be aware and responsive to the needs of others when one’s own needs are being met (Crockenberg, 1981). Therefore, parents who are part of broader, more supportive networks of people may be less overwhelmed and have fewer demands on their time, allowing them to be more available to their offspring (Cochran & Brassard, 1979). Interestingly, Crnic and colleagues (1984) suggest that the effects of parental support systems on infant developmental competence might not be measurable until later, during the preschool years, after the parents’ interactions within the support system have developed and become more capable and frequent.

Parental social support may also influence child development more directly as support available to parents is frequently available to their children as well (Crockenberg, 1981). A relative or friend who predictably provides parenting support to a mother under stress, may also serve as a stable and reliable source of care for a young child, perhaps contributing to more optimal developmental outcomes for that child (Crockenberg, 1981; Pianta & Ball, 1993).

Importantly, in her studies of resilient children, Werner found that the existence of any high-quality, secure relationship with even one person appears to buffer children from the negative effects of stress and/or poverty (Werner, 1985). Perhaps parental social networks provide stable care that might not otherwise be available to a given child. Inversely, in families touched by maternal depression, a mother's isolated lifestyle may prevent young children from developing an extrafamilial support network, leaving them more vulnerable to adversity (Cummings & Davies, 1994).

Crucial to any discussion of the role social support plays in child development is the recognition that mothers may play a significant transactional role in the creation of their own support networks (Crittenden, 1985). Depression in mothers has been documented to be associated negatively with measures of social support (Jackson, 1998). Interestingly, Zahn-Waxler, Ianotti, et al. (1990) found that there were some depressed mothers who continued to parent in a proactive, responsive manner despite their depressed state. Of these "proactive" mothers, only 11% were found to interact with a depressed friend, choosing to surround themselves instead with psychologically healthy women. Of the less responsive and less proactive, depressed mothers, 70% interacted with a depressed friend, bringing into question the role that characteristics of the mothers play in determining their social networks. Furthermore, Polansky et al. (1985) found that neglectful mothers, who reported their neighborhoods as lacking support, were instead viewed by neighbors as 'deviant' and unlikely to reciprocate help and were therefore isolated by the support networks around them. Researchers have been left to determine the order of causality: Are mothers depressed due to challenging situations and lack of social support? Or are mothers lacking in social support because of the effects of their depressive symptomology?

Crnic and Greenberg (1987) suggest that the construct “social support” may actually serve as a proxy representing a host of social competencies and personality characteristics. As such, social support may operate as a coping resource that is more efficiently utilized and developed by higher functioning individuals or by those whose ecological settings allow them to do so. Ecological settings such as home, school, work, and community groups, as well as the interactions between these contexts, may influence the resources that are available or utilized at any given time (Crnic & Greenberg, 1987).

Finally, while social support has primarily been found to lead to more optimal family outcomes, there is some evidence that it may, at times, impact negatively on family functioning. Cochran and Brassard (1979) suggest that social support may actually weaken the parental role when it is provided in the form of unsolicited advice which undermines the parenting role, or when it places time demands upon a parent that causes his/her energies to be diverted from caregiving activities. In fact, it has been found that in a low-income, black sample of single mothers, greater availability of instrumental support, generally provided in the form of a grandmother’s presence, appeared to exacerbate the effects of maternal depression on parent stress, leading, subsequently, to a greater number of child behavior problems (Jackson, 1998). Social support can be buffering if delivered in a helpful manner, but can cause greater distress if its source is a conflictual relationship. Furthermore, it has been found that in a population of single mothers, who could be postulated as having a greater need for support, that higher levels of support with *parenting* duties resulted in better child outcomes, while increased *social* contact actually seemed to decrease parenting efficacy, perhaps because it diverted energy away from parenting and into social activities (Weinraub & Wolf, 1987).

High Quality Day Care as a Factor

Day care represents another potential resource to low-income families, particularly, perhaps, to those with a depressed primary caregiver. As of the mid-1990s, 1.7 million infants under one year of age were in childcare while their parents worked (U.S. Census Bureau, 1997). One study, which found that 72% of infants were placed in non-parental care during the first year of life, reported that three-quarters of those infants entered day care prior to four months of age and were in others' care for an average of 28 hours per week (NICHD Early Child Care Research Network, 1997a). Furthermore, the percentage of children under age 3 in center-based care tripled between the years of 1977 and 1994 (U.S. Census Bureau, 1982, 1997), rising from a mere 8% to 24% of children with employed mothers. With an ever increasing number of children being placed in non-maternal child care arrangements at very young ages and for longer amounts of time than ever before (Phillips & Adams, 2001), with traditional programs such as Head Start which generally offer part-time programs becoming impractical for working mothers (Brooks-Gunn, et al., 2000), and with a growing consensus that center-based care offers more benefits than more informal arrangements (Shonkoff & Phillips, 2000), researchers have turned their attention to evaluating the developmental outcomes related to this societal shift in caregiving duties.

It has been shown in multiple studies that early, high quality day care provides an opportunity to affect the daily environments of children directly (Cherlin, 1995), and can enhance the cognitive development of poor children when compared to those who were not in day care (Aber et al., 2000; Belsky & Steinberg, 1978; Burchinal, Lee & Ramey, 1989). Poor infants were found to receive relatively poor quality care in home-based settings and only received care comparable to that provided to their more affluent peers when they attended a child

care center (NICHD Early Child Care Research Network, 1997b). More specifically, it has been noted that the decline in intellectual functioning typically noted in socioeconomically disadvantaged children beginning around the age of 18 months is less pronounced in children who attended a university based day-care intervention program as opposed to children being cared for at home. The day-care cohort of children significantly outscored home-reared children on IQ tests given at 18 and 36 months of age (Burchinal, et al., 1989). In addition, the quality of care received has been found to be significantly correlated with the observed social competence of children in daycare (Bradley, Caldwell, Fitzgerald, Morgan, & Rock, 1986).

In a different study published in 1977, the experiences of children in home care, in family day care, and in day care centers were found to be significantly different (Cochran, 1977). This difference in experience was attributed to the varying roles of the caregivers in each setting. For both maternal care and that provided in home-based day care, Cochran suggested that the physical environment is set up in such a way to further the adult home-making roles (cooking, cleaning, paying bills) that take place in addition to child caretaking, leading to more child exploration, but also greater limit setting than that found in day care centers. In contrast, day care centers are focused on only one adult role, that of child care. Therefore, the focus of adults at a daycare center, as well as the set up of the physical environment, is geared towards providing many play opportunities with as few limits on exploration as possible (Cochran, 1977; Howes, 1983). “The pattern which emerges is one where the child in either type of home setting is being constantly reminded of the saliency of the adult, while the center child’s attention is drawn via similar restricting and directing techniques to the importance of appropriate peer relations (Cochran, 1977, p. 706).”

A working definition of “high quality care” is necessary to any discussion of the process through which it could improve the developmental outcomes of the children of low-income depressed mothers. Overall center quality appears to have a profound effect on language development, self-regulatory abilities, overall cognitive achievement, and socially competent behaviors (Bradley, et al., 1986; Hayes, et al., 1990). More specifically, classroom practices were found to be related to children’s language and cognitive skills, whereas social skills were found to be associated with the “closeness” of the teacher-child relationship (Peisner-Feinberg, et al., 2001). Phillips (1988) notes that the quality of day care has traditionally focused on three primary policy variables termed the “iron triangle”: group size, caregiver/child ratio, and caregiver qualifications (as cited in Hayes, et al., 1990). Bredekamp and Copple, in their publication, Developmentally Appropriate Practice in Early Childhood Programs (1997), expand upon this core ‘definition’ by citing several childcare practices inherent to a high quality program.

First, there should be adequate continuity of care to ensure that each infant and child is able to form a strong relationship with a primary care provider, with whom reciprocal patterns of communication can be enhanced. Day care providers have been found to be salient members of a child’s immediate social world and micro-system, impacting upon their development. The stability of caregiving has been found to be a salient factor in developmental outcome (NICHD, 1997a). Children with more frequent day care changes are more likely to be classified as insecurely attached (NICHD, 1997a), appear to have less competent peer interaction as toddlers (Howes & Stewart, 1987), and are more withdrawn and aggressive in preschool (Howes & Hamilton, 1993). Whenever possible, adults should transition to older rooms with children so as to provide opportunity for ongoing and uninterrupted relationships with children.

In fact, there is a growing body of evidence that supports the benefits of long- term continuity of care which ensures that infants and small children will be tended by the same individual or individuals over a lengthy period of time, thus allowing for the development of long-term relationships. Children appear to gain a sense of security from the relationships they share with their teachers, which appears to resemble the security gained through the mother-child relationship (Howes & Hamilton, 1993). When compared to staff members that had been present for less than 3 months, Barnas and Cummings (1997) found that children directed more attachment behaviors to long term staff, and that those same teachers were more able to soothe distressed children than those who had been present for a shorter period of time. Young children appear to treat child care providers as an alternate category of attachment relationship and respond differently to those providers who have been present for longer periods of time and have therefore become more predictable (Howes, 1999). In addition, stability of early care has been shown to be related to better school adjustment in first grade (Howes, 1988).

Furthermore, adults should engage in many one to one, and face- to- face interactions with infants and young children, and these interactions should be warm and responsive. In addition, caregivers should consistently respond to physical and emotional needs, thus encouraging the development of trust (Bredekamp & Copple, 1997). Finally, high quality care needs to ensure a low adult-child ratio that supports an adult's ability to respond contingently to each child's needs. In fact, Legendre and Kortinus (1996), found that children's cortisol levels, generally considered a marker of stress, were positively correlated with group size and larger ratios of children to caregivers (as cited in Gunnar, 1998).

Although high quality care has been found to benefit children from disadvantaged environments over lower quality or maternal care, there is no guarantee that low-income parents

will be able to place their children in the types of high-quality, enriched programs on which these findings are based (Cherlin, 1995). The cost of high-quality childcare settings is prohibitive for many low-income families, leaving many poor mothers with fewer childcare choices (Spencer, Blumenthal, & Richards, 1995). In fact, it has been established that the relationship between income and the quality and stability of care received were positively and linearly related (Galinsky, Howes, Kontos, & Shinn, 1994; NICHD, 1997a).

Employed mothers in families with higher-incomes were found to be more likely to pay for care than were mothers in lower-income families who sought out informal arrangements with relatives or other members of their communities (Cherlin, 1995). The amount of income spent on childcare represents an incredible burden for poor families with mothers who received public assistance (AFDC) spending an average of 22% of the family income on child care, while families not receiving AFDC only spent 9% of their total income on childcare (Hofferth, 1992). The economic burden of childcare has resulted in children from families who operate under the burdens of greater psychological and economic stress being more likely to be placed in lower quality care, thus experiencing “double jeopardy” from stressors in both their home and daycare environments (Gamble & Zigler, 1986; Hayes, et al., 1990). Children with secure parental attachment have been found to be buffered from the stresses of unstable and unresponsive child care (Erickson, Sroufe, & Egeland, 1985) whereas children with insecure parental attachments have been thought to be at greater risk from low quality care (Gamble & Zigler, 1986). For children of low-income depressed mothers, unstable, low-quality childcare, which has been found to be a prominent possibility within the lower socioeconomic strata, may intensify the already negative developmental consequences of unresponsive, unstable, maternal care.

The results of studies examining the impact of the provision of high-quality childcare to low income populations hold a major policy implication for those making the funding decisions within our society: “the provision of universal, high-quality, center-based child care [for children from ages 1 to 3] seems likely to be beneficial to all types of participating children, even those who otherwise would be cared for solely by their mothers” (Hill, et al., 2002, p. 622). Furthermore, programs that target children and families that will benefit the most from the interventions offered, generally those children subjected to one or more cognitive, emotional, or resource deficiency, will have the greatest chance of repaying their societal costs (Karoly, et al., 1998). Children of depressed caregivers may well be a target population for whom intervention would have the potential of producing a significant long-term benefit to society.

Given the high rate of maternal depression amongst families living within poverty, the impairments in parenting that have been found to result from depressive symptomology, and finally the established importance of high quality adult-child interaction to optimal child development, it is important to question if perhaps high quality day care, provided at an early age, may serve the purpose of providing infants and young children alternative opportunities for achieving mutual regulation and intersubjectivity that they might not otherwise receive. In addition, high quality day care would inhibit the isolation so often found in families with a depressed caregiver by placing both mother and child in contact with external supports and relationships. Brooks-Gunn et al. (2000) note that the benefits of intervention programs emerge as much from enhancing parental competence, as from helping children to acquire and retain competencies. Furthermore, theory would support the need for this intervention beginning in infancy for those mother-child dyads lacking in mutual regulation, reciprocity, and responsiveness.

Howes and colleagues (1998) examined the attachment relationships that children had with both their mothers and caregivers. Interestingly, they found that toddlers with insecure attachments to *both* mother and caregiver demonstrated the least ability to engage in interactions with caregivers while at day care. 45% of the children studied had nonconcordant attachment relationships with their mother and caregivers, with 41% of these nonconcordant attachments representing children insecurely attached with their mothers, but securely attached with their caregivers. Those children who established insecure attachments with their mothers, but secure attachments with their daycare providers, demonstrated more socially competent behaviors with their peers than those insecurely attached to their mother who also failed to form a secure relationship with the caregiver. These findings suggest that a positive attachment to a caregiver may offer the child an alternative model of social relationships, thus contributing to the development of higher levels of competence. In this way infant childcare may serve as an early intervention for children with disturbed mother-child interactions (Howes, Rodning, Galluzzo, & Myers, 1988). Further support for early intervention, in fact, is provided in a 1995 study that found that infants as young as 3 months old could develop more positive interaction patterns with their day care teachers than with their own mothers, indicating that nursery school teachers of the infants of depressed mothers might serve as natural buffers in the environment (Pelaez-Nogueras, et al., 1995).

CHAPTER III

Methodology

Sample

As suggested by bioecological theory, it is important to study children in their natural contexts. The present study utilized a naturally occurring population of low-income mothers and their preschool- aged children drawn from a federally funded Head Start program located in a small city in Southwest Virginia. This particular program began serving families in the prenatal period and extended services to age 5 or entrance to kindergarten. Services were being provided to approximately 785 Head Start (3 years of age and up) and 97 Early Head Start (6 weeks to 3 years of age) children and their families. Data were collected from 49 parent-child dyads enrolled in the Head Start Program at six different full-day centers. From the original sample of 49, six dyads were eliminated from the data analyses for the following reasons: the family moved before a complete set of child data could be collected (1), fathers filled out the CES-D and support questionnaires rather than mothers (2), mother's reading level prohibited proper completion of questionnaires (1), child had an IEP that was indicative of a disability that would impact performance on cognitive instruments (1), and mother possessed a graduate degree with her child's cognitive data significantly skewing data analyses (1). Therefore, complete data sets were collected from 43 mother-child dyads (20 girls and 23 boys). Data from these 43 dyads were used in all subsequent analyses.

Because of the differences in the number of children served by the Early Head Start Program and those served by regular Head Start, there was a natural sample of children who had differing "ages of entry" to the Head Start Program. Some preschoolers in the study had received services since infancy, while others did not enter the program until age three or four.

By evaluating children at preschool age, the sample managed to include children who had been enrolled in Head Start for varying amounts of time. In the final sample, children's age of entry to the program ranged between 2 months and 59 months of age (mean=37 months, SD = 13.34) children entering Early Head Start before age 3, and 29 entering after age 3. At the time of data collection, children ranged in age from 44 months to 64 months with a mean age of 55 months (SD = 5.46). To compensate for the wide range of ages included in the study, age in months at time of assessment was controlled for in all analyses involving child outcome measures other than the PPVT which automatically controlled for age.

The majority of the sample identified themselves as African American (77%), with 14% identifying themselves as Caucasian, 2% as Asian American and 7% as other. Ninety-five percent of the sample indicated that they were non-hispanic. Mothers' educational levels ranged from eighth grade to completion of a college degree with 63% reporting a high school degree or less, and 37% having completed a higher level of training. All participants were low-income as that is an entry requirement for acceptance into all Head Start programs. See Appendix A for more detailed descriptive statistics.

Procedures

Initial contact with participants was made through a preliminary letter (Appendix D) that introduced the study, invited mothers to participate, and included a copy of the informed consent form (Appendix E) for their perusal. Also included in the letter was a date and time approximately a week later that the researcher would be available at the Head Start Center to answer questions and assist with completion of the questionnaires. Mothers were informed within the letter that they would be compensated for their time with a five dollar gift card to Wal-Mart. In addition, there was a section of the letter where mothers could indicate the preference

to have the questionnaires sent home to be completed and returned. Several mothers indicated this preference and in these cases the forms were sent home with their children along with a self-sealing envelope and letter of explanation informing mothers of the confidentiality of their responses. Teachers were given a large, manila envelope in which to collect any information being returned to the researcher.

As explained in the letter, the researcher was available for three to four hours during afternoon pick-up time at each center. Many mothers inquired about the study and asked questions before deciding whether or not to participate. In all cases, the researcher reviewed the contents of the Informed Consent Form and each questionnaire prior to providing the mother with a clipboard holding all required forms. Mother data packets included a questionnaire regarding basic demographic information and care received by the child prior to entering Head Start (Appendix F), the CES-D (Appendix G), the Perceived Social Support Scale-Family (Appendix H), and the Perceived Social Support Scale-Friends (Appendix I). Available space varied at each center, but mothers were free to complete the questionnaires anywhere that they felt most comfortable. Assistance in completing the forms was offered to all mothers but was never accepted, although several mothers inquired about specific questions on the forms. Two mothers sought out reading assistance from Head Start staff at the center, while the others completed the forms independently. Individual consistency in the answers on the questionnaires, including those items that were reverse coded, indicate that participants' reading ability was adequate for the paperwork. One mother declined help, but was clearly circling answers without reading as she completed the questionnaires. Therefore, her and her child's data were eliminated from the analyses.

Most mothers completed the questionnaires that afternoon at the center and were given their five dollar gift card to Wal-Mart in return. Others, who indicated that they were interested but in a hurry, were allowed to take them home and return them to the classroom teacher at a later date to hold for the researcher to pick up. In these cases, gift cards were sent home after the questionnaires were returned to the teacher. In almost all cases, teachers were very helpful in reminding and encouraging parents to stop by and speak with the researcher, and many helped to follow up with parents about returning the data packet. At the one center where children were transported home by school bus rather than by parents, the questionnaire packet was sent home to all mothers to be completed if interested. On several occasions, mothers of children who were not an appropriate age for the study indicated their interest, suggesting that a larger sample might have been possible had there been a longer time window in which to collect data. Clearly, the ability to revisit each of the centers six months later would have resulted in a second wave of children who were an appropriate age for the study.

Once maternal permission had been received and maternal data collected, each teacher was asked to complete the Social Skills Rating Scale and the Classroom Conduct Problems Scale (United States Department of Health and Human Services, 2001; see Appendixes K and L) for each participating child in her classroom. In each case, the questionnaires were completed by the head teacher and she was compensated \$25 for her time.

Finally, data on both cognition and language ability were collected from each participating child after receiving the child's verbal assent (see Appendix J). Utilizing the Yes-No task (Wolfe & Bell, 2004), the Day/Night Stroop (Diamond, Prevor, Callendar, & Druin, 1997; Gerstadt, Hong, & Diamond, 1994), and the Peabody Picture Vocabulary Test (Dunn & Dunn, 1997), children were assessed once, individually, at a location within the Head Start

Center. In all but one center, assessment was able to take place at a location outside the classroom. At three centers, a quiet, self-contained space was available for use by the researcher. At two other centers, common hallway space, which was quieter than the classroom but contained some degree of disruption, was utilized, while at one center there was no space available other than a “less-traveled” area of the classroom.

In all cases, The Day/Night Stroop (Diamond, et al., 1997; Gerstadt, et al., 1994) and the Yes/No task (Wolfe & Bell, 2003) were administered first, followed by the PPVT (Dunn & Dunn, 1997) due to the length of the Peabody test. In the experience of previous researchers, the two working memory tasks were found to be much more quickly accomplished and therefore such ordering was found to facilitate smoother evaluation with young children (Bell, 2003, personal communication).

Instruments

Demographics and Previous Day Care Experiences

Basic demographic information, as well as information regarding the amount and type of care received by the child prior to entry into either Early Head Start or Head Start, were collected on one questionnaire (Appendix F). Mothers were asked to list all care providers who cared for their child for more than 15 hours a week prior to entry into Head Start. In addition, mothers were asked to describe their relationship to these care providers. Type of previous care was dummy coded as “parent only”, “family only”, “center-based only”, “friend”, “friend and family”, “home daycare”, “center and family/friend”, or “undefined.” See Appendix A for frequencies of previous day care experiences.

Demographic information collected included race and maternal education. In addition, each child’s birthdate and date of entry to the Head Start Program were obtained from the

mother. This information allowed the researcher to calculate the child's age at time of data collection, as well as the age of entry and the duration of service each child had received in relation to Head Start.

Maternal Depression

Maternal depressive symptomology was assessed using the Center for Epidemiologic Studies Depression Scale (CES-D), which is a 20-item scale that inquires about depressive symptomology within the past week (see Appendix G). The CES-D has been used extensively in the literature on maternal depression and has been utilized frequently with low-income populations (see Lyons-Ruth, et al., 1990; Orr & James, 1984; Pelaez-Nogueras, et al., 1995; Petterson & Albers, 2001 for examples). The CES-D has been shown to have high validity, as compared to other self-report measures and by correlations with clinical assessment of depression. Furthermore, its reliability, validity and factor structure have been established as being similar across a variety of demographic characteristics in the general population with coefficient alphas higher than .80 for all subgroups of the population (Radloff, 1977). Importantly, the CES-D has been found to produce equal validity and reliability for both white and black populations (Radloff, 1977; Roberts, 1980), which made up the majority of this sample.

The CES-D produces scores that range from 0 to 60, with a score above 16 being indicative of the presence of depressive symptomology high enough to be considered "depressed". In large-scale epidemiological studies, it has been found that 80-91% of the population scored in a range below 16, while 99% of people with recognized depression scored above the cutoff score of 16 (Husaini, Neff, Harrington, Hughes, & Stone, 1980; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977).

Maternal Perceived Support

Each mother's perception of her available social support from both family and friends was assessed utilizing the Perceived Social Support Scale (see Appendixes H and I). The PSS measures the degree to which a person perceives that his/her needs for support are fulfilled by family and friends (Procidano & Heller, 1983). There is a separate scale for family support and friend support, each consisting of 20 questions which require the participant to answer Yes, No, or Don't Know. Sample items include: "My friends give me the moral support I need" and "Most other people are closer to their family than I am." In a validation study, PSS-Fr and PSS-Fa were found to have Cronbach's alpha of .88 and .90 respectively ($n = 222$). Furthermore, each scale was found to be composed of a single factor (Procidano & Heller, 1983). More recently the scales were utilized with a population similar to that proposed here and were found to have alpha = .95 for the family scale and .84 for the scale measuring support from friends (Jackson, 2000).

Child Cognitive Development

Two different tasks were utilized to measure a child's cognitive level, specifically his or her working memory and inhibitory control. During both tasks the child was required to keep two rules in mind and to suppress a dominant response in order to perform a non-dominant response. This latter process has been found to reflect self-regulatory abilities related to the maturation of the anterior attention network in the second half of the first year of life (Kochanska, Murray, & Harlan, 2000; Rothbart & Ahadi, 1994; Rothbart & Bates, 1998). Self-regulatory abilities, in turn, have been found to form the foundation for many different areas of functioning including cognitive, social, emotional, motor and behavioral competencies

(Kochanska, et al., 2000). In addition, level of working memory has been positively associated with receptive language ability (Wolfe & Bell, 2004). As suggested by the mutual regulation model, the development of the ability to self-regulate may reflect, at least partially, the quality of the caregiver-child relationship during infancy, making effortful control tasks salient measures for research involving depressed mothers and their children.

The Day/Night Stroop task (Gerstadt, et al., 1994) is thought to involve the development of the prefrontal cortex and has been used in the developmental literature with children aged 3.5 to 7 (Diamond, et al., 1997; Gerstadt, et al., 1994; Wolfe & Bell, 2004), and requires children to utilize working memory to remember two rules while simultaneously inhibiting the dominant verbal response to a visual stimuli (Diamond, et al., 1997). The task was administered individually. Sixteen testing cards, marked with either a black sky and yellow moon, or a white sky with a yellow sun, were used, as well as two training cards. Each child was told to say “day” when shown the night picture and “night” when shown the day picture. After being given two learning trials, 16 test trials arranged in a pseudorandom order including eight of the day and eight of the night cards, were administered. The directions were repeated until the child could get the two test cards correct or the researcher determined that the child was not capable of performing the task. Percentage correct was calculated from the child’s responses.

For the yes/no task (Wolfe & Bell, 2004) the child was instructed to say “no” when the experimenter nodded her head yes, and to say “yes” when the experimenter shook her head no. As in the Day/Night Stroop task, the child had to inhibit a dominant response in order to perform a sub-dominant response. Two test trials were given, followed by sixteen test trials representing eight “yes” and eight “no” responses in a pseudorandom order. The directions were repeated until the child could get the two test cards correct or the researcher determined that the child was

not capable of performing the task. Here again, the percentage correct was calculated from the child's responses.

Most of the child working memory data were collected independently by the primary investigator. However, interrater reliability for the two working memory tasks was accomplished by having an assistant accompany the primary investigator on several occasions. This resulted in reliability coding for approximately 30% of the subjects ($n=13$) with the percent agreement between the two coders being 99.5% (414 out of 416 responses). The discrepancies, which were determined to be due to difficulty in the assistant hearing a child's response, were discussed, with final determination being made by the primary investigator.

Child Language Development

The Peabody Picture Vocabulary Test-III (PPVT-III; Dunn & Dunn, 1997) was administered to each child individually to measure receptive language ability. The Peabody is a nationally standardized instrument and has been utilized extensively in studies with Head Start Children (United States Department of Health and Human Services, 2001). The Peabody has been found to have alternate-forms reliability ranging from .88 to .96 with a median value of .94 and coefficient alphas ranging from .92 to .98 for the 25 standardization age groups (Dunn & Dunn, 1997). An association between verbal intelligence and maternal depression has been established in the literature, as well as a connection between early intervention and increased verbal intelligence (Cicchetti, et al., 1998).

Child Social Development

The Social Skills Scale (United States Department of Health and Human Services, 2001) (see Appendix K), which is a twelve-item scale completed by Head Start teachers, was used to assess the frequency with which a child engaged in friendly, cooperative, and compliant behavior

in class during the past month. This scale was specifically created for research with Head Start children and is an adaptation of the Social Skills Rating Scale developed by Elliot, Gresham, Freeman, and McCloskey (1988).

The Classroom Conduct Problems Scale (see Appendix L), which is a fourteen item scale completed by the teacher, was used to assess the frequency with which a child engaged in aggressive, hyperactive, or depressed-withdrawn behavior in class during the past month. It was developed specifically for use by the FACES research team with Head Start children and was modified from several existent scales (see United States Department of Health and Human Services, 2001).

Data Analysis

The research questions posed in this study were addressed using quantitative analyses. Descriptive analyses were conducted first to establish the frequencies, means, medians and standard deviations of all study variables (Appendix A). Next, correlational analyses were used to examine the directionality and significance of the associations between the independent and dependent variables. To more specifically test the hypotheses of the study, multiple regression was used to study the relations between maternal depression, age of entry to Head Start, perceived support, and child developmental outcome. Finally, hierarchical linear regression and analysis of variance techniques were used to look at main effects and group differences in the data.

CHAPTER IV

Results

This study investigated the relations between maternal depression, maternal perceived social support, age of entry to Head Start, and preschool-aged children's cognitive and social competencies. The types of data collected and the analyses conducted in this study were driven by a conceptual model that proposed that age of entry to high quality daycare would moderate the relation between maternal depression and child developmental outcome and that, in addition, maternal perceived support would act in a mediating capacity to attenuate the negative relationship between maternal depression and developmental outcome. Although the proposed mediated-moderator model was not supported by the data, this chapter will highlight the main effects within the data that were found to be significant.

After running descriptive statistics, correlational analyses were used to closely examine the direction and significance of the associations between the variables. Next, one-way ANOVA were conducted to assess group differences on the four child outcome measures (working memory, PPVT, social skills, and conduct problems) using three categorical, independent variables: age of entry to Head Start, maternal depressive status, and levels of maternal perceived support. Each of these independent variables was initially collected using a continuous scale, but was then dummy coded as a two-category variable: early/late entry to Head Start, maternal depressed/non-depressed status, and high/low levels of support. Finally, hierarchical linear regression equations were used to test the hypothesized relations between maternal depression, age of entry to Head Start, maternal perceived support and child developmental outcome. Because the data did not support the proposed model, further regression analyses were conducted to establish main effects present in the data.

Maternal Data- Descriptive Statistics and Correlations

Mothers in the study reported scores on the CES-D ranging from 0 to 48 (mean = 15.67, SD = 12.12). As established in the literature (Radloff, 1977), scores less than or equal to twelve were used to indicate “non-depressed” status and scores of 16 and above were used to delineate “depressed” status. Two subjects reported symptomology scores that fell between the two categories (14 and 15 respectively) and they were included in the non-depressed group for all analyses. Using this system of categorization, the maternal data yielded 63% “non-depressed” (lower levels of symptomology) and 37% “depressed” (higher levels of symptomology) mothers (see Appendix A).

Maternal reports of perceived family support ranged from 0 to 20 with higher scores indicating the perception of higher levels of support (mean = 14.77, SD = 5.37). Maternal reports of perceived friend support ranged from 4 to 20 (mean = 14.63, SD = 4.91). Because the two support variables (friend and family support) were found to be highly correlated ($r = .475$, $p = .001$), they were combined to form one composite support variable for analysis purposes. The combined support variable had a range of 6 to 40 (mean = 29.395, SD = 8.87). See *Table 1* (Appendix B) for more detailed descriptive statistics regarding maternal variables. In addition, the support variables were found to significantly negatively correlate with scores on the CES-D (Family: $r = -.437$, $p = .002$; Friend: $r = -.401$, $p = .004$; Combined: $r = -.489$, $p = .000$). These correlations are reported in *Table 2* (Appendix B).

Previous Childcare Experience and Age of Entry- Descriptive Statistics and Correlations

In response to the inquiry regarding the number of caregivers other than themselves who had cared for their children for more than 15 hours per week prior to being admitted to Head Start, mothers reported anywhere from 0 to 5 or more caregivers (mean = 1.93, SD = 1.45, see

Appendix A for frequencies). Although not included as part of the original hypotheses, multiple caregivers could be theoretically expected to negatively impact child development as it has been well established in the literature that consistency of care is important in the early years of life (Bredekamp & Copple, 1997), with center-based care offering a more optimal situation than informal arrangements (Shonkoff & Phillips, 2000). Furthermore, it has been suggested that due to welfare reforms which require even the mothers of very young infants to work, low-income women may be piecing together sub-standard care for their children in the absence of governmentally subsidized daycare (Zigler, 1994). The number of previous caregivers did not correlate significantly with any of the other variables included in the study, although it was marginally negatively associated with perceived level of family support ($r = -.2311$, $p = .070$) perhaps because mothers reporting higher family support needed fewer caregivers for their children. Because it did not seem to be significantly associated with any of the outcome variables, nor with child's age of entry to Head Start nor maternal depressive status, this variable was not included in any of the analyses. These correlations are reported in *Table 3* (Appendix B).

Children's age of entry to Head Start ranged from 2 months to 59 months of age (mean = 37.14, SD = 13.34). See Appendix A for more detailed descriptive statistics. For the purposes of comparing earlier ages of entry to later ages of entry, the subjects were divided into two dummy-coded groups: those that entered prior to 36 months of age ($n = 14$) and those that entered after 36 months of age ($n = 29$). This age split was chosen on the theoretical grounds that any service obtained prior to 36 months of age was through Early Head Start rather than traditional Head Start and therefore represented "earlier than typical" intervention. All included results will specify whether the continuous or categorical form of this variable was utilized.

Length of Head Start Service was a measure of the number of months that a child had been attending Head Start. While this variable necessarily correlated highly with the age of entry for each child ($r = -.9980$, $p = .000$), it was not expected to be as salient a measure as the age that a child was when he/she began receiving Head Start Services. Given the age range of the children included in the study, length of service does not provide any clear indication of the age of entry for any particular child. Children with exactly the same length of service, but who were more than a year apart in age at the time of assessment, would have entered Head Start at quite different stages of development. Given that the conceptual model for this study is predicated on the belief that there is a sensitive period in the first few years of life during which caregiving behaviors are particularly important, it was hypothesized that age of entry would be the more specific, and therefore, the “richer” of the two variables for analysis purposes. While length of service is included in the correlation table for Child Cognitive Outcomes (*Table 4*, Appendix B), it was not found to significantly contribute to the prediction of any of the outcome variables during regression nor did it produce any group differences during ANOVA analysis. Therefore, child age of entry, based upon statistical evidence that supported the theoretical assertion that it should be the more useful variable of the two, was used in all regression and anova analyses rather than length of Head Start Service.

Child Cognitive Outcomes- Descriptive Statistics and Correlations

The two working memory and inhibitory control tasks were designed to test a child’s ability to remember two rules simultaneously while inhibiting a dominant response. Scores on the Day/Night Stroop ranged from 0 to 100 % correct with a mean score of 74% ($SD = 21.01$). Scores on the Yes/No task tended to be lower and ranged from 6.3 to 93.8 % correct producing a mean score of 55% ($SD = 22.321$). For more detailed information regarding all child outcome

variables, see *Table 5*, Appendix B. Because the results of the two tasks were positively correlated ($r = .3317$, $p = .016$), the scores on the two tasks were averaged together to create one composite working memory score. This composite score, which ranged from 3.15% to 93.8 % correct (mean = 64.572, SD = 17.77), was used in all regression and ANOVA analyses. The combined working memory scores were found to positively correlate with Percentile Rank on the Peabody Inventory ($r = .2589$, $p = .049$). In addition, scores on the Day/Night Stroop negatively correlated with scores on the Conduct Scale ($r = -.2541$, $p = .052$), whereas scores on the Yes/No task showed a marginal, negative association with levels of maternal depression ($r = -.2119$, $p = .089$). Please see *Table 4* (Appendix B) for more detailed correlation information.

The PPVT-III (Dunn & Dunn, 1997) was utilized as a measure of receptive language ability. In all cases, the nationally standardized Percentile Rank was used for the purpose of analysis. Percentile rankings within the sample ranged from the 4th percentile up to the 73rd percentile, with a mean ranking of 30.5 (SD = 20.62). See Appendix A for more detailed information on frequency and descriptive statistics. The median percentile rank for this task was the 25th percentile, indicating that half of the children assessed in this study performed lower than 75% of the national sample. In addition, the PPVT was significantly related to several of the predictor variables in this study, as well as being associated with several of the other outcome variables. Scores on the PPVT were negatively associated with age of entry ($r = -.2788$, $p = .037$), positively associated with length of intervention ($r = .2789$, $p = .037$), negatively related to scores on the CES-D ($r = -.2862$, $p = .033$), positively related to the Yes/No task ($r = .2800$, $p = .036$), positively related to combined working memory ($r = .2589$, $p = .049$), and positively related to social skills ($r = .2848$, $p = .034$). See *Table 4* for more detailed correlation information.

Child Social Outcomes- Descriptive Statistics and Correlations

The Social Skills Scale is an instrument developed specifically for use within a Head Start sample (United States Department of Health and Human Services, 2001). It was designed to assess the frequency with which a child engaged in compliant, cooperative, and pro-social behaviors during the past month. It was scored on a scale from 0 to 24 with higher scores representing more pro-social, positive behavior. Teacher ratings on this scale ranged from 6 to 24 with a mean score of 15.16 ($SD = 4.54$, median = 15.0). Please see *Table 5* for the Means, Median, and Standard Deviation of all child outcome measures.

The Classroom Conduct Scale was also designed for use within a Head Start Population (United States Department of Health and Human Services, 2001). It purports to measure the frequency with which each child engaged in hyperactive, depressed-withdrawn, or aggressive behavior while at school within the last month. It was scored on a scale of 0 to 28 with higher scores representing more behavioral difficulties. For this sample, scores ranged from 0 to 19 with a mean score of 6.13 ($SD = 5.02$).

For this sample population, social skills and classroom conduct were found to be highly, negatively correlated as could be expected ($r = -.6567$, $p = .000$). In addition, social skills were found to be positively associated with score on the PPVT ($r = .2848$, $p = .034$). Finally, Classroom Conduct scores were found to be marginally, negatively related to scores on the Day/Night Stroop ($r = -.2541$, $p = .052$). See *Table 4* for more detailed information on correlations with these variables.

Between Group Differences for Child Outcome Measures

To determine between group differences for the four child outcome measures (working memory, PPVT, social skills, and classroom conduct), one way analyses of variance were

systematically conducted using three grouping variables: maternal depressive status, age of entry to Head Start, and level of maternal perceived support. For the PPVT, one-way ANOVA analysis was used because the Percentile Rank produced by that instrument already accounts for the child's age at time of assessment. For all other outcome measures, ANCOVA analyses were used with child's age at time of assessment entered as a covariate. Descriptive statistics for these analyses, including group means and standard deviations, can be found in *Tables 6-9*, Appendix B. Despite the fact that the direction of the difference in many of the group means supported the hypotheses of this study, significance was only achieved in one case: scores on the PPVT as grouped by age of entry (i.e. earlier and later entry, $F [1, 42] = 4.381, p = .043$). The earlier entering children had a group mean on the PPVT of 39.93 as compared to 26.41 for the later entering group ($SD = 24.07, 17.54$ respectively, see *Figure 1* and *Table 10*). No other significant group differences were identified using ANOVA or ANCOVA.

Regression Analysis of the Proposed Conceptual Model

Before beginning the analyses involving child outcome measures, the data were examined for any possible gender differences that might exist. No significant differences in demographics or outcome measures were found between boys and girls. In addition, the influence of maternal education was examined. Maternal education was found to correlate with working memory ($r = .312, p = .021$) and percentile rank on the PPVT ($r = .384, p = .006$). Using regression, maternal education was found to be an independent predictor of both working memory ($\beta = 4.687, R^2 = .159, p = .041$) and score on the PPVT ($\beta = 6.830, R^2 = .147, p = .011$). Therefore, level of maternal education was controlled for in all of the following analyses unless specifically stated.

Hypothesis One

The first hypothesis of this study, that child age of entry into Head Start moderates the effect of maternal depressive symptomology on child developmental outcome, was tested using regression (Baron & Kenny, 1986; Holmbeck, 1997). For the PPVT language regression analysis, a four model regression equation was run with maternal education entered first, score on the CES-D entered second, categorical age of entry (early, late) entered third, and the interaction between the CES-D and categorical age of entry entered in the fourth block (Holmbeck, 1997). For each of the other three child outcome measures (working memory, social skills, and classroom conduct), a five model regression equation was run with child's age at the time of assessment entered first, maternal education entered second, score on the CES-D entered third, categorical age of entry entered fourth, and the interaction between score on the CES-D and categorical age of entry entered fifth. It was necessary to enter age at time of assessment in the first block for these three regression analyses in order to control for the child's age given the wide range of assessment ages included within the sample. All four regression analyses used the Enter method. In order for age of entry to be found to be moderating the relationship between maternal depression and developmental outcome, the interaction between score on the CES-D and categorical age of entry would need to be significant. This was not found to be the case for any of the four child outcome measures. *Tables 11-14* show the regression coefficients, R and R^2 values for these four non-significant regression analyses. The data collected do not support the hypothesis that age of entry acts as a moderating variable on the relations between maternal depression and developmental outcome.

Hypothesis Two

Hypothesis two postulated that maternal perceived support mediates the relation between maternal depressive symptomology and child developmental outcome. Had age of entry been found to be a moderating variable as suggested by hypothesis one, this hypothesis would have needed to be tested using a mediated-moderator model (Baron & Kenney, 1986). However, because the data did not support a moderated model, hypothesis two was tested as a simple mediation effect. Three regression equations were needed to test for a mediator effect (Baron & Kenny, 1986; Holmbeck, 1997). First maternal depressive symptomology (score on the CES-D) was used to predict maternal perceived social support (combined support variable) while controlling for maternal education. This analysis produced a significant result ($\beta = -.355$, $R = .489$, $R^2 = .239$, $t = -3.436$, $p = .001$) with maternal depressive status accounting for approximately 24% of the variance in support scores.

Next the relations between maternal depressive symptomology and child outcome measures were assessed. Each of the four child outcome measures were analyzed with a separate regression equation. Because the PPVT had already accounted for child's age at time of assessment, its regression analysis was conducted using only maternal education and score on the CES-D as predictors, whereas the other three outcome variables entered child's age at time of assessment in the first block to control for age, followed by maternal education in the second block, with maternal score on the CES-D in the third and final block. All regressions were run using the Enter method. The results from these four analyses are detailed in *Table 15*, Appendix B. Maternal depressive status was not found to predict any of the four child outcome measures when controlling for maternal education.

Because none of the previous analyses found evidence for score on the CES-D predicting child developmental outcome, there was no need to determine if the relationships were mediated by social support. However, had significance been found in any of those regression equations, it would have been necessary to test for mediation by adding maternal perceived support to the regression equation testing the predictive value of maternal depressive symptomology on child outcome. If support were acting as a mediator for the relation between maternal depressive symptomology and child outcome, the predictive value of depression on child developmental outcome would be greatly attenuated when support was added to the regression equation.

Investigation of Main Effects Present in the Data

Maternal Level of Education

Using regression analyses, the predictive ability of maternal education was tested for all four child outcome measures. For the PPVT, maternal education was entered as the only predictor, while for the other three outcome measures, child's age at time of assessment was entered in the first block, with maternal education entered in the second. Maternal level of education was found to predict both working memory ($\beta = 4.687, R^2 = .159, p = .041$) and score on PPVT ($\beta = 6.830, R^2 = .147, p = .011$). Maternal education was not found to predict either social skills or classroom conduct. When regression analyses were run to test whether or not maternal education interacted with either score on the CES-D or age of entry in predicting child working memory or PPVT score, no interaction effects were found.

To investigate group differences by level of maternal education, the sample was divided into two groups and dummy-coded for analysis purposes: those mothers who had a high school degree or less ($n = 27$), and those that had a higher level of education ($n = 16$). A one-way ANOVA was run to look at the group differences for score on the PPVT by level of maternal

education, while ANCOVA controlling for age was used to look at group differences for the other three child outcome measures. Results of these analyses are shown in *Table 16*.

Significant group differences were found for score on the PPVT as grouped by maternal education ($F [1, 42] = 6.720, p = .013$). Children with mothers who had a high school education or less had a mean PPVT score of 24.93 whereas children with mothers who had acquired a higher level of education had a mean PPVT score of 40.75 ($SE = 3.52, 5.26$ respectively). See *Figure 2*. ANCOVA for the other three outcome variables were nonsignificant.

Age of Entry

Because age of entry was not found to moderate the relationship between maternal depressive symptomology and child developmental outcome, possibly due to the small sample size of 43 dyads, it was pertinent to determine if it had a main effect on any of the outcome variables. For this reason, regression equations were run utilizing categorical age of entry as a predictor for child developmental outcome. For the receptive language outcome, a two-model analysis was run with maternal education entered as the first predictor and categorical age of entry as the second. For the other three child outcome variables, a three-model analysis was run with child's age at time of assessment entered into the first block to control for age, followed by maternal education in the second block, and categorical age of entry in the third. The Enter method was used in all analyses. Categorical age of entry did not predict any of the four outcome variables. See *Table 17* for results of these four regression analyses. While one way ANOVA found significant group differences between early entry and later entry PPVT scores, and regression finds categorical age of entry to be a significant predictor of receptive language ability ($p = .043$), these effects become non-significant when maternal level of education is taken into account.

Perceived Social Support

To determine whether the maternal variable of perceived social support had a main effect on any of the outcome variables, regression equations were run using support as a predicting variable for child developmental outcome. For the receptive language outcome, a two-model analysis was run with maternal education in the first block and categorical age of entry entered as a predictor in the second block. For the other three child outcome variables, a three-model analysis was run with child's age at time of assessment entered into the first block to control for age, followed by maternal education in the second block, and age of entry in the third block. The Enter method was used in all analyses. Maternal perceived support was not found to significantly predict any of the four child outcome measures. See *Table 18* for results of these analyses.

Group Differences by "Level of Depression Symptomology"

The theoretical model on which this study was based is predicated on the belief that it is impairment of maternal responsiveness and nurturance due to depressive symptomology that leads to deficits in child outcome for offspring of depressed mothers. When regressions were conducted using continuous score on the CES-D as a predictor for child developmental outcome, no significance was found. See *Table 15* for the results of these regression equations.

To determine if depressive status (depressed, non-depressed) as determined by the CES-D was a better predictor than raw score on the CES-D, regression equations were run using depressive status as the independent variable. As noted in the literature, scores on the CES-D of 16 and above were dummy-coded as "depressed" with all others coded as "non-depressed." As before, a two-model analysis was run with maternal education in block one and depressive status entered as a predictor in block two for the receptive language outcome. For the other three child

outcome variables, a three-model analysis was run with child's age at time of assessment entered into the first block to control for age, followed by maternal education in block two, and depressive status in the third block. Results of these analyses can be found in *Table 19*. No significance was found for any of these regression equations.

Finally, mothers were divided into two different depressive categories: those with high depressive symptomology and those with lower or non-existent depressive symptomology. Because it is the degree of parental impairment that is postulated to be responsible for child developmental deficits in the children of depressed mothers, it was pertinent to explore whether perhaps the traditional "definition" of depressed and non-depressed generally utilized with the CES-D was not capturing the most salient categorical differences in mothers' symptomology for this particular sample. Perhaps it was the mothers who could not only be categorized as depressed, but who reported scores well above the cut-off for depression, who were the most impaired in their parenting abilities. To test this, groups were formed by placing all of the mothers who had scores on the CES-D at least 5 points higher than the cut-off for depression into one category ($n = 12$, see Appendix A) and all of the mothers who were either "non-depressed", or had scores within 5 points above the cutoff score for "depression", into another category ($n = 31$). This new cut-off point was chosen in an effort to eliminate those mothers who were only slightly above the cut-off score from the depressed category. In looking at data frequencies for the CES-D scores, there was a naturally occurring gap between CES-D scores of 19 and 23. This natural break in scores was utilized to form the new groups with the result that 4 mothers who had previously been coded as "depressed" were now included in the "non-depressed" category. This simple shift of 4 subjects greatly improved the predictive ability of the maternal depression construct. Regression equations were then run to test for the predictive value of the new

categorical variable based upon level of symptomology. Once again, a two-model analysis was run with maternal education in the first block and level of symptomology entered as a predictor in the second block for the receptive language outcome. For the other three child outcome variables, a three-model analysis was run with child's age at time of assessment entered into the first block to control for age, followed by maternal education in block two and level of symptomology in block three. The results of these analyses are shown in *Table 20*. Level of depressive symptomology was found to be a significant predictor of child social skills ($\beta = -3.256$, $p = .039$). It was not found to be a significant predictor of working memory, PPVT, or classroom conduct. When maternal perceived support was added to the previous regression equation to examine whether maternal perceived social support potentially mediated the significant relation between level of depressive symptomology and child social skills, this was not found to be the case. In fact, the addition of maternal perceived support, which was itself nonsignificant ($\beta = -8.575E-02$, $t = -.924$, $p = .361$), actually improved the predictive ability of level of depressive symptomology ($\beta = -4.190$, $t = -2.285$, $p = .028$).

Due to the significance found in the regression equation utilizing categorical level of depressive symptomology as a predictor for social skills, a one-way ANCOVA controlling for child's age and maternal education was conducted to examine group differences in social skills scores based upon higher or lower levels of maternal depressive symptomology. Identical analyses (with only maternal education entered as covariate for the PPVT) were run for the other three child outcome measures as well. Descriptive statistics for the comparison of means by categorical level of symptomology for all four outcome variables are listed in *Table 21*. Significant group differences between those with higher and lower depressive symptomology were found for child social skills ($p = .039$, see *Table 22*). Children whose mothers had lower

levels of depressive symptomology had a mean score on the Social Skills Scale of 16.16, while those with higher levels of symptomology had a mean score of 12.75 on the social skills scale (see *Figure 3*).

Post Hoc Gender Analyses

After examining main effects present in the data for the entire sample, some preliminary, exploratory analyses were conducted to examine whether the significant main effects operated in the same manner for boys ($n = 23$) and girls ($n = 20$). As stated earlier, when examined for group differences in child outcome measures and maternal demographic characteristics, there were no group differences between boys and girls in this sample. Therefore differences found between genders in how the main effects manifest are not due to fundamental differences in the sample, but rather to differences in the relations between maternal variables and child outcomes for each gender. Because of the small sample sizes involved in these analyses, these findings should be considered speculative in nature, although, perhaps, worthy of future study. The results of these analyses are detailed in this section.

Maternal Level of Education

In whole group analyses, maternal level of education was found to be a predictor of percentile rank on the PPVT ($p = .013$). When the analyses were run separately for boys and girls, maternal education predicted percentile rank on the PPVT for boys ($\beta = 11.203$, $R^2 = .455$, $t = 4.190$, $p = .000$), while it was not a predictor of score on the PPVT for girls ($\beta = 2.514$, $R^2 = .020$, $t = .602$, $p = .555$). To test for an interaction effect between child gender and maternal education in predicting child receptive language ability, a two block regression analysis was run with maternal education entered in the first block, and the interaction between maternal education and gender in the second. This resulted in a significant interaction effect for maternal

education and gender in predicting receptive language ability ($\beta = 5.077$, $T = 2.602$, $p = .013$), with maternal education's independent predictive ability dropping to nonsignificant levels when the interaction term was included ($\beta = 4.467$, $t = 1.740$, $p = .090$).

When maternal education's predictive value for child working memory was examined in the whole group, it was found to be significant ($p = .041$). When this relation was examined separately for boys and girls, it was not found to be significant for either suggesting that more than likely maternal education impacts boys' and girls' working memory in a similar fashion, but that the entire sample was needed to achieve statistical significance for this effect. The interaction between gender and maternal education was found to be non-significant when examined in relation to child working memory.

Level of Depressive Symptomology

Maternal Level of Depressive Symptomology was found to be a significant predictor of child social skills when examined using the whole sample ($\beta = -3.051$, $t = -2.188$, $p = .039$). When examined separately, categorical level of maternal depressive symptomology appeared to more strongly predict boys' social skills ($\beta = -3.470$, $R = .583$, $R^2 = .339$, $t = -2.231$, $p = .038$) than it did girls' ($\beta = -3.172$, $R = .466$, $R^2 = .218$, $t = -1.315$, $p = .207$). When regression was utilized to test for an interaction effect between gender and maternal depressive symptomology in predicting child social skills, the interaction effect had a significance of $p = .099$ ($\beta = -4.215$, $t = -1.693$), whereas the independent predictive ability of level of maternal depressive symptomology dropped to a non-significant level ($\beta = -1.204$, $t = -.626$, $p = .535$) when the interaction term was included in the equation.

Furthermore, when the hypothesized moderating role of age of entry on depression's relation to child outcome was examined, it was found to operate differently within each gender.

To test whether age of entry moderated the relation between maternal level of depressive symptomology and boys' social skills, a five-model regression analysis was run. Child's age was entered in the first block, followed by maternal education in the second block. Next, categorical level of depressive symptomology was entered in the third block, followed by age of entry in months in the fourth block, and the interaction between level of symptomology and age of entry in the fifth. This analysis resulted in a significant interaction term ($\beta = -.347$, $R = .719$, $R^2 = .517$, $t = -2.261$, $p = .037$) indicating that continuous age of entry moderates depressive symptomology's relation to social skills for boys. When an identical regression analysis was run to test for a moderating effect of age of entry among the girls' data, no interaction was found ($\beta = .241$, $R = .512$, $R^2 = .263$, $t = .924$, $p = .371$). When the equations were run using continuous CES-D data, instead of categorical depressive symptomology, a similar trend was found: for boys, the interaction between CES-D and age of entry had a p value of .089, whereas for girls, the p-value was .639, indicating that perhaps age of entry interacts with depressive symptomology in predicting social skills differently for boys and for girls.

To examine more closely the direction of the noted moderation effect in boys, a two-way ANCOVA was run controlling for child's age and maternal education. The fixed variables were entered as categorical level of depression and categorical age of entry. Throughout the analyses reported in this chapter, categorical age of entry has utilized a cut off of 35 months for early age of entry with children who entered at 36 months of age or later being categorized as late entry. Because two of the boys in the high level of depression group began Head Start at 36 months of age, using the already established age of entry categorization system resulted in there being only one boy in the highly depressed, early entry category. Because this ANCOVA was purely speculative in nature and was being utilized for the sole purpose of examining the direction of

effect of the previously stated moderation effect, the age of entry category was recoded to include a start age of 36 months in the early entry group. This resulted in an equal distribution of boys of highly depressed mothers in the early and late entry categories, although the results can only be considered preliminary given the small group sizes involved. In addition, please note that continuous age of entry was used in the original regression equation that found a significant interaction, but that categorical data were used here to look at the direction of effects.

Using this new coding system for age of entry, a significant interaction effect ($p = .027$) was found for level of depressive symptomology and categorical age of entry. Please see *Table 23* for the results of this ANCOVA. The group means were then used to create a preliminary line graph that offers a “highly speculative look” at the direction of the effects represented by the data. These results can be found in *Figure 4*. Among the boys of mothers with low levels of depressive symptomology, those that entered early had a mean score on the Social Skills Scale of 13.40, whereas those that entered later had a mean score of 15.42. For the boys of mothers with high levels of depressive symptomology, early entering boys had a mean score on the Social Skills Scale of 13.00, while later entering boys had a mean score of 8.33, by far the lowest score of any of the four groups. Although highly preliminary due to the small sample size, this line graph suggests that the moderation effect found when using the continuous variables (that avoid the previously mentioned sample size problem) is in the hypothesized direction, with boys of highly depressed mothers who enter early having better social outcomes than those who enter later. Clearly, future research would need to address this relationship with a greater number of subjects.

Summary of Significant Results

- Maternal education significantly predicts both child percentile rank on the PPVT and child working memory.
- Level of maternal depressive symptomology predicts child social skills.
- Several gender differences were preliminarily supported by the data:
 - 1) Maternal education significantly predicts boys' score on the PPVT, but not girls.
 - 2) Level of maternal depressive symptomology predicted boys' social skills, whereas it did not significantly predict girls' social skills.
 - 3) Preliminary support was found for an age of entry moderation effect on the relation between level of maternal depressive symptomology and child social skills for the boys' data.

CHAPTER V

Discussion

The purpose of this study was to examine the interrelations among maternal depression, maternal perceived social support, and child's age of entry to Head Start and to test a proposed model, predicated on the Mutual Regulation Model (Tronick & Weinberg, 1997) and bioecological theory, that postulated that age of entry would moderate the impact of maternal depressive symptomology on child developmental outcome. In addition, attention was given to the potential mediating role of perceived social support.

Bioecological theory conceptualizes individual development as dependent upon transactional processes that occur between an individual and his/her environment. How these processes impact an individual child is dependent upon characteristics of the child, characteristics of the environment, and characteristics of the time period in which they occur (Bronfenbrenner & Morris, 1998). Clearly, due to the inherent complexity of interacting factors in the environment, one of the largest challenges of developmental research is to identify which characteristics within an environment are most salient to the questions being asked. The use of the proposed conceptual model allowed data collection to focus on four primary components: Maternal depressive status, age of entry to Head Start, maternal perceived social support, and child developmental outcome, in addition to typical demographic characteristics.

Consistent with findings in the literature that suggest elevated rates of depressive symptomology among low-income mothers (Aber, Jones, & Cohen, 2000; Liaw & Brooks-Gunn, 1994; Orr & James, 1984), 37% of this sample reported scores on the CES-D high enough to be considered "depressed." Despite the elevated appearance of this finding compared to statistics based upon large, epidemiological studies (Husaini et al., 1980), it represents a very similar

percentage to that reported by Loeb, Fuller, Kagan, and Carrol (2004) who conducted a study with mothers entering a welfare-to work program and found that just over 40% of their sample scored above the cutoff for depression on the CES-D.

In turn, maternal depressive symptomology was found to be a strong predictor of maternal perceived social support. In fact, the two variables were so highly negatively associated (i.e. those with high depressive symptomology reported low social support) that it may be pertinent to explore whether the CES-D and the Perceived Support Scales (Procidano & Heller, 1983) actually represent two independent variables as hypothesized, or whether, instead, they are two different measures of the same latent construct. Within this sample, maternal perceived support was not found to mediate the impact of depressive symptomology on child development as hypothesized, but was instead found to improve the predictive ability of maternal depression when included in the regression equation. Because the level of support measured was “perceived”, not an actual measure of available instrumental support, there is a distinct possibility that a mother’s perception of support is heavily influenced by her mental health status, rather than representing a true measure of available help. In addition, it must be noted that depressive symptomology in and of itself may make it less likely that mothers will develop networks of individuals with whom they are in contact. Future studies with larger sample sizes may wish to investigate whether the two constructs, maternal depressive symptomology and *perceived* support, are actually different measures of the same latent factor.

The primary hypothesis that age of entry would moderate maternal depressive symptomology’s impact on child development was not supported by the data. No interaction effect was found between age of entry and maternal depression for any of the child developmental outcomes. Integral to that hypothesis, however, was the expectation, supported

by many studies in the literature, that maternal depressive symptomology would indeed predict cognitive and social outcomes. In fact, within this sample, score on the CES-D was unable to significantly predict any of the outcome measures, social or cognitive, and this failure of the data to support the model at the foundational level may be responsible for the overall lack of support for a moderating role for age of entry.

There are several factors that may have contributed to the findings that maternal depressive symptomology was not predictive of child cognitive and social outcome. The first of these is simply that a sample size of 43 may not have been large enough to capture smaller effect sizes in the data. Correlations within the data set suggest that score on the CES-D was significantly correlated with receptive language ability and marginally associated with working memory and social skills in the predicted directions, indicating that the data “fit” reasonably with the existent literature. Despite these associations, however, the more convincing argument regarding why maternal depression did not predict child outcome measures was the overwhelming salience of maternal education to the prediction of child cognitive outcome. Maternal level of education was found to consistently predict child working memory and receptive language skills over and beyond age of entry and maternal depression. In fact, the marginal relations found between maternal depression and the child cognitive outcomes, as well as the predictive ability of age of entry on receptive language skill, became non-significant when the equations controlled for maternal education.

The primacy of maternal education in predicting child outcome is noted frequently in the literature. Maternal education has been found to be associated with higher levels of cognitive stimulation and “human capital” for children (Votruba-Drzal, Coley, & Chase-Lansdale, 2004), as well as having been found to moderate the influence of other environmental factors such as

child care (Peisner-Feinberg, et al., 2001). Furthermore, The NICHD Early Child Care Research Network (2003) reported that maternal education proved to be a stronger predictor of several outcome measures than any child care factor they studied, and Peisner-Feinberg et al. (2001) found that maternal education more strongly predicted cognitive and language outcomes over time, with effect sizes substantially larger than those produced by child-care quality.

The argument that maternal education, or other environmental factors, may be more influential than maternal depression in predicting child outcome is supported by the findings of a recent study which utilized a remarkably similar sample, that suggested that maternal depression was not associated with any of the child cognitive measures, although it was found to significantly influence children's social skills (Loeb, et al., 2004). In that particular study, Loeb et al. (2004) found that maternal cognitive ability, rather than formal education per se, was the critical component influencing child cognitive outcome. In further support of this argument, Hay and Kumar (1995) found that the association between maternal mood disorder and cognitive deficit was confined to children with less educated mothers.

The lack of support for either a moderating or main effect role of age of entry on child outcome while controlling for maternal education is notable. The primacy of the maternal education variable may be part of the explanation for this finding. Mothers provide the primary environment for children, as well as the most consistent one (Peisner-Feinberg, et al., 2001), and their degree of sensitivity and stimulation may have a profound effect on child development. In addition, the small sample size may not have provided enough power to identify whatever age of entry effect might have remained after controlling for maternal education. Age of entry was a significant predictor of receptive language ability when the regression was run without controlling for maternal education. When maternal education was controlled for in the equation,

age of entry's predictive value became non-significant, although the p-value remained relatively low. Perhaps a larger sample size would have found age of entry to have an independent, predictive value, over and above that of maternal education, which a sample size of 43 was not able to capture. A 1997 study examining early intervention and mediating processes in cognitive performance within a sample of low-income African American families found that early, educational childcare, responsive stimulating care at home, and maternal IQ were all associated with more optimal cognitive development (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997). In addition, given the theoretical position that multiple, environmental risks operate synergistically on developmental processes (Cichetti et al., 1998; Bronfenbrenner & Morris, 1998), it could be argued that perhaps the children in this sample faced multiple, and potentially severe, risks at home, with attendance at Head Start doing little to buffer their development (Votruba-Drzal, et al., 2004). Furthermore, receptive language scores within this sample were remarkably low with a mean percentile ranking of 30.5%, and the median score resting right at the 25th percentile. Perhaps, because there were very few "high performers" in the group, it was hard to distinguish the negative effects of maternal depressive symptomology on development as the vast majority of the children, even those without depressed mothers or those who entered Head Start early, were also developing within an environment of layered, contextual risk. This argument would account for the discrepancy between the findings of this study (and others using similarly low-income, high-risk populations such as Loeb et al., 2004) that do not support a model in which maternal depression exerts negative influence on cognitive development, and those throughout the literature which do (e.g., Coghill et al., 1986, Petterson & Albers, 2001). Perhaps identifiable effects of maternal depression are more evident within a lower-risk

population than in a population where all of the children face at least a certain degree of contextual challenge.

When the role of depressive symptomology was tested using a categorical variable that placed only those mothers with scores on the CES-D at least 5 points above the cutoff for depression into a “high depression” category, while placing those who were non-depressed or narrowly surpassed the cutoff for “depression” into a “low depression” category, level of maternal depression was found to predict child social skills, although not child cognitive outcome; a finding that was concordant with those of Loeb et al. (2004). The salience of maternal depressive symptomology in predicting social skills may be due to evidence that quality of mothers’ interactions with their infants and young children, which may be impaired by depressive symptomology, is strongly associated with children’s peer interactions (NICHD Early Child Care Research Network, 2001; Zahn-Waxler, et al., 1992). In their sample, the NICHD Early Child Care Research Network observed that children of mothers who showed greater responsibility and positive affect, and less intrusiveness and hostility, were rated by caregivers as more positive and less negative in interactions with their peers. Furthermore, these children with more highly sensitive and positive mothers, appeared to be more socially skilled with other children leading to the conclusion that adult caregiving appears to be a “central correlate” of a child’s early social competence (NICHD Early Child Care Research Network, 2001). The findings in this sample would suggest that perhaps mothers who scored only slightly above the cut-off for depression on the CES-D were able to interact more responsively and with greater sensitivity with their infants and young children, than those who reported symptomology at even higher levels.

The fact that within this sample maternal education was such a significant predictor of cognitive ability, but not of social competence, whereas maternal depressive symptomology was predictive of social skills, but not cognitive ability, is suggestive of the importance of different transactional processes to each type of developmental outcome. Perhaps mothers' own cognitive abilities, verbal interactions, and the provision of a stimulating environment are the qualities most critical to cognitive development, whereas the relationship, itself, between mothers and their children, as measured by sensitivity and the ability to form intersubjective states (Tronick & Weinberg, 1997), may be the most pertinent factor for optimal social development. In addition, it is possible, despite all mothers in the sample being low-income, that there were subtle differences in income levels between the more highly educated mothers and those with lower levels of education. Income level has been found to be associated with child cognitive development, with the most pronounced impact being among children who live within deep or prolonged poverty (Brooks-Gunn, 2003). Because this study did not collect data regarding income, or the length of time that a family had been living below the poverty line, it is not possible to determine if some of the cognitive differences apparent in the sample are due to the confounding constructs of income level or the effects of enduring versus transitional poverty. This factor would appear to more directly impact cognitive, rather than social development, as income level has been more strongly associated with intellectual development.

In contrast, positive social interactions beginning in infancy appear to be the most critical component for the development of social competence. In addition to depressive symptomology's direct effect on a mother's interactions with her child, it may very well also indirectly influence the amount of interaction that her child has with peers as depressed mothers have been found to involve their children in peer groups less often than those that are non-

depressed (Zahn-Waxler, e. al., 1992). Early exposure to peers may be important to the development of social competence as peer conflict among toddlers, like that experienced naturally within group play sessions, has been associated with both sociability and social skill during the preschool years perhaps because early experience with conflict allows children to practice and perfect their abilities to negotiate and compromise successfully with others (NICHD Early Child Care Network, 2001).

When the relation between level of maternal depressive symptomology and child social skills was examined separately for each gender, a conspicuous difference was evident. For boys, maternal level of depressive symptomology's relation to social skills was moderated by age of entry as evident by the significant interaction effect between age of entry and maternal level of depressive symptomology in predicting social skills. When the direction of this moderation effect was examined using group differences, it was found to be in the hypothesized direction with boys who had mothers with a high level of depressive symptomology who entered Head Start at an earlier age having better social skills than those who had mothers with a high level of depressive symptomology who entered later. For girls, neither the main effect of level of depressive symptomology, nor the interaction effect, was a significant predictor of social skills. Although these results must be considered preliminary and highly speculative due to the small sample size involved, the interactions between gender and maternal factors are notable and are in agreement with much of the literature.

It has been repeatedly cited that boys appear to be more vulnerable to early stressors and sensitivity of care than are girls (Brooks-Gunn, Han, & Waldfogel, 2002; Crockenberg, 2003; Zaslow & Haynes, 1986). More specifically, Werner & Smith (1992) found that boys exhibited greater vulnerability to the effects of deficits in caregiving during childhood, and Gross et al.

(1995) found that boys with mothers who exhibited high levels of depression were more likely to have deficits in social competence and a greater number of conduct problems than girls (Gross, Conrad, Fogg, Willis, & Garvey, 1995). The findings in this study are concordant with those of the studies noted above, as level of maternal depression appeared to be predictive of social skills only for the boys. Furthermore, within this study, entering Head Start early appeared to have a positive impact on the social competence of boys whose mothers had high levels of depressive symptomology. This finding is supported in the literature by those of Peisner-Feinberg et al. (2001) who found that higher quality child care had a more powerful, compensatory impact on ego strength, effectance, and ratings of internalizing problems for boys. As noted previously, play with peers has been found to increase ratings of positive affect and complexity of interaction as compared to solitary play (NICHD Early Childhood Research Network, 2001). In addition, NICHD researchers (2001) found that children with more child care experience in group settings were observed to be more skilled and positive in their play with classmates. Furthermore, the quality of childcare has been found to be associated with increases in children's positive behaviors similar to those measured by the Social Skills Scale in this study (Votruba-Drzal et al., 2004), with responsive caregiver behavior being the aspect of child care most consistently related to positive peer interaction (NICHD Early Child Care Research Network, 2001). Perhaps early attendance at Head Start afforded boys in this sample, whose mothers reported high levels of depressive symptomology, the opportunity to develop more competent skills with peers through more sensitive caregiving and greater early exposure to peer interaction.

A similar gender difference was found in this study when the ability of maternal education to predict child receptive language ability was examined separately for boys and girls. Maternal education was highly predictive of boys' percentile ranking on the PPVT while its

predictive ability was non-significant for girls. Notably, the interaction of gender and maternal education in predicting receptive language ability was significant. It may be, as suggested within the literature, that boys are more impacted by maternal proximal processes than are girls in early life. American mothers have been suggested to be more supportive of girls' language development than boys' (Santrock, 2001) and furthermore, it has been noted in the literature that 18 to 30 month old African American children from homes with greater levels of stimulation and responsivity had greater vocabularies than those from homes with lower levels of responsivity (Roberts, Burchinal, & Durham, 1999). The difference in the predictive ability of maternal education on child receptive language skill between boys and girls may be due to boys' increased sensitivity to the quality of their mothers' interactions and levels of stimulation. Karrass and colleagues found in a 2002 study that maternal verbal encouragement of attention, a factor that could potentially vary with a mother's education level, appears to be particularly critical for boys' language development (Karrass, Braungart-Rieker, Mullins, & Lefever, 2002).

Additionally, the importance of maternal education for boys' language development may relate to differences in other aspects of girls' and boys' environments. It has been found that children's linguistic skills were positively associated with their peer competence (NICHD Early Child Care Research Network, 2001). Furthermore, it has been noted that girls tend to have higher social competence at 36 months of age, and that their play differs qualitatively than that of boys (NICHD, 2001). A 2001 study found that speech utilized during same-sex peer interactions showed gender differences in the use of certain linguistic forms and styles of communication (Nakamura, 2001). It may be that girls interact with peers in ways that further language development, whereas boys are more dependent upon caregivers for their growth in language ability. While maternal education's effect on linguistic development was not a major thrust of

the hypotheses of this study, these results would suggest that there may be salient gender differences which should be examined by researchers seeking to understand development in the context of maternal deficits and strengths.

Limitations

There are several limitations to this study that should be noted. Clearly, sample size limits any conclusions that can be drawn from the data. A sample size of 43 offers little statistical power when using multiple regression for analysis. There may be effects within the data that were not identified at a level of significance due to the small sample size. For example, because of the very small number of children in this sample who entered Head Start at an early age, it was necessary to group the children into only two groups: those entering prior to age three and those entering after age three. A significantly larger sample would have allowed children to be grouped into much more specific age categories that would allow a more detailed and meaningful examination of age effects related to Head Start entry. Inversely, all of the reported findings in this study regarding gender differences should be regarded as preliminary and speculative in nature given the small group sizes utilized in those ANOVA and regression analyses. Similar gender analyses could be conducted with large, secondary data sets to explore some of these relations with greater statistical power and broader generalizability of results.

The reliability of the child cognitive assessments were quite limited by the environments in which they were conducted. Whereas the PPVT appeared to be less affected by environmental disturbance, the working memory tasks were clearly impacted by activity in the surrounding areas of the Head Start Center. Anecdotally, children were noted to perform at a much higher level on working memory tasks prior to a disturbance such as a door slamming or a child passing nearby, than after the interruption. Several children were performing perfectly on a task prior to

being distracted, but were then never able to regain their focus. Because of the difference in testing space available at each center, it is the belief of the researcher that any results utilizing the working memory tasks should be viewed as tentative, given the disturbances inherent to collecting data in a child care setting. It would be of great benefit to future research if an assessment that tapped into working memory skill, but was less influenced by environmental disturbance, could be developed for use in the field.

The lack of a method for gathering longitudinal data on maternal depressive symptomology represents a critical deficit. The current study is predicated on conceptual models that describe the importance of healthy caregiver-child interactions in the earliest years of life, while predicting deficits in children for whom these transactional processes are lacking. While statistics would suggest that there is a fair amount of continuity in maternal depressive status from infancy to the preschool years (Field, 1998), the fact that this study only collected data on maternal mental health when the children were preschoolers represents a methodological weakness. While many children whose mothers report high depressive symptomology when they are four years of age may also have experienced impaired parenting during the early years of life, a longitudinal approach would be necessary to confirm that assumption.

Furthermore, the use of the CES-D as a measure of depressive status may, perhaps, represent a deficit. Within the literature addressing the developmental impact of maternal depression, the variety of ways in which the "presence" of maternal depression has been measured is widely recognized as a weakness in the field (Goodman & Gotlib, 1999). Some studies utilize clinical diagnosis, while others utilize measures of self-report. The CES-D simply measures depressive symptomology within the last week, rather than representing a clinical diagnosis. Its use, however, is clearly evident within the literature and it has been widely used

and validated with a variety of populations, and has been found to be a strong measure of depressive symptomology (Orr & James, 1984; Radloff, 1977). Furthermore, the use of a scale that measures symptomology rather than diagnosis is supported by models that suggest that it is the actual parent-child interactions, rather than a diagnosis per se, that are critical (Tronick & Weinberg, 1997). Maternal depressive symptomology need not be intense enough to be clinically diagnosed in order for it to adversely interrupt maternal-infant social interactions (Peleaz-Nogueras, Field, Cigales, 1995).

The overwhelming influence of maternal education was unexpected. More detailed demographic information collected from mothers regarding employment, income levels, and duration of poverty status would be helpful in exploring the complex relations at work in predicting child developmental outcome. The interwoven interactions existent within any environmental context require researchers to give careful consideration to all possible influencing factors when considering any given individual and his/her subsequent developmental trajectory.

Finally, many analyses were conducted in the preparation of this paper raising the issue of whether it is possible that the significant results are simply a chance result of repeated statistical testing of the same data set (Mills, 1993). While spurious findings are a possibility, the exploration of unexpected findings are a legitimate and meaningful component of scientific inquiry (Whitley, 1996). This study clearly stated it's a priori hypotheses and the non-significant results of those analyses. Furthermore, all of the post-hoc analyses conducted in this study were grounded in theory and supported by previous research efforts with the findings being congruent with those previously reported. Any post-hoc findings of this study should be viewed as preliminary and worthy of replication.

Summary and Implications for Policy and Future Research

The results of this study would suggest that mother-child transactional processes are important to both cognitive and social development. It was found that level of maternal education had a strong influence on children's cognitive development, whereas high levels of maternal depressive symptomology were predictive of lower levels of child social skill. Notably, when genders were analyzed separately, some preliminary differences were found in the relations between maternal predictors and child outcome. For both receptive language ability and social competence, maternal factors predicted boys' developmental outcomes, whereas they were not predictive of those same outcomes for girls. Furthermore, age of entry appeared to moderate the relation between maternal depressive symptomology and boys' social skills outcome.

Because of the small sample size associated with this study, it would be pertinent for future research to address the noted discrepancies between boys and girls with a substantially larger sample size that could more accurately detect meaningful trends and relations within the data. Furthermore, to address the salience of maternal education and its implications for policy, future research would need to collect more detailed data regarding mothers' cognitive abilities, employment, income, sensitivity of care-giving, level of stimulation provided within the home, and duration of low-income status in order to determine more exactly which component related to educational status is most influential on child cognitive outcome. This knowledge would allow policy makers to address the needs of low-income mothers accordingly.

From the perspective of policy regarding direct provisions for children, these data were supportive of only one age of entry moderating effect: that which moderated the level of maternal depressive symptomology's impact on boys' social skills. In light of the small sample

size, however, it would be well informed to withhold policy judgment given the large body of literature that theoretically suggests that further age of entry effects should exist within real low-income populations. There is some suggestion within the literature that at least a portion of the positive effects of early child-care may have a “sleeper effect” of sorts with the positive benefits of the early care not becoming evident until children are well into elementary school (Peisner-Feinberg et al., 2001). Furthermore, the fact that age of entry moderated maternal depression’s relation to boys’ social skills outcome would suggest that the responsivity and stimulation of early, high quality care did indeed make a difference for at least a portion of the population being served by Head Start. If the positive benefits of earlier entrance to Head Start on the social skills of sons of highly depressed mothers, such as those preliminarily represented within this data, are indicative of a change in fundamental self-regulatory capabilities, the positive impact as these children continue to develop would be exponential as self-regulation plays a key role in both cognitive and social development.

The implications of the evidence in the literature, concordant with those found in this study, suggesting that boys are more vulnerable to early stressors and maternal deficits in the first few years of life than are girls, should receive careful consideration by clinicians and practitioners in the field. Whereas it would be irresponsible to promote policy that favored boys over girls in terms of services rendered, it would seem relevant to make practitioners aware that contextual challenges early in life may impact boys more intensely than girls. Differences between boys and girls in the development of self-regulation and subsequent behavior may result in boys receiving more disciplinary action within classrooms, when a more appropriate and productive response might be to address the elements lacking in the caregiving that particular

child is receiving. This ability of practitioners to be responsive and sensitive in the face of poorly regulated behaviors could be critical to effective intervention for boys in particular.

In conclusion, the mothers and children who participated in this study were clearly living within contexts of multiple risk. Elevated levels of maternal depression were evident among the mothers, while developmental risk, as evident in the low receptive language scores, was inherent for most of the children. There is a clear need for programmatic support within this population. Despite this study's lack of statistical support for earlier intervention, it is the continued belief of the researcher that timing is a critical component of intervention and should receive ongoing attention in both research and policy circles. Furthermore, intervention should be predicated on the assumption that positive, transactional processes between adults and children are an integral component of healthy development. Early relationships are a universal experience for young children. It is the quality of these relational experiences that varies between individual children, thus differentially influencing development. Developmental researchers should continue current efforts to disentangle the interwoven factors which influence caregiving behavior and child development within low-income populations, with policy makers acting in accordance to findings.

References

- Aber, J.L. (1994). Poverty, violence, and child development; Untangling family and community level effects. In C.A. Nelson, (Ed.), *Threats to Optimal Development: The Minnesota Symposia on Child Psychology, Vol. 27.* Hillsdale, NJ: Lawrence Erlbaum Associates.
- Aber, J.L., Bennett, N.G., Conley, D.C., & Li, J. (1997). The effects of poverty on child health and development. *Annual Review of Public Health, 18*, 463-483.
- Aber, J.L., Jones, S., & Cohen, J. (2000). The impact of poverty on the mental health and development of very young children. In Zeanah (Ed.), *Handbook of Infant Mental Health, (113-128).* New York: The Guilford Press.
- Alpern, L., & Lyons-Ruth, K. (1993). Preschool children at social risk: Chronicity and timing of maternal depressive symptoms and child behavior problems at school and at home. *Development and Psychopathology, 5*, 371-387.
- Ashman, S.B. & Dawson, G. (2002). Maternal depression, infant psychobiological development, and risk for depression. In S.H. Goodman & I.H. Gotlib, (Eds.), *Children of Depressed Parents: Mechanisms of Risk and Implications for Treatment,* (p.37-58). Washington, D.C.: American Psychological Association.
- Balcazar, H., Hartner, J., & Cole, G. (1993). The effects of prenatal care utilization and maternal risk factors on pregnancy outcome between Mexican Americans and non-Hispanic whites. *Journal of the National Medical Association, 85*, 195-202.
- Barnas, M.V., & Cummings, E.M. (1997). Caregiver stability and toddlers' attachment-related behaviors towards caregivers in daycare. *Infant Behavior and Development, 17*, 171-177.

- Barnett, W.S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. *The Future of Children, 5(3)*, 25-50.
- Barnett, W.S. (1998). Long-term cognitive and academic effects of early childhood education on children in poverty. *Preventive Medicine, 27*, 204-207.
- Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51(6)*, 1173-1182.
- Barrera, M. (1981). Social support in the adjustment of pregnant adolescents. In B. Gottlieb (Ed.), *Social networks and social support*, (pp. 69-96). Beverly Hills, CA: Sage.
- Bell, M.A. (2003). Personal communication.
- Belsky, J. (1984). The determinants of parenting: A process model. *Child Development, 55*, 83-96.
- Belsky, J. & Steinberg, L.D. (1978). The effects of day care: A critical review. *Child Development, 49*, 929-949.
- Bendersky, M. & Lewis, M. (1994). Environmental risk, biological risk, and developmental outcome. *Developmental Psychology, 30(4)*, 484-494.
- Bowen, G.L. & Neeman, P.A. (1993). Child day care and the employment of AFDC recipients with preschool children. *Journal of Family and Economic Issues, 14*, 49-68.
- Bradley, R.H., Caldwell, B.M., Fitzgerald, J.A., Morgan, A.G., & Rock, S.L. (1986). Behavioral competence of maltreated children in child care. *Child Psychiatry and Human Development, 16(3)*, 171-193.

- Bradley, R.H., Caldwell, B.M., Rock, S.L., Ramey, C.T., Barnard, K.E., Gray, C., Hammond, M.A., Mitchell, S., Gottfried, A.W., Siegel, L., Johnson, D.L. (1989). Home environment and cognitive development in the first 3 years of life: A collaborative study involving six sites and three ethnic groups in North America. *Developmental Psychology, 25*(2), 217-235.
- Brazelton, T.B., Koslowski, B., & Main, M. (1974). The origins of reciprocity: The early mother-infant interaction. In Lewis, M., & Rosenblum, L.A. (Eds.), *The effects of the infant on its caregiver*. New York: Wiley.
- Bredekamp, S. & Copple, C. (1997). *Developmentally Appropriate Practice*. Washington, D.C.: National Association for the Education of Young Children.
- Breznitz, Z., & Friedman, S.L. (1988). Toddlers' concentration: Does maternal depression make a difference? *Journal of Child Psychology and Psychiatry, 29*, 267-279.
- Bronfenbrenner, U. (1974). Ecology of Childhood. *Child Development, 45*, 1-5.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. & Ceci, S.J. (1993). Heredity, environment, and the question "how?" - A first approximation. In R. Plomin & G.E. McClearn (Eds.), *Nature, nurture, & Psychology*. Washington, D.C.: American Psychological Association.
- Bronfenbrenner, U. & Ceci, S.J. (1994). Nature-nurture reconceptualized in developmental perspective: A bioecological model. *Psychological Review, 101*(4), 568-586.

- Bronfenbrenner, U. & Morris, P.A. (1998). The ecology of developmental processes. In W. Damon & R.M. Lerner (Eds.), *Handbook of Child Psychology, Fifth Edition. Volume 1: Theoretical models of human development*, (pp. 993-1028). New York: John Wiley & Sons, Inc.
- Brooks-Gunn, J. (2003). Do you believe in magic? What we can expect from early childhood intervention programs. *Social Policy Report, Society for Research in Child Development*, 17(number 1).
- Brooks-Gunn,, J., Berlin, L.J., & Fuligni, A.S. (2000). Early childhood intervention programs: What about the family? In J.P. Shonkoff & S.J. Meisels, (Eds.), *Early Childhood Intervention, Second Edition*, (pp. 549-577). Cambridge: Cambridge University Press.
- Brooks-Gunn, J., Gross, R.T., Kraemer, H.C., Spiker, D., & Shapiro, S. (1992). Enhancing the cognitive outcomes of low-birth-weight, premature infants: For whom is the intervention most effective? *Pediatrics*, 89(8), 1209-1215.
- Brooks-Gunn, J., Han, W., & Waldfogel, J. (2002). Maternal employment and child cognitive outcomes in the first three years of life: The NICHD study of Early child care. *Child Development*, 73 (4), 1052-1072.
- Bryant, D.M., & Ramey, C.T. (1987). An analysis of the effectiveness of early intervention programs for high-risk children. In M. Gurlnick & C. Bennett, (Eds.), *The Effectiveness of Early Intervention for At-Risk and Handicapped Children*, (pp. 33-78). New York: Academic Press.

- Burchinal, M.R., Campbell, F.A., Bryant, D.M., Wasik, B.H., & Ramey, C.T. (1997). Early intervention and mediating processes in cognitive performance of children of low-income African American families. *Child Development, 68*(5), 935-954.
- Burchinal, M., Lee, M., & Ramey, C. (1989). Type of day-care and preschool intellectual development in disadvantaged children. *Child Development, 60*, 128-137.
- Campbell, S.B., & Cohn, J.F. (1991). Prevalence and correlates of postpartum depression in first time mothers. *Journal of Abnormal Psychology, 100*, 594-599.
- Campbell, S.B., Cohn, J.F., Flanagan, C., Popper, S., & Meyers, T. (1992). Course and correlates of postpartum depression during the transition to parenthood. *Development and Psychopathology, 4*, 29-47.
- Campbell, S.B., Cohn, J.F., & Meyers, T. (1995). Depression in first-time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology, 31*(3), 349-357.
- Caughy, M.O., DiPietro, J.A., & Strobino, D.M. (1994). Day-care participation as a protective factor in the cognitive development of low-income children. *Child Development, 65*, 457-471.
- Cherlin, A.J. (1995). Policy issues of child care. In P.L. Chase-Lansdale & J. Brooks-Gunn (Eds.), *Escape from Poverty*, (121-137). New York: Cambridge University Press.
- Chugani, H.T. (1994). Development of regional brain glucose metabolism in relation to behavior and plasticity. In G. Dawson & K.W. Fischer, (Eds.), *Human Behavior and the Developing Brain*, (pp. 153-175). New York: The Guilford Press.

- Cicchetti, D., Rogosch, F.A., Toth, S.L. (1998). Maternal depressive disorder and contextual risk: Contributions to the development of attachment insecurity and behavior problems in toddlerhood. *Development and Psychopathology, 10*, 283-300.
- Cochran, M.M. (1977). A comparison of group day and family child-rearing patterns in Sweden. *Child Development, 48*, 702-707.
- Cochran, M.M., & Brassard, J.A. (1979). Child development and personal social networks. *Child Development, 50*, 601-616.
- Coghill, S.R., Caplan, H.L., Alexandra, H., Robson, K.M., & Kumar, R. (1986). Impact of maternal depression on cognitive development of young children. *British Medical Journal, 292*, 1165-1167.
- Cohen, S., & Wills, T.A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310-357.
- Cohn, J.F., Matias, R., Tronick, E.Z., Connell, D., & Lyons-Ruth, K. (1987). Face to face interactions of depressed mothers and their infants. In E. Tronick & M.M. Field (Eds.), *New Directions for child development*. San Francisco: Jossey-Bass.
- Cohn, J.F., & Tronick, E.Z. (1987). Mother-infant interaction: The sequence of dyadic states at 3, 6, and 9 months. *Child Development, 54*, 185-193.
- Coleman, J.S. (1990). *Foundations of social theory*. Cambridge, MA: Harvard University Press.
- Colletta, N.D. (1981). Social support and the risk of maternal rejection by adolescent mothers. *The journal of psychology, 109*, 191-197.

- Colletta, N.D., & Lee, D. (1983). The impact of support for black adolescent mothers. *Journal of family issues, 4(1)*, 127-143.
- Conger, Conger, K.J., Elder, Jr., Lorenz, R.O., Simons, R.L., & Whitbeck (1992). Family process model of economic hardship and adjustment of early adolescent boys. *Child Development, 63*, 526-541.
- Cooper, P.J., Campbell, E.A., Day, A., Kennerley, H., & Bond, A. (1988). Non-psychotic psychiatric disorder after childbirth: A prospective study of prevalence, incidence, course and nature. *British Journal of Psychiatry, 152*, 799-806.
- Cooper, P.J., Murray, L., Stein, A. (1991). Postnatal Depression. In J. Seva, (Ed.), *European Handbook of Psychology*, (pp. 1255-1262). Zaragoza, Spain: Anthropos.
- Crandell, L.E., & Hobson, R.P. (1999). Individual differences in young children's IQ: A social-developmental perspective. *Journal of Child Psychology and Psychiatry, 40(3)*, 455-464.
- Crittenden, P.M. (1985). Social networks, quality of child rearing, and child development. *Child Development, 56*, 1299-1313.
- Crnic, K., & Greenberg, M. (1987). Maternal stress, social support, and coping: Influences on the early mother-infant relationship. In C.F.Z. Boukydis, (Ed.), *Research on Support for Parents and Infants in the Postnatal Period*, (25-40). Norwood, NJ: Ablex Publishing.
- Crnic, K.A., & Greenberg, M.T. (1990). Minor parenting stresses with young children. *Child Development, 61*, 1628-1637.

- Crnic, K.A., Greenberg, M.T., Ragozin, A.S., Robinson, N.M., & Basham, R.B. (1983). Effects of stress and social support on mothers and premature and full-term infants. *Child Development, 54*, 209-217.
- Crnic, K.A., Greenberg, M.T., Robinson, N.M., & Ragozin, A.S. (1984). Maternal stress and social support: Effects on the mother-infant relationship from birth to eighteen months. *American Journal of Orthopsychiatry, ,224-235.*
- Crockenberg, S.B. (1981). Infant irritability, mother responsiveness, and social support influences on the security of infant-mother attachment. *Child Development, 52*, 857-865.
- Crockenberg, S.C. (2003). Rescuing the baby from the bathwater: How gender and temperament (may) influence how child care affects child development. *Child Development, 74(4)*, 1034-1038.
- Cummings, E.M., & Davies, P.T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry, 35(1)*, 73-112.
- Cunningham, M., & Zayas, L.H. (2002). Reducing depression in pregnancy: designing multimodal interventions. *Social Work, 47(2)*, 114-123.
- Dawson, G., Frey, K., Self, J., Panagiotides, H., Hessl, D., Yamada, E., & Rinaldi, J. (1999). Frontal brain electrical activity in infants of depressed and non-depressed mothers: Relation to variations in infant behavior. *Development and Psychopathology, 11*, 589-605.
- Dawson, G., Panagiotides, H., Grofer Klinger, L., Hill, D. (1992). The role of frontal lobe functioning in the development of self-regulatory behavior in infancy. *Brain and Cognition, 20*, 152-175.

- Denham, S.A. (1998). *Emotional Development in Young Children*. New York: Guilford Press.
- Diamond, A., Prevor, M.B., Callender, G., & Druin, D.P. (1997). Prefrontal Cortex Cognitive Deficits in Children Treated Early and Continuously for PKU. *Monographs of the Society for Research in Child Development*, 62(4, Serial No. 252).
- Duncan, G.J., & Brooks-Gunn, J. (1997). Income effects across the life span: Integration and interpretation. In G.J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of Growing Up Poor*(pp. 596-610). New York: Russell Sage Foundation Press.
- Duncan, G.J., Brooks-Gunn, J., & Klebanov, P.K. (1994). Economic deprivation and early childhood development. *Child Development*, 65, 296-318.
- Duncan, G.J., Brooks-Gunn, J., Yeung, W.J., Smith, J.R. (1998). How much does childhood poverty affect the life chances of children? *American Sociological Review*, 63, 406-423.
- Dunn, L.M., & Dunn, L. (1997). Peabody Picture Vocabulary Test (3rd ed.). [Test materials]. Circle Pines, MN: AGS Publishers.
- Egeland, B., Pianta, R., & O'Brien, M. (1993). Maternal intrusiveness in infancy and child maladaptation in early school years. *Development and Psychopathology*, 5, 359-370.
- Egeland, B. & Sroufe, L.A. (1981). Attachment and early maltreatment. *Child Development*, 52, 44-52.
- Eisenberg, N., Fabes, R.A., Murphy, B., Karbon, M., Smith, M., & Maszk, P. (1996). The relations of children's dispositional empathy-related responding to their emotionality, regulation and social functioning. *Developmental Psychology*, 32(2), 195-209.

- Elliot, S.N., Gresham, F.M., Freeman, R. & McCloskey, G. (1988). Teacher and observer ratings of children's social skills: Validation of the social skills rating scales. *Journal of Psychoeducational Assessment, 6*, 152-161.
- Erickson, M.F., Sroufe, L.A., & Egeland, B. (1985). The relationship between quality of attachment and behavior problems in preschool in a high-risk sample. In Bretherton, I., & Waters, E. (Eds.), *Growing Points of attachment: Theory and research. Monographs of the Society for Research in Child Development, 50*(1-2, Serial No. 209), 147-166.
- Etaugh, C. (1980). Effects of nonmaternal care on children. *American Psychologist, 35*(4), 309-319.
- Field, T. (1992). Infants of depressed mothers. *Development and Psychopathology, 4*, 9-66.
- Field, T. (1998). Maternal depression effects on infants and early interventions. *Preventive Medicine, 27*, 200-203.
- Field, T., Healy, B., Goldstein, S., & Guthertz, M. (1990). Behavior-state matching and synchrony in mother-infant interactions of nondepressed vs. depressed dyads. *Developmental Psychology, 26*, 7-14.
- Field, T., Healy, B., Goldstein, S., Perry, S., Bendell, D., Schanberg, S., Zimmerman, E.A., & Kuhn, C. (1988). Infants of depressed mothers show "depressed" behavior even with nondepressed adults. *Child Development, 59*, 1569-1579.
- Field, T.M., Sandberg, D., Garcia, R., Bega-Lahr, N., Goldstein, S., & Guy, L. (1985). Pregnancy problems, postpartum depression and early mother-infant interactions. *Developmental Psychology, 57*, 1152-1156.

- Fox, C.R., & Gelfand, D.M. (1994). Maternal depressed mood and stress as related to vigilance, self-efficacy, and mother-child interactions. *Early Development and Parenting, 3*, 233-243.
- Galinsky, E., Howes, C., Kontos, S., & Shinn, M. (1994). *The study of children in family child care and relative care: Highlights of findings*. New York: Families and Work Institute.
- Gamble, T.J., & Zigler, E. (1986). Effects of infant day care: Another look at the evidence. *American Journal of Orthopsychiatry, 56(1)*, 26-42.
- Gerstadt, C.L., Hong, Y.J., & Diamond, A. (1994). The relationship between cognition and action: Performance of children 3 ½-7 years old on a Stroop-like day-night test. *Cognition, 53*, 129-153.
- Giovanni, J.M., & Billingsley, A. (1970). Child neglect among the poor: A study of parental adequacy in families of three ethnic groups. *Child Welfare, 49(4)*, 196-204.
- Goodman, S.H., & Gotlib, I.H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review, 106*, 458-490.
- Goodman, S.H., & Gotlib, I.H. (2002). Transmission of risk to children of depressed parents: Integration and conclusions. In S.H. Goodman & I.H. Gotlib, (Eds.), *Children of Depressed Parents: Mechanisms of Risk and Implications for Treatment*, (p. 307-326). Washington, D.C.: American Psychological Association.
- Gross, D., Conrad, B., Fogg, L., Willis, L., & Garvey, C. (1995). A longitudinal study of maternal depression and preschool children's mental health. *Nursing Research, 44*, 96-101.

- Gunnar, M.R. (1998). Quality of early care and buffering of neuroendocrine stress reactions: Potential effects on the developing human brain. *Preventive Medicine*, 27, 208-211.
- Hammen, C. (1992). The family-environmental context of depression: A perspective on children's risk. In D. Cicchetti & S. Toth (Eds.), *Rochester Symposium on Developmental Psychopathology: Vol. 4. Developmental Perspectives on Depression* (pp. 251-281). Rochester, NY: University of Rochester Press.
- Hammen, C. (2002). Context of stress in families of children with depressed parents. In S.H. Goodman & I.H. Gotlib, *Children of Depressed Parents: Mechanisms of Risk and Implications for Treatment*, (pp. 175-199). Washington, D.C.: American Psychological Association.
- Hart, D., Atkins, R., & Fegley, S. (2003). Personality and development in childhood: A person-centered approach. *Monographs of the Society for Research in Child Development*, 68(1, Series no. 272).
- Hashima, P.Y., & Amato, P.R. (1994). Poverty, social support, and parental behavior. *Child Development*, 65, 394-403.
- Hay, D.F., & Kumar, R. (1995). Interpreting the effects of mothers' postnatal depression on children's intelligence: A critique and reanalysis. *Child Psychiatry and Human Development*, 25, 165-181.
- Hayes, C.D., Palmer, J.L., & Zaslow, M.J. (1990) (Eds.). *Who cares for America's children?* Washington, D.C.: National Academy Press.
- Hill, J., Waldfogel, J., & Brooks-Gunn, J. (2002). Differential effects of high-quality child care. *Journal of Policy Analysis and Management*, 21(4), 601-627.

- Hofferth, S.L. (1992). The demand for and supply of child care in the 1990s. In A. Booth, (Ed.), *Child Care in the 1990s: Trends and Consequences*, (3-25). Hillsdale, NJ: Erlbaum.
- Holmbeck, G.N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literature. *Journal of Consulting and Clinical Psychology*, 4, 599-610.
- Holmbeck, G.N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of pediatric psychology*, 27(1), 87-96.
- Howes, C. (1983). Caregiver behavior in Center and Family Day Care. *Journal of Applied Developmental Psychology*, 4, 99-107.
- Howes, C. (1988). Relations between early child care and schooling. *Developmental Psychology*, 24, 53-57.
- Howes, C. (1999). Attachment relationships in the context of multiple caregivers. In J. Cassidy & P.R. Shaver, (Eds.), *Handbook of Attachment: Theory, Research and Clinical Applications*, (pp. 671-687). New York: Guilford.
- Howes, C., & Hamilton, C.E. (1993). The changing experience of child care: Changes in teachers and in teacher-child relationships and children's social competence with peers. *Early Childhood Research Quarterly*, 8, 15-32.
- Howes, C., Rodning, C., Galluzzo, D.C., & Myers, L. (1988). Attachment and child care: Relationships with mother and caregiver. *Early Childhood Research Quarterly*, 3, 403-416.
- Howes, C. & Stewart, P. (1987). Child's play with adults, toys, and peers: An examination of family and child-care influences. *Developmental Psychology*, 23(3), 423-430.

- Husaini, B.A., Neff, T.A., Harrington, J.B., Hughes, M.D., & Stone, R.H. (1980). Depression in rural communities: Validating the CES-D scale. *Journal of Community Psychology, 8*, 20-27.
- Jackson, A.P. (1998). The role of social support in parenting for low-income, single, black mothers. *Social Service Review, (September)*, 365-378.
- Jackson, A.P. (2000). Maternal self-efficacy and children's influence on stress and parenting among single black mothers in poverty. *Journal of Family Issues, 21(1)*, 3-16.
- Jackson, A.P., Brooks-Gunn, J., Huang, C., & Glassman, M. (2000). Single mothers in low-wage jobs: Financial strain, parenting, and preschoolers' outcomes. *Child Development, 71(5)*, 1409-1423.
- Jackson, A.P., Gyamfi, P., Brooks-Gunn, J., & Blake, M. (1998). Employment status, psychological well-being, social support, and physical discipline practices of single black mothers. *Journal of Marriage and the Family, 60*, 894-902.
- Jameson, P.B., Gelfand, D.M., Kulcsar, E., & Teti, D. (1997). Mother-toddler interaction patterns associated with maternal depression. *Development and Psychopathology, 9*, 537-550.
- Karoly, L.A., Greenwood, P.W., Everingham, S.S., Hoube, J., Kilburn, M.R., Rydell, C.P., Sanders, M., & Chiesa, J. (1998). *Investing in our Children: What We Know and Don't Know About the Costs and Benefits of Early Childhood Interventions*. Santa Monica, CA: RAND.
- Karrass, J., Braungart-Rieker, J.M., Mullins, J., & Lefever, J.B. (2002). Processes in language acquisition: The roles of gender, attention, and maternal encouragement of attention over time. *Journal of Child Language, 29(3)*, 519-544.

- Kochanska, G., Kuczynski, L., Radke-Yarrow, M., & Welsh, J.D. (1987). Resolutions of control episodes between well and affectively ill mothers and their young children. *Journal of Abnormal Child Psychology, 15*(3), 441-456.
- Kochanska, G., Murray, K.T., & Harlan, E.T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*(2), 220-232.
- Kochanska, G., Radke-Yarrow, M., Kuczynski, L., & Friedman, S. (1987). Normal and affectively ill mothers' beliefs about their children. *American Journal of Orthopsychiatry, 57*, 345-350.
- Kolb, B., & Fantie, B. (1989). Development of the child's brain and behavior. In C.R. Reynolds & E. Fletcher-Janzen, (Eds.), *Handbook of Clinical Child Neuropsychology*, (p. 17-39). New York: Plenum Press.
- Liaw, F., & Brooks-Gunn, J. (1994). Cumulative familial risks and low-birthweight children's cognitive and behavioral development. *Journal of Clinical Child Psychology, 23*, 360-372.
- Liaw, F.R., & Brooks-Gunn, J. (1993). Patterns of low birth weight children's cognitive development and their determinants. *Developmental Psychology, 29*(6), 1024-1035.
- Loeb, S., Fuller, B., Kagan, S.L., & Carroll, B. (2004). Child care in poor communities: Early learning effects of type, quality, and stability. *Child Development, 75*(1), 47-65.
- Lovejoy, M.C., Graczyk, P.A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review, 20*(5), 561-592.

- Lyons-Ruth, K., Connell, D.B., Grunbaum, H., & Botein, S. (1990). Infants at social -risk: Maternal depression and family support services as mediators of infant development and security of attachment. *Child Development, 61*, 85-98.
- McLeod, J.D. & Shanahan, M.J. (1993). Poverty, parenting, and children's mental health. *American Sociological Review, 58*, 351-366.
- 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.
- Mills, J.L. (1993). Data torturing. *New England Journal of Medicine, 329*, 1196-1199.
- Nakamura, K. (2001). Gender and language in Japanese preschool children. *Research on Language and Social Interaction, 34(1)*, 15-34.
- NICHD Early Child Care Research Network (1997a). Child care in the first year of life. *Merrill-Palmer Quarterly, 43(3)*, 340-360.
- NICHD Early Child Care Research Network (1997b). Poverty and patterns of child care. In G.J. Duncan, & J. Brooks-Gunn, (Eds.), *Consequences of Growing Up Poor*, (pp. 100-131). New York: Russell Sage Foundation.
- NICHD Early Child Care Research Network. (1999). Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Child Development, 35 (5)*, 1297-1310.
- NICHD Early Child Care Research Network (2001). Child care and children's peer interaction at 24 and 36 months: The NICHD study of early child care. *Child Development, 72(5)*, 1478-1500.

- NICHD Early Child Care Research Network (2003). Does amount of time spent in child care predict socioemotional adjustment during transition to kindergarten? *Child Development*, 74(4), 976-1005.
- O'Hara, M. (1986). Social support, life events, and depression during pregnancy and the puerperium. *Archives of General Psychiatry*, 43, 561-573.
- Orr, S., & James, S. (1984). Maternal depression in an urban pediatric practice: Implications for health care delivery. *American Journal of Public Health*, 74, 363-365.
- Peisner-Feinberg, E.S., Burchinal, M.R., Clifford, R.M., Culkin, M.L., Howes, C., Kagan, S.L., and Yazejian, N. (2001). The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade. *Child Development*, 72 (5), 1534-1553.
- Pelaez-Nogueras, M. Field, T., Cigales, M., Gonzalez, A., & Clasky, S. (1995). Infants of depressed mothers show less "depressed" behavior with their nursery teachers. *Infant Mental Health Journal*, 15, 358-367.
- Petterson, S.M., & Albers, A.B. (2001). Effects of poverty and maternal depression on early child development. *Child Development*, 72(6), 1794-1813.
- Phillips, D., & Adams, G. (2001). Child care and our youngest children. *Future of Children*, 11(1), 35-52.
- Pianta, R.C., & Ball, R.M. (1993). Maternal social support as a predictor of child adjustment in kindergarten. *Journal of Applied Developmental Psychology*, 14, 107-120.
- Polansky, N.A., Gaudin, J.M., Ammons, P.W., & Davis, K.B. (1985). The psychological ecology of the neglectful mother. *Child Abuse & Neglect*, 9, 265-275.

- Procidano, M.E., & Heller, K. (1983). Measures of perceived social support from friends and from family: Three validation studies. *American Journal of Community Psychology*, 11(1), 1-24.
- Radke-Yarrow, M., Cummings, E.M., Kuczynski, L., & Chapman, M. (1985). Patterns of attachment in two- and three-year-olds in normal families and families with parental depression. *Child Development*, 56, 884-893.
- Radke-Yarrow, M., McCann, K., DeMulder, E., Belmont, B., Martinez, P., & Richardson, D.T. (1995). Attachment in the context of high-risk conditions. *Development and Psychopathology*, 7, 247-265.
- Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Ramey, C.T., Bryant, D.M., & Suarez, T.M. (1985). Preschool compensatory education and the modifiability of intelligence: A critical review. In D.K. Detterman, (Ed.), *Current Topics in Human Intelligence, Vol. 1: Research Methodology*, (pp. 247-296). Norwood, NJ: Ablex Publishing Company.
- Ramey, C.T., Campbell, F.A., & Blair, C. (1998). Enhancing the life course for high-risk children: Results from the Abecedarian Project. In J. Crane (Ed.), *Social Programs that Work*, (pp. 163-183). New York: Russell Sage Foundation.
- Ramey, C.T., & Ramey, S.L. (1998). Prevention of intellectual disabilities: Early interventions to improve cognitive development. *Preventive Medicine*, 27, 224-232.
- Roberts, J.E., Burchinal, M.R., & Durham, M. (1999). Parents' report of vocabulary and grammatical development of African American preschoolers. *Child Development*, 70, 92-106.

- Roberts, R.E. (1980). Reliability of the CES-D scale in different ethnic contexts. *Psychological Research* (2), 125-134.
- Rothbart, M.K., & Ahadi, S.A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology*, 103, 55-106.
- Rothbart, M.K., & Bates, J.C. (1998). Temperament. In N. Eisenburg (Ed.), W. Damon (Series Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (pp. 105-176). New York: Wiley.
- Ruff, H.A., & Rothbart, M.K. (1996). *Attention in early development: Themes and variations*. New York: Oxford.
- Sander, L. (1975). Infant and caretaking environment: Investigation and conceptualization of adaptive behavior in a system of increasing complexity. In Anthony, E.J. (Eds.), *Explorations in child psychiatry* (129-166). New York: Plenum.
- Santrock, J.W. (2001). *Child Development*. New York: McGraw Hill.
- Seccombe, K. (1999). "So you think I drive a Cadillac? Needham Heights, MA: Allyn and Bacon.
- Sharp, D., Hay, D.F., Pawlby, S., Schmucker, G., Allen, H., & Kumar, R. (1995). The impact of postnatal depression on boys' intellectual development. *Journal of Child Psychology and Psychiatry*, 36(8), 1315-1336.
- Shields, M.K., & Behrman, R.E. (2002). Children and welfare reform: Analysis and recommendations. *Future of Children*, 12(1), 5-26.
- Shirk, M., Bennett, N., & Aber, J.L. (1999). *Living on the line: American families and the struggle to make ends meet*. New York: Westview Press.

- Shonkoff, J.P., & Phillips, D.A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, D.C.: National Academy Press.
- Simons, R.L., Beaman, J., Conger, R.D., & Chao, W. (1993). Stress, support, and antisocial behavior trait as determinants of emotional well-being and parenting practices among single mothers. *Journal of Marriage and the Family, 55*, 385-398.
- Spencer, M.B., Blumenthal, J.B., & Richards, E. (1995). Child care and children of color. In P.L. Chase-Lansdale & J. Brooks-Gunn (Eds.), *Escape from Poverty*, (138-158). New York: Cambridge University Press.
- Stack, C.B. (1974). *All Our Kin: Strategies for Survival in a Black Community*. New York: Harper & Row.
- Teti, D., 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.
- Tronick, E.Z. (1986). Interactive mismatch and repair: Challenges to the coping infant. *Zero to Three, 6*, 1-6.
- Tronick, E.Z. (1989). Emotions and emotional communication in infants. *American Psychologist, 44*, 112-119.
- Tronick, E.Z., Als, H., & Adamson, L. (1979). Structure of early face-to face communicative interactions. In Bullowa, M. (Ed.), *Before Speech*. Cambridge, England: Cambridge University Press.
- Tronick, E.Z., & Cohn, J.F. (1989). Face to face interaction: Age and gender differences in coordination and the occurrence of miscoordination. *Child Development, 60*, 85-92.

- Tronick, E.Z., & Weinberg, M.K. (1997). Depressed mothers and infants: Failure to form dyadic states of consciousness. In Murray, L., & Cooper, P.J. (Eds.), *Postpartum depression and child development* (54-84). New York: The Guilford Press.
- U.S. Census Bureau (1982). Trends in child care arrangements of working mothers. *Current Population Reports* (pp. 23-117). Washington,D.C.: U.S. Government Printing Office.
- U.S. Census Bureau (1997). *Who's minding our Preschoolers? Fall, 1994 (Update)* (P70-62 and PPL-81) November 1997. Washington, D.C.: U.S. Department of Commerce.
- U.S. Census Bureau. (1999). *Statistical abstract of the United States: 1999*. (p. 417, No. 660). Washington, DC: U.S. Government Printing Office.
- United States Department of Health and Human Services. (2001). *Head Start FACES: Longitudinal findings on program performance: Third progress report*.
- Votruba-Drzal, E., Coley, R.L., & Chase-Lansdale, P.L. (2004). Child care and low-income children's development: Direct and moderated effects. *Child Development*, 75(1), 296-312.
- Watson, J.E., Kirby, R.S., Kelleher, K.J., Bradley, R.H. (1996). Effects of poverty on home environment: An analysis of three-year outcome data for low birth weight premature infants. *Journal of Pediatric Psychology*, 21(3), 419-431.
- Weinfeld, N.S., Sroufe, L.A., Egeland, B., & Carlson, E.A. (1999). The nature of individual differences in infant-caregiver attachment. In J. Cassidy & P.R. Shaver, *Handbook of Attachment: Theory, Research, and Clinical Applications*, (pp. 68-88). New York: Guilford.

- Weinraub, M., & Wolf, B.M. (1983). Effects of stress and social supports on mother-child interactions in single- and two-parent families. *Child Development, 54*, 1297-1311.
- Weinraub, M. & Wolf, B.M. (1987). Stressful life events, social supports, and parent-child interaction: Similarities and differences in single-parent and two-parent families. In C.F.Z. Boukydis, (Ed.), *Research on support for parents and infants in the postnatal period* (114-135). Norwood, NJ: Ablex Publishing.
- Weissman, M., Leaf, P., & Bruce, M.L. (1987). Single parent women. *Social Psychiatry, 22*, 29-36.
- Weissman, M.M., Sholomskas, D., Pottenger, M., Prusoff, B.A., & Locke, B.Z. (1977). Assessing depressive symptoms in five psychiatric populations: A validation study. *American Journal of Epidemiology, 106*, 203-214.
- Werner, E.E. (1985). Stress and protective factors in children's lives. In A.R. Nicol (Ed.), *Longitudinal studies in Child Psychology and Psychiatry* (pp. 335-356). Chichester, England: Wiley.
- Werner, E.E. & Smith, R.S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, NY: Cornell University Press.
- Whitely, B.E. (1996). *Principles of Research in Behavioral Science*. Mountain View, CA: Mayfield Publishing Company.
- Wolfe, C., & Bell, M.A. (2004) *Working Memory and inhibitory control in early childhood: Contributions from physiology, temperament, and language*. *Developmental Psychobiology, 44*, 68-83.
- Wolkind, S.N., Zajicek-Coleman, E., Ghodsian, M. (1980). Continuities in maternal depression. *International Journal of Family Psychiatry, 1*, 167-182.

- Zahn-Waxler, C., Cummings, E.M., Iannotti, R.J., & Radke-Yarrow, M. (1984). Young children of depressed parents: A population at risk for affective problems. In D. Cicchetti & K. Schneider-Rosen (Eds.), *Childhood depression: New directions for child development* (pp. 81-105). San Francisco: Jossey-Bass.
- Zahn-Waxler, C., Denham, S., Iannotti, R.J., & Cummings, E.M. (1992). Peer relations in children with a depressed caregiver. In Parke, R.D., & Ladd, G.W. (Eds.), *Family-Peer Relationships: Modes of Linkage* (317-344). Hillsdale, NJ: Erlbaum.
- Zahn-Waxler, C., Iannotti, R.J., Cummings, E.M., & Denham, S. (1990). Antecedents of problem behavior in children of depressed mothers. *Development and Psychopathology, 2*, 271-291.
- Zahn-Waxler, C., Kochanska, G., Krupnick, J., & McKnew, D. (1990). Patterns of guilt in children of depressed and well mothers. *Developmental Psychology, 26*, 51-59.
- Zahn-Waxler, C., McKnew, D.H., Cummings, E.M., Davenport, Y.B., & Radke-Yarrow, M. (1984). Problem behaviors and peer interactions of young children with a manic-depressive parent. *American Journal of Psychiatry, 141*, 236-240.
- Zaslow, M.J., & Emig, C.A. (1997). When low-income mothers go to work: Implications for children. *The Future of Children, 7(1)*, 110-115.
- Zaslow, M.S., & Hayes, C.D. (1986). Sex differences in children's responses to psychosocial stress: Towards a cross context validation. In M.E. Lamb & B. Rogoff (Eds.), *Advances in Developmental Psychology* (Vol. 4, 289-337). Hillsdale, NJ: Erlbaum.
- Zigler, E. (1994). Reshaping early childhood intervention to be a more effective weapon against poverty. *American Journal of Community Psychology, 22(1)*, 37-47.

Appendix A
Frequencies and Statistics

Demographic Variables

Center

	N	Percent
1	8	18.6
2	7	16.3
3	4	9.3
4	11	25.6
5	7	16.3
6	6	14.0

Child's Gender

	N	Percent
Girl	20	46.5
Boy	23	53.5

Hispanic Identification

	N	Percent
Non-Hispanic	41	95.3
Hispanic	2	4.7

Racial Identity

	N	Percent
Asian American	1	2.3
African American	33	76.7
Caucasian	6	14.0
Other	3	7.0

Maternal Level of Education

	N	Percent
Eighth Grade	5	11.6
High School	22	51.2
Technical School	6	14.0
Community College	6	14.0
College	4	9.3

Child's Age at Time of Data Collection in Months

Mean = 55.33 Median = 56.00

Months	N	Percent
44	1	2.3
45	2	4.7
47	1	2.3
48	2	4.7
50	3	7.0
51	2	4.7
52	3	7.0
53	3	7.0
54	1	2.3
55	3	7.0
56	2	4.7
57	3	7.0
58	2	4.7
59	2	4.7
60	4	9.3
61	3	7.0
62	3	7.0
63	2	4.7
64	1	2.3

Number of Previous Care Providers

Mean = 1.93, Median = 2.00, SD = 1.45

Number of Providers	N	Percent
0	8	18.6
1	10	23.3
2	11	25.6
3	8	18.6
4	3	7.0
5 or more	3	7.0

Type of Previous Care

Type	N	Percent
Parent only	8	18.6
Family only	12	27.9
Center-based care only	3	7.0
Home Daycare	2	4.7
Friend	2	4.7
Center + family/friend	11	25.6
Undefined	5	11.6

Age at Entry in Months

Mean = 37.14 Median = 39

Months	N	Percent
2	1	2.3
3	1	2.3
11	1	2.3
12	1	2.3
19	1	2.3
25	1	2.3
26	1	2.3
27	2	4.7
28	1	2.3
29	1	2.3
30	1	2.3
33	1	2.3
35	1	2.3
36	3	7.0
37	3	7.0
39	2	4.7
40	1	2.3
42	2	4.7
43	3	7.0
44	1	2.3
45	3	7.0
46	3	7.0
47	1	2.3
50	2	4.7
52	1	2.3
53	1	2.3
54	1	2.3
58	1	2.3
59	1	2.3

Categorical Age of Entry

	N	Percent
Prior to 36 months	14	32.6
36 months or older	29	67.4

Maternal Data**Score on the CES-D**

Mean = 15.67 Median = 11.00, SD = 12.12

Score (0-60)	N	Percent
0	1	2.3
2	1	2.3
4	5	11.6
5	2	4.7
6	3	7.0
7	3	7.0
8	1	2.3
10	1	2.3
11	5	11.6
12	3	7.0
14	1	2.3
15	1	2.3
16	1	2.3
18	2	4.7
19	1	2.3
23	1	2.3
25	1	2.3
27	1	2.3
29	1	2.3
31	1	2.3
32	1	2.3
33	2	4.7
35	1	2.3
38	1	2.3
40	1	2.3
48	1	2.3

Categorical Depression Status

	N	Percent
Non-depressed	27	62.8
Depressed	16	37.2

Highly Depressed Status

	N	Percent
Non-Depressed or Low	31	72.1
Highly Depressed	12	27.9

Perceived Family Support

Mean = 14.77 Median = 17.00 SD = 5.37

Score (0-20)	N	Percent
0	1	2.3
1	1	2.3
3	1	2.3
5	1	2.3
8	1	2.3
9	3	7.0
10	1	2.3
11	1	2.3
12	2	4.7
14	3	7.0
15	3	7.0
16	2	4.7
17	7	16.3
18	4	9.3
19	4	9.3
20	8	18.6

Perceived Friend Support

Mean = 14.63 Median = 16.00 SD = 4.91

Score (0-20)	N	Percent
4	2	4.7
5	2	4.7
7	2	4.7
8	1	2.3
9	2	4.7
10	1	2.3
12	2	4.7
13	1	2.3
14	2	4.7
15	2	4.7
16	6	14.0
17	6	14.0
18	4	9.3
19	4	9.3
20	6	14.0

Combined Support

Mean = 29.395 Median = 32.00 SD = 8.8375

Score (0-40)	N	Percent
6	1	2.3
7	1	2.3
10	1	2.3
12	1	2.3
18	1	2.3
19	1	2.3
20	1	2.3
23	1	2.3
24	1	2.3
25	2	4.7
26	1	2.3
27	2	4.7
28	1	2.3
29	3	7.0
30	2	4.7
31	1	2.3
32	3	7.0
33	3	7.0
34	3	7.0
35	2	4.7
36	1	2.3
37	2	4.7
38	3	7.0
39	2	4.7
40	3	7.0

Combined Score of Both Support Scales and the CES-D

Mean = 13.72 Median = 20.00 SD = 18.159

	N	Percent
-26	1	2.3
-20	2	4.7
-17	2	4.7
-12	1	2.3
-9	2	4.7
-6	2	4.7
-2	2	4.7
1	1	2.3
7	1	2.3
13	1	2.3
14	1	2.3
16	2	4.7
17	1	2.3
18	1	2.3
19	1	2.3
20	1	2.3
22	1	2.3
23	1	2.3
24	2	4.7
25	2	4.7
26	1	2.3
27	3	7.0
28	3	7.0
29	1	2.3
30	1	2.3
31	1	2.3
32	1	2.3
33	2	4.7
35	1	2.3
38	1	2.3

Child Cognitive and Social Data**Percentage Correct on Day/Night Stroop**

Mean = 73.198 Median = 81.3 SD = 21.01

Percentage Correct	N	Percent
0.0	1	2.3
31.3	1	2.3
37.5	1	2.3
43.8	2	4.7
50.0	2	4.7
56.3	5	11.6
62.5	1	2.3
68.8	1	2.3
71.4	1	2.3
75.0	4	9.3
81.3	7	16.3
87.5	10	23.3
93.8	6	14
100.0	1	2.3

Percentage Correct on Yes/No Task

Mean = 52.247 Median = 56.30 SD = 22.321

Percentage Correct	N	Percent
6.3	1	2.3
25.0	6	14
31.3	4	9.3
37.5	2	4.7
43.8	5	11.6
50.0	1	2.3
56.3	5	11.6
62.5	3	7.0
68.8	7	16.3
75.0	3	7.0
81.3	2	4.7
87.5	1	2.3
93.8	3	7.0

Combined Average Score on Stroop and Yes/No Tasks

Mean = 63.7221 Median = 65.65 SD = 17.7692

Average Percent Correct	N	Percent
3.15	1	2.3
34.40	2	4.7
43.75	1	2.3
43.80	3	7.0
46.90	2	4.7
48.20	1	2.3
56.25	2	4.7
56.30	1	2.3
59.40	5	11.6
62.55	2	4.7
65.65	5	11.6
71.90	3	7.0
75.00	1	2.3
75.05	3	7.0
78.15	3	7.0
81.25	2	4.7
81.30	2	4.7
84.40	1	2.3
87.55	1	2.3
90.65	1	2.3
93.8	1	2.3

Percentile Rank on the Peabody Inventory

Mean = 30.81 Median = 25.00 SD = 20.62

Percentile	N	Percent
4	3	7.0
5	2	4.7
6	1	2.3
12	3	7.0
14	3	7.0
16	2	4.7
19	3	7.0
21	1	2.3
23	2	4.7
25	2	4.7
27	1	2.3
30	2	4.7
32	1	2.3
34	1	2.3
37	1	2.3
39	3	7.0
45	1	2.3
47	1	2.3
50	2	4.7
53	1	2.3
58	1	2.3
63	2	4.7
66	1	2.3
68	1	2.3
70	1	2.3
73	1	2.3

Social Skills Scale

Mean = 15.21 Median = 15.00 SD = 4.54

Score (0-24)	N	Percent
6	1	2.3
7	1	2.3
8	2	4.7
9	1	2.3
10	1	2.3
11	2	4.7
12	2	4.7
13	5	11.6
14	6	14.0
15	6	14.0
17	2	4.7
18	4	9.3
19	1	2.3
20	2	4.7
21	1	2.3
22	4	9.3
23	1	2.3
24	1	2.3

Classroom Conduct Scale

Mean = 6.30 Median = 5.00 SD = 5.02

Score (0-28)	N	Percent
0	3	7.0
1	3	7.0
2	8	18.6
3	3	7.0
4	3	7.0
5	3	7.0
7	3	7.0
8	5	11.6
9	1	2.3
10	3	7.0
12	3	7.0
13	1	2.3
15	1	2.3
16	1	2.3
17	1	2.3
19	1	2.3