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DIFFERENCES IN DIMENSIONS OF CHILDHOOD FUNCTIONING IN CHILDREN OF PRETERM VERSUS FULL TERM BIRTH STATUS

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ABSTRACT OF DISSERTATION

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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy
in the College of Arts and Sciences
at the University of Kentucky

By

Tameika Shenay Turner

Lexington, Kentucky

Director: Dr. Ramesh Bhatt, Professor of Psychology

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As medical advances are made in the area of neonatology, more and more premature babies are surviving at younger gestational ages and lower birth weights. Growth in the survival rates of preterm infants leads to questions regarding the long term developmental trajectory of these children. The current study sought to expand on research regarding dimensions of childhood functioning and to apply it to the problem of prematurity by (a) utilizing a new instrument: the Merrill Palmer Revised edition, (b) including children of preterm and full term birth statuses from as young as 2 months of age, and (c) collecting data from parental and clinician reports. In addition to attempts to clarify the relationship between birth status and childhood dysfunction, this study also sought to augment existing literature by exploring the correlation between parental report and clinician observation of childhood dysfunction.

The results of this study did not support the hypothesis that children of preterm birth will demonstrate more problems in functioning when compared to full term peers. Although there were more significant differences between preterm and full term children in the older cohort group, those differences did not consistently reflect dysfunction by the preterm children. Additionally, this study considered dimensions of dysfunction as measured by parental report and clinician observations. Notably, a lack of agreement between parent and clinician observations emerged for the young age cohort group. However, the high level of agreement for the older children suggests that parental and clinician perspectives converge with older children. Contrary to the hypothesis, birth status, gender, ethnicity, and SES did not collectively form a specific risk index for dysfunction. However, these factors did interact with each other to predict functioning on several scales. In fact, there were no significant main effects. Instead, predictors of dysfunction were interactions of variables such as birth status, age, gender, and ethnicity. This general finding illustrates the importance of taking into consideration all aspects of the child's situation when making an assessment of functioning.

KEYWORDS: Prematurity, Childhood Dysfunction, Merrill-Palmer-Revised, Parental Report, Observer Report

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Chapter One

Introduction

One out of every eight babies born in the United States is premature ("Premature Birth," 2006). Prematurity refers to infants born at <37 weeks gestational age. As great medical strides are being made in the care and treatment of infants born prematurely, the survival rate of these medically fragile babies is escalating. Growth in the numbers of babies surviving at younger gestational ages and lower birth weights leads to questions regarding the long term developmental trajectory of these children. A great deal of research noting the sequelae of prematurity suggests that children of preterm birth are at an increased risk for difficulties in many domains of development. Researchers have noted the persistence of early deficits (Reid, 1993), with children who display poor regulatory skills in infancy being at greater risk for later aggression and antisocial behaviors (Rothbart, Ahadi, & Hershey,1994).

Despite the potential persistence of early problems in behavioral development, researchers have also confirmed the benefits of appropriate and timely intervention (Brooks-Gunn, Klebanov, Liaw, & Spiker, 1993; Als, Lawhon, Duffy, McAnulty, Gibes-Grossman, & Blickman, 1994; Spiker, Ferguson, & Brooks-Gunn, 1993). In light of the growing number of surviving, preterm infants, efforts to fine-tune existing interventions require an understanding of the specific needs of the population for whom they are designed. To best assist the positive development of premature children, professionals must ascertain (a) whether these children do indeed present unique concerns across a range of behaviors; (b) if so, how early these problems appear; (c) if these differences are present in both infancy and early childhood; and (d) if they are reliably detectable by parents and clinicians. Thus, the goal of the present study is to further prematurity research by exploring these issues in children of preterm birth while considering several important contributing factors, such as their age, gender, ethnicity, and socioeconomic status (SES).

As an introduction to this project, the following section includes discussions of literature pertaining to the emotional and behavioral sequelae of prematurity across the dimensions of childhood functioning as well as the relationships between parental and observer reports of childhood dysfunction. This introduction section concludes with the relevance of such research to early intervention.

Dimensions of Childhood Functioning

Mathiesen and Sanson (2000) studied the dimensionality of problems in childhood functioning. They conducted factor analysis of a parent-report screening tool known as the

Behavioral Checklist (BCL) and uncovered factors reflecting emotionality, regulation, sociability, and hyperactivity-attentiveness. They relied solely upon maternal report, studied infants at 18 months and 30 months, and did not include preterm children. The current study seeks to expand on dimensionality research of this kind and apply it to the problem of prematurity, by (a) utilizing a new instrument: the Merrill Palmer Revised edition, (b) including children of preterm and full term birth statuses from as young as 2 months of age, and (c) collecting data from parental and clinician reports.

Temperament and Emotionality. Temperament refers to the individual differences in behavior and mood that are constitutional in nature and stable over time and across situations. Although researchers believe temperament is detectable in children from a very early age, a study of developmental models of infant and early childhood temperament by Lemery, Goldsmith, Klinnert, and Mrazek (1999) supports the claim that this construct becomes more stable from infancy to toddlerhood with greater stability in the toddlerhood to preschool stages. For example, these researchers found that distress-anger, along with fear and activity level, remained particularly stable from 24 to 48 months of age (Lemery et al., 1999).

According to Chess and Thomas (1986), a "difficult temperament" is characterized by irregularity of biological functioning, intense negative mood, deficits in adaptability to change, and withdrawal responses to new stimuli. Although only 10% of participants in their New York Longitudinal Study demonstrated unequivocal "difficult temperaments," 70% of these children were later diagnosed with a behavior disorder (Chess & Thomas, 1986). These authors suggest that incompatibility between one's temperament and one's environment may play an important role in the later development of behavior disorders. This relationship may exist either in the form of considerable incompatibility between the child's temperament and her environment or as the result of pathologically exaggerated temperamental characteristics preceded and reinforced by a series of negative interactions with the environment. Here, the authors are careful to note that this perspective is not intended to negate the influence of such environmental factors as physical handicaps, biologically-based disturbances, and traumatic events on the development of psychological disorders (Chess & Thomas).

Interestingly, research by Oberklaid, Sanson, Pedlow and Prior (1993) found that maternal perceptions of difficult temperament in infancy are positively related to future behavior problems in preschool. Here, combining maternal perceptions of both difficult temperament and behavior problems with other variables, such as prematurity, perinatal stress, and male sex, led to increased accuracy in predictions about future maladjustment (Oberklaid et al.). Additionally,

Young and Fox (1999) researched the relationship between temperament and empathy and found that 2-year-old children, who at 4 months showed low arousal and low motor activity, were behaviorally inhibited and exhibited less empathy toward an unfamiliar person in distress than did children in the comparison groups. Thus, some aspects of early temperament seem to endure with time and offer rich information about the potential development of future behavior problems.

Researchers have also considered the relationship between early "difficult temperaments" and behavior problems in adolescence. To explore this issue, Caspi, Henry, McGee, Moffitt, and Silva (1995) conducted a longitudinal study that followed children from 3 to 15 years of age. During this study, examiners observed and rated each child's behavior at 3, 5, 7, and 9 during performance on a standard set of cognitive and motor tasks. The observers rated 22 behavioral characteristics using a 3-point scale, with the high end indicating that the participant demonstrated a higher level of the characteristic. When the participant reached 9, 11, 13 and 15 years of age, parents and teachers provided ratings of internalizing and externalizing behaviors. These researchers organized the 22 behavioral characteristics into four factors. They were Lack of Control, Approach, Sluggishness, and Wariness. Here, Lack of Control, for children at 3 and 5 years of age, encompassed attributes such as emotional lability, low frustration tolerance, and impulsive and uncontrolled behavior. For the participants at ages 7 and 9, the Lack of Control construct was divided into two factors: Irritability and Distractibility. Irritability captured the impulsivity, poorly regulated behavior, and instability of emotional responses. As the name suggests, Distractibility consisted of traits such as inability to maintain attention to a task and lack of persistence with difficult tasks. Additionally, parents were given a list of 16 competencies such as mature, friendly, cooperative and asked to rate how accurately these strengths describe their child at 13 and 15 years of age. The results of this study indicated that Lack of Control at 3 and 5 correlated with externalizing behavior problems, including inattention, hyperactivity, destructiveness, and disobedience at 9 and 11. This finding persisted through mid-adolescence with participants high on Lack of Control at 3 and 5 demonstrating higher levels of attention problems and aggression at ages 13 and 15. Finally, a negative relationship emerged between Lack of Control and parental reports of competency. Here, children who were rated high on early Lack of Control were deemed to have fewer social strengths than children with fewer early behavior problems (Caspi et al).

Information about the trajectory of children with "difficult temperaments" is important when considering the child of premature birth. As previously discussed, children of premature birth seem to be somewhat more vulnerable to the later development of behavioral problems.

Certainly, considering early temperament patterns may help professionals target areas for intervention. Although Wolke (1998) reported no evidence that preterm children show differences in temperament when compared to full term counterparts, he does suggest that infants born at <32 weeks gestational age are more likely to suffer colic and feeding problems. These early signs of fussiness are consistent with the aforementioned traits of the "difficult temperament" and are important to consider. In a study by Weiss, St. Jonn-Seed, and Wilson (2004), 80% of mothers rated their preterm, low birth-weight (LBW) infants as having difficult temperaments. Here, these infants demonstrated significant difficulty with irregularity of biological functioning, deficits in adaptability to change, and high distractibility. The preterm, LBW infants also exhibited problems with intense negative mood and withdrawal response to new stimuli; however, deviation from the norm was less significant on these 2 traits (Weiss et al.). Thus, information about the endurance of early behavioral problems coupled with the vulnerability to compromise resulting from premature birth necessitates further examination of these issues within the premature population.

Rothbart and Derryberry (1981) suggest that temperament encompasses the constructs of reactivity and regulation. Here, reactivity refers to an individual's response to a given stimulus while self-regulation refers to an individual's attempts to cope with that stimulus and to modulate reactive responses to it. These constructs are thought to exist on a continuum with the combination of specific levels of reactivity and regulation producing unique temperament patterns (Fox, 1989). For example, a person who is low on both reactivity and regulation may be described as depressed or socially withdrawn while someone who is high on both is deemed to be sociable and uninhibited. Here, the combination of high reactivity and low regulation manifests itself as hyperactivity or lack of control. Alternatively, low reactivity and high regulation result in inhibition (Fox).

Malatesta, Grigoryev, Lamb, Albin, and Culver (1986) observed the interactive behaviors of full-term and preterm infants and their mothers for evidence of emotion socialization resulting from reciprocal interactions between infant and mother. Preterm infants were included as a comparison group due to the difficulties in temperament and interactive deficits that are often associated with prematurity. These assumptions about prematurity were supported by this data as preterm infants offered less eye contact to their mothers and displayed more negative emotions at 5-months-old than their full-term counterparts.

Thus, successful interaction with one's environment is influenced not only by the child's innate temperament, but also by the child's ability to regulate his or her emotions. Research on emotion regulation suggests that children with fewer regulatory skills are more prone to displays

of behaviors that are consistent with future externalizing disorders. Early deficits in regulatory skills tend to perpetuate later incompetence as the child faces each new developmental stage with suboptimal resources (Squires, 2000).

Anger and Aggression. Researchers have found that the expression of anger appears very early in life. For example, Sullivan and Lewis (1989) suggest that a range of emotions including anger can be observed in infants as young as 10-weeks-old. Research by Johnson, Emde, Pannabecker, Stenberg, and Davis (1982) found that 84% of mothers endorsed expressions of anger in their 1- to 3-month-old infants. Also, children as young as 7 months of age have been observed to display the necessary facial expressions to communicate anger (Stenberg, Campos, & Emde, 1983).

Izard (1977) defines anger as the response that follows an impediment to a desired goal. This definition has led researchers to consider the relationship between motivation or interest and anger. For example, Stifter and Grant (1993) found that those infants who were rated by their mothers as generally more angry and who demonstrated greater interest in a given toy displayed more intense anger at the removal of this toy. A longitudinal study of anger by Rothbart et al. (1994) found that infant anger, as elicited by an impeded goal, was positively related to later aggression.

Gender of the child is another variable that has been considered in anger research with children. For example, Jacklin, Maccoby, and Dick (1973) found that one-year-old females tended to display more anger to frustration than did their male counterparts. Additionally, gender seems to influence the child's reaction to anger. In one study, observers attended a preschool and watched for angry interactions among 69 children of the ages 3 years 5 months to 5 years 11 months (Fabes & Eisenberg, 1992). The results of their observations suggested that preschool boys and girls respond differently to anger, with boys displaying a tendency to vent physically their frustrations when angered while girls become more verbally assertive.

Age also seems to influence anger expression and management. Between 18 months and 2 years of age the ability to verbally communicate emotions begins to emerge. During this time, children are developing increasing independence via increased communication and motor skills. Lemery et al. (1999) suggest that this independence and awareness of self in relation to others results in greater control of one's own emotions. With these new skills and discoveries comes parental expectation for the toddler to increasingly express her emotional state via words rather than tantrums or other more primitive means (Jenkins, Oatley, & Stein, 1998). Logically, older children utilize more sophisticated coping strategies than do their younger counterparts (Fabes & Eisenberg,1992).

Inability to effectively regulate one's angry emotions seems to have implications for the quality of preschoolers' social interactions. Children who are more impulsive and behaviorally dysregulated tend to respond to anger-producing situations with aggression (Fabes & Eisenberg, 1992). Also, children who are most likely to become angry within the social context demonstrate less sophisticated coping responses such as crying, throwing tantrums, and tattling (Fabes & Eisenberg). According to Fabes and Eisenberg, popular, socially-savy children are less likely to engage in angry conflicts than their less socially competent counterparts. Also, Rothbart et al. (1994) found that children who demonstrate greater anger expressivity are seen by peers and adults as more aggressive than their less angry counterparts. As a result, inability to regulate angry emotions negatively impacts preschoolers' social relationships and increases the likelihood of conflicts with peers.

Therefore, anger is a construct that is observable in infancy and has implications for later development as poorly regulated anger appears to have an enduring influence on later social and behavioral development. Children who have difficulty adjusting to frustrating stimuli at an early age tend to carry this deficit to future developmental stages, which leads to problems in their interactions with their families and peers as well as to externalizing behavior problems. In a study by Grunau, Whitfield, and Fay (2004), parents of ELBW (extremely low birth weight), preterm adolescents rated them as less socially competent than their NBW counterparts, citing delinquent and aggressive behaviors among the list of problems exhibited by the ELBW teens.

The importance of researching the relationship between birth status and negative emotionality is predicated upon the temperamental and regulatory problems noted in the preterm population (Wolke, 1998) coupled with the cited relationship between infant anger and later aggression and antisocial behaviors (Rothbart et al., 1994). Given that early detection and intervention are critical for interrupting the negative trajectory of inadequate emotional development and the paucity of anger research within the preterm population, information about regulatory skills and potential vulnerabilities in this area are important for the successful development and application of intervention strategies.

Sociability. Researchers suggest that prematurity impacts perceptions of early social functioning and subsequent social interactions. For example, research by Stern and Karraker (1992) indicated that mothers of both preterm and full term babies hold stereotypes about premature infants describing them as less sociable and less cognitively competent than their full term counterparts. Therefore, the mother of a preterm infant may have lower social expectations for her child and interact with him in a manner that results in behavior consistent with these low expectations (Stern & Karraker, 1992). Additionally, medical compromise seems to play a role

in the relationship between the preterm child and his caregiver. For example, Landry, Chapieski, Richardson, Palmer, & Hall (1990) found that the degree of medical compromise suffered was related both to self-directed and maternal behaviors as high risk, low birth weight children spontaneously demonstrated fewer self-directed behaviors and were provided fewer opportunities for choice making by their mothers. A similar sentiment is endorsed by Wolke (1998) who suggests that mothers of VLBW children seem to respond with a more active and controlling style. To assess whether this pattern of parental control persisted with time, Barrett, Roach, and Leavitt (1996) observed mother-child interactions of preterm and full-term children at 12 and 20 months of age and found that, at both age points, mothers of preterm toddlers had higher rates of assistance and intrusion into their child's play than did mothers of full-term toddlers.

Interestingly, Hughes, Shults, McGrath, and Medoff-Cooper (2002) found that, at 6 weeks of age, preterm infants were rated as less intense and more withdrawn than their full-term counterparts. This withdrawal may be an artifact of the reciprocal relationship between the infant and the caregiver as preterm infants tend to have difficulty with giving clear social cues and sustaining attention during social interactions (Lester, Hoffman, & Brazelton, 1985). As a result of these deficits, parents who are actively attempting to connect with their infant may inadvertently overstimulate their infant, thereby leading the infant to withdraw (Hughes, et. al).

Early behavioral inhibition, or tendency to withdrawal from new stimuli and strangers (Kagan, 1994), has been linked to child anxiety (Shamir-Essakow, Ungerer, & Rapee, 2005). This interactional style seems to persist. In fact, there appears to be a relationship between behavioral inhibition in infancy and anxiety in adolescence within a community sample of full term children (Prior, Smart, Sanson, & Oberklaid, 2000). Although many studies rely on parent and teacher ratings along with objective testing to determine functioning, Grunau et al. (2004) obtained self-reports from preterm adolescents and discovered that these youth also consider themselves to have deficits in social skills. Thus, information about the preterm child's sociability appears to have implications for later functioning.

Attention and Executive Functioning. The results of several longitudinal studies suggest that pre-term children perform more poorly on parent and teacher ratings of negative behaviors, which include inattentiveness (Horwood, Morgridge & Darlow, 1998; Huddy, Johnson, & Hope, 2001; Klebanov, Brooks-Gunn & McCormick, 1994; Levy-Shiff et al., 1994; Ross, Lipper & Auld, 1990). In fact, research by Gray, Indurkhya, and McCormick (2004) found that prematurity and low birth weight doubled the likelihood of clinically significant behavior problems. For example, a follow-up study of 7 and 8-year-old children of preterm birth found that very low birth weight

(VLBW) children demonstrated poorer outcomes on measures of attention deficit hyperactivity than did their full term counterparts (Horwood et al.). Similarly, Hughes et al. (2002) found that at 12 months of age, preterm infants sustained less attention to a given activity and were more likely to discontinue when faced with an obstacle. Environment seems to play a role in attentiveness as Breslau and Chilcoat (2000) found that low birth weight (LBW) was associated with greater parent and teacher ratings of clinically significant attention problems in children from disadvantaged, urban communities than in normal birth weight children or in LBW children from the suburbs. However, research by Nadeau, Tessier, Boivin, Lefebvre, and Robaey (2003) found that premature birth status was a better predictor of behavioral problems at school age than was family adversity.

Also interested in the impact of birthweight on behavior, Klebanov et al. (1994) divided participants into smaller classes of extremely low birth weight, or ELBW, (< 1000g), other VLBW (1001-1500g), heavy low birth weight (1501-2500g), and normal birth weight, or NBW, (>2500g). These researchers found that the extremely low birth weight children received higher scores for daydreaming and hyperactive behaviors than did their heavier low birth weight and normal birth weight counterparts (Klebanov et al.).

Executive functioning is comprised of a number of processes that drive intentional, goal-directed behaviors and are relevant for behavior, emotional control, and social skills (Anderson, Doyle, & Victorian Infant Collaborative Study Group, 2004). Researchers suggest that the typical trajectory of development of executive functioning begins with simple motor inhibition and impulse control in early childhood and progresses to complex functions that require selective and sustained attention (Klenberg, Korkman, & Lahti-Nuuttila, 2001). Rothbart, Zaiae, and O'Boyle (1992) suggest that one's ability to modulate and shift attention may serve as an internal coping strategy for handling sensory stimulation. Research on executive functioning in ELBW/very preterm (<28 weeks gestation) 8-year-old children found that parents of these children rated them as being at increased risk for clinically significant problems with ability to shift attention and problem-solving strategies to account for contextual changes as well as with ability to regulate their emotional responses (Anderson et al., 2004). Bohm, Smedler, and Forssberg (2004) found that 5 ½ year-old preterm children demonstrated deficits in executive functioning relative to same age full term counterparts even after controlling for IQ. This is especially important in light of research suggesting the long term impact of poor executive functioning. For example, a study by Belsky, Friedman, and Hsieh (2001) found that high negative emotionality coupled with low attentional persistence at 15 months of age was associated with lower social competence in 3-year-olds. Given the long term implications of

deficits in each, attention and executive functioning are certainly important components of childhood functioning that warrant further study in the preterm population.

Summary. Many researchers purport that children of preterm birth are indeed more likely to experience both social (Schothorst & van Engeland, 1996) and behavioral (Lukeman & Melvin, 1993) problems than are their full-term counterparts. Wolke (1998) suggests that one quarter of studied VLBW children suffered severe or multiple psychological problems ranging from internalizing disorders to behavior problems. The vulnerability to psychological distress seems to persist into adulthood as parents of VLBW women report higher incidents of anxiety and depression in their daughters than do parents of normal birthweight women (Hack, 2006).

Although many studies suggest increased behavior problems among children of preterm birth, other longitudinal studies deny differences between these children and those of full-term birth (Hille et al., 2001; McDonald, Sigman & Ungerer, 1989; Oberklaid, Sanson, Pedlow & Prior, 1993; Oberklaid et al., 1991; Schothorst & van England, 1996). Despite noted deficits in social competencies, Schothorst et al. found no difference between the total behavior scores of preterm children and those of their full term counterparts. Similarly, a study of 2-year-olds born at <32 weeks gestational age found that these children scored comparably to full term controls on parental ratings of behavior problems (Stoelhorst et al., 2003). The present study considers both that the potential for negative long-term effects of prematurity are concerning and that some controversy remains over whether preterm children do in fact exhibit deficits in functioning. For those two reasons, the present study uses a new, comprehensive measure and relies upon both parental and clinician reports of functioning to clarify the relationship between birth status and childhood dysfunction and to contribute toward an ultimate consensus in this debate.

Relationship between Parental and Observer Reports of Childhood Dysfunction

A great deal of research has considered the correlations between various sources reporting behavior problems in children. However, studies exploring deficits in young children have generally been limited to reports from parents, teachers, and classroom observers and suggest questionable agreement among these sources. For example, Doctoroff and Arnold (2004) found that parental responses to a behavior inventory were not highly correlated with teacher and classroom observer ratings of problem behaviors. Interestingly, raters from similar contexts, such as teachers and classroom observers, were more congruent. Similarly, Firmin, Proemmel, and Hwang (2005) compared parent and teacher ratings of behaviors in children six to eighteen years old and discovered that ratings of parents and teachers were highly correlated

on most domains; however, parents and teachers did not agree about externalizing behaviors. Research by Cai, Kaiser, and Hancock (2004) considered SES and ethnicity via the exploration of cross-informant agreement for low income, predominantly African American preschoolers. These researchers suggested that the lack of agreement between teachers and parents may reflect unique contextual expectations held by parents and teachers with parents highlighting behaviors that compromise successful management in the home while teachers focus on impediments to classroom and social functioning (Cai et al.).

Clinicians are frequently called upon to assess a child's functioning using tools such as the Merrill Palmer, which include observer ratings. In light of research about the questionable agreement between parent and teacher ratings, an understanding of correlations between parents and clinical evaluators will assist with interpretations of reports from multiple sources. Thus, the current study seeks to augment existing literature by exploring the correlation between parental report and clinician observation of childhood dysfunction.

Importance of Early Intervention

Considering problematic behavior from a developmental perspective implies that obtaining competencies at one developmental level is a requisite for successful ascension to the next rung of the development ladder (Cicchetti & Cohen, 1995). Based on the aforementioned literature, inability to develop early behavioral and emotional regulation skills often precludes effective responses to later challenges. Logically, children who display early signs of dysfunction are at increased risk of developing psychopathology in adolescence and adulthood (Reid, 1993). Additionally, premature birth status seems to predispose many children to psychological problems that persist well into adulthood (Hack, 2006).

Relying on evidence suggesting that premature birth status negatively influences functioning in important developmental domains, researchers have proclaimed the advantages of interventions for preterm (Brooks-Gunn et al., 1993; Als et al., 1994; Spiker et al., 1993) and low birthweight infants (Gardner, Walker, Powell, & Grantham-McGregor, 2003) with noted improvements in the areas of cognitive and behavioral development. More specifically, early detection and intervention are critical for interrupting the negative trajectory of inadequate emotional development as children who have difficulty adjusting to frustrating stimuli at an early age tend to carry this deficit to future developmental stages. Thus, research designed to clarify potential differences in functioning has important implications for the development and fine-tuning of intervention strategies for preterm children.

Additionally, the reciprocal nature of the preterm infant-parent relationship points to the need for early intervention. Understanding the specific deficits in the preterm population as it

relates to future problems will assist in the development of specific interventions to enhance parenting skills. This, in turn, will improve parental feelings of competence and reduce parental stress and anxiety while also interrupting the negative interactional pattern between primary caregivers and their preterm child (Ohgi, Fukuda, Akiyama, & Gima, 2004). For example, Shaw, Dishion, Supplee, Gardner, and Arnds, (2006) found that family based intervention with mothers of at-risk toddlers resulted in an increase in maternal involvement with their children from the ages of 2 to 4 years and a decrease in conduct problems during the same time period. Similarly, Plant and Sanders (in press) found that well planned interventions for children with disabilities resulted in improved parental competence and satisfaction.

Also, Stern and Karraker (1992) found that stereotypes held by mothers of premature infants seem to be amenable to change in the presence of information and education highlighting similarities between full term and preterm children. Therefore, if research indicates that premature children demonstrate few deficits, this information could be passed to mothers who in turn may amend their interactions with preterm children to more closely approximate the interactions they have with their full term children.

Not only is intervention in and of itself important, but user friendly interventions tailored to meet the specific needs of families with preterm children may be essential to increase the likelihood of compliance and subsequent positive results. For example, Casey et al. (1994) found that preterm children with failure to thrive, whose families complied with interventions, exhibited higher IQ scores and better behavior ratings at 3 years of age than did children of families with low compliance rates.

Possible interventions for preterm children are vast in scope and include programs to target deficits in physical, cognitive, and behavioral development. However, the present study seeks to consider dimensions of childhood dysfunction the focus on which is predicated upon the temperamental and regulatory problems noted in the preterm population (Wolke, 1998) coupled with the cited relationship between poor regulation in infancy and later aggression and antisocial behaviors (Rothbart et al., 1994). Additionally, this study seeks to assist with intervention planning by identifying the earliest age at which deficits in functioning are detectable. This information is valuable to those attempting to match appropriate services for preterm children with the appropriate developmental stage.

Goals of Present Study

Despite some discrepancies in the literature, most researchers and professionals who work with children of premature birth agree that the early medical frailty and insults endured by a majority of these children place them at increased risk for deficits in subsequent development.

In our quest for information regarding early detection and intervention, the aforementioned emotional and behavioral sequelae of prematurity make a strong argument for the further study of childhood dysfunction in this population.

Longitudinal research by Mathiesen and Sanson (2000) considered behaviors in children from 18 to 30 months and found that specific elements of child temperamental emotionality predicted stability on four dimensions of functioning from 18 to 30 months of age (Mathiesen & Sanson). This finding certainly speaks to the importance of such research; however, that study assessed only full term children from the ages of 18 months-30 months. To further knowledge in this area, the present study had three goals. First, I utilized new measurement scales from the standardization of the revised Merrill Palmer, I considered children of preterm and full term birth statuses, and I included participants from 2 months to 71 months to assess the age range at which differences in functioning are detectable in children of different birth statuses.

Second, examiners typically rely heavily on parental report for information regarding young children; however, researchers suggest that multiple sources of information provide a more complete picture of the child's functioning (Doctoroff & Arnold, 2004). Most studies on the congruence between parents and other reporters utilized teachers and classroom observers as the comparisons; however, the present study is designed to extend the existing research by evaluating agreement between parent and examiner reports across a range of behavioral and emotional responses. Third, this study considers the cumulative effect of birth status, gender, ethnicity, and SES on childhood dysfunction in preterm and full term children.

Hypotheses

In light of previous work regarding the effects of prematurity on behavior, I offer the following hypotheses: 1) Children of preterm birth will demonstrate more problems in the aforementioned areas of functioning, when compared to full term peers. More specifically, I predict that these differences in dysfunction between preterm and full term children will increase with age; therefore, detection of significant differences will occur more frequently in the later age cohort; 2) Parent and clinician observer ratings of behaviors will be moderately correlated. Much like teachers, the clinician observer has a role different from that of a parent as well as more limited interaction with the child both of which will likely reduce agreement between the clinician and parent. However, I predict that agreement will be moderate because both the clinician and parent have the task of assessing a wide-range of behavioral and emotional responses in a single child outside the context of the classroom. 3) Finally, within the premature population, I hypothesize that gender, ethnicity, and SES will collectively form a risk index for

childhood dysfunction with males, minority children, and children of less educated parents demonstrating more problems than their counterparts.

Design

I have chosen to conduct this investigation using a cross-sectional, nonexperimental design. The cross sectional nature allows for the expedient collection of data from children of ages ranging from two months through 71 months. Here, age and birth status (preterm and full term) are the predictor variables while scores on the parental and observer questionnaires serve as the criterion variables. The present study also considers the degree to which gender, ethnicity, and SES relate to childhood dysfunction in both the premature and full term populations.

Much like work by Buss and Goldsmith (1998) and Zeanah et al. (1997), this study considers emotionality from a developmental perspective with an appreciation that specific age points provide distinct snapshots of emotion. The choice to include the specified age ranges was based on the unique developmental information provided at each developmental stage. Here, the infant group (<18 months) is included to offer information about early childhood functioning. Toddlerhood and early childhood (>18 months) provides information about behavioral development during a time when communication skills and advanced regulatory coping strategies are emerging (Lemery et al., 1999), as children face the unique set of regulatory skill challenges provided by the demands of school and increasing social interactions (Fabes & Eisenberg, 1992, Klebanov et al., 1994).

Chapter Two

Methods

Participants

Data utilized in the present study was collected from participants in a larger standardization study on the Merrill-Palmer Developmental Scales-Revised Edition (Roid & Sampers, 2004). The publishers of the Merrill-Palmer Revised project shared, with this researcher, their non-identifying, normative data, which was collected from June 2000 to December 2000.

The original study included a nationally representative population as participants were solicited from all four major U.S. Census regions (Northeast, Midwest, South, and West). Additionally, the ethnic composition of the study population mirrored that of the US population, as indicated by the 2000 Census report, with slightly increased minority subsamples: 60% Anglo-Americans, 20% Hispanic-Americans, 13% African-Americans, 4% Asian-Americans, and .3% Native Americans. Data regarding socioeconomic status (SES), as measured by maternal education level, was collected for each participant at the time of assessment. At the onset of the evaluation, parents also provided information regarding the child's date of birth, original due date, birth weight, gender, and ethnicity as well as any known medical or developmental problems.

Field researchers for the standardization project were responsible for participant recruitment. Assessment sites were randomly selected from a list of potential sources which included participants' homes, day care centers, schools, preschools, clinics, and community organizations. The participants received $5.00 for their participation. The standardization study received approval from the Institutional Review Board (IRB) at the host agency (Stoelting Co.). Each child's participation in the study was contingent upon informed parental consent and IRB approval at each assessment site.

In the current study, data from 54 preterm children and 54 full term children, selected from a larger sample of 1393 full term children, were studied. The selected full term sample was matched to the preterm sample on gender, ethnic background, and SES. The age range for both groups was 2-71 months.

Examiners

The examiners in the standardization project were either licensed health-care professionals or advanced graduate students who worked under direct, professional supervision and possessed at least a master's degree in one of the following concentrations: psychometrics, school psychology, early childhood/exceptional education, clinical, or counseling

psychology. Examiners were also required to have experience in the assessment of children and infants, with and without disabilities.

Examiners received training in the administration of the Merrill-Palmer test during a 4-day training workshop. This training experience included observation by project staff as well as performance feedback to each examiner prior to actual testing. To maintain interrater reliability, examiners were monitored by local supervisors throughout the data collection process. Also, communication between sites and project staff was maintained via a newsletter containing suggestions and directions about data collection.

Settings

Researchers for the original study collected data in a variety of settings, including participants' homes, day care centers, schools, preschools, clinics, and community organizations. Examiners were trained to standardize the testing environment as much as possible to account for the fact that assessments occurred in a number of different settings. Participants were solicited from both rural (<2500) and urban (>2500) communities.

Materials

The Merrill-Palmer Revised Edition is designed to monitor progress in the areas of cognition, language, motor, and social-emotional and adaptive behavior via play-based assessment. Administration of the test involves observation of the child's interaction with the testing tools, which include a variety of age-appropriate toys, books, and pictorial materials. There are two Levels of the Merrill-Palmer Revised Edition test. Level 0 of the Merrill-Palmer was designed to assess children ages birth to <18 months (<1 ½ yrs) while Level 1 was designed to measure the skills of children ages $\geq$18 months (1½ years) to 78 months (6½ years). Each version of the test includes a variety of tasks that progress from lower to higher level skills.

Data for the present study was taken from standardization forms of the Social Emotional Scales within the Merrill Palmer Revised Edition. These forms include the Examiner Observation/Testing Behaviors, and the Social-Emotional/Temperament Style-Parent Report. Both scales are comprised of items rated on a four-point frequency scale with the following options: Rarely/Never, Sometimes, Often, and Usually/Always. The Examiner Observation/Testing Behaviors scale is designed to assess the child's behavior during the evaluation process. For children <18 months, categories of assessment include Emotionality, Attention and Fearful, and Cautious. For children >18 months, areas assessed are Organized and Cooperative, Active and Eager, and Angry and Oppositional. The Social-

Emotional/Temperament Style-Parent Report scale is designed to examine the child's social interactional style. Both tools consider emotional reactivity and use of inhibition.

Procedures

In the standardization study, IRB approval was obtained by the host agency (Stoelting Co.). Following the attainment of IRB approval and informed parental consent, the trained examiner met with the child and administered the age-appropriate version of the Merrill Palmer Revised instrument. During the evaluation, the examiner noted the child's behavioral reactions to the tasks. Additionally, the parents completed age-appropriate forms regarding the child's typical behaviors. Assistance was offered to families who were unable to read or fully comprehend the forms.

In the current study, IRB exemption status was obtained from the University of Kentucky because all data was provided by the publishers of the Merrill-Palmer Revision project and contained no identifying information. In this study, I compared, for preterm and full term children, parental and examiner responses on the Social Emotional Scales of the Merrill-Palmer Revised edition.

In this study, I factor analyzed the full data set (N = 1447) to identify specific factors of the clinician and parent forms for young (<18months) and old (>18months) children, which yielded a total of four sets of factors. Next, I determined which questions loaded significantly on each factor thereby creating factor scales. These factor scales became the criterion variables to which the independent variables predicted.

Analyses were performed to assess for differences on criterion variable at various ages. In particular, the interaction of group status and age was examined to determine the age at which the two groups begin to differ in functioning. Given the aforementioned literature highlighting important developmental milestones at this age break coupled with the fact that parents and clinicians completed unique forms for younger (<18 months) and older (>18 months) participants, the present study sample was divided into 2 groups (<18 months and >18months) by age. Additionally, all analyses were run twice; once using the chronological age of the preterm participants and once using their adjusted, or corrected ages. The calculation of corrected age is a common practice in the field and consists of the deduction of months of prematurity from the chronological age. More specifically, the examiner subtracts the child's due date from the test date to obtain his corrected age at the time of assessment.

In this study, preterm and full term participants were matched on gender, age cohort (<18months or >18months), minority status, and SES. Here, SES was defined by maternal years of education. Using the SPSS statistical program in which the variables of gender,

ethnicity, SES, and age cohort were filtered, each of the preterm children was matched to a full term counterpart. When multiple matches were found, the first available option was always selected.

Data Analysis

Data analysis in this study proceeded in the following stages. First, I factor analyzed, separately, the parental and clinician reports on the full sample of children (<18 months n=362), (>18 months n=1085). These analyses were repeated twice: once with children under 18 months, for whom certain items were applicable, and once for children over 18 months, for whom other items were relevant. Next, I conducted a series of multiple regression analyses predicting each of the reliable scales derived from the factor analyses from birth status and age. Here, the analyses were repeated a total of four times-twice for each age group including chronological and corrected ages for the preterm children.

In this study, missing data were imputed using the expectation maximization (EM) method secondary to evidence that parameter estimates are less biased when missing data are imputed via a valid technique such as this one (Allison, 2003). Principal axis factoring with oblique rotation (Gilley & Uhlig, 1993) was used to reduce the data to specific factors. Factors were chosen based on eigenvalues greater than one, examination of scree plot, and determination of theoretical coherence and relevance for the factors. An item was determined to load on a factor if its loading was .40 or greater on that factor. I then created scales which were the sums of the items comprising the factors, enabling me to compare the reports of parents and clinicians.

The study sample included 54 preterm children. Fifty-four full term children were selected from the overall sample and matched to preterm children as described above. Primary analyses were conducted on the sample of 108. All analyses were conducted four times: once each for chronological and corrected ages for younger children (<18mos) and once each for chronological and corrected ages for older children (>18mos). Initially, birth status and age in months (within young and old age categories) served as the primary predictors. I conducted a series of multiple regression analyses predicting each of the reliable scales derived from the factor analyses. In each case, at step one I entered birth status (preterm versus full term) and age with the interaction of those two variables entered at step two. Here, a significant interaction of age and birth status indicates that the main effects of these variables would not have a simple interpretation because the effect of each is contingent upon the level of the other. Following completion of the primary analyses, I conducted additional, exploratory analyses to

test whether there was a relationship between birth status, age, SES, minority status, gender, and outcomes, again using multiple regression.

As recommended by Aiken and West (1991), continuous variables were centered in advance to reduce the likelihood of multicollinearity and to yield interpretable regression coefficients. The process of centering consists of subtracting the sample mean from the variable thereby creating a "centered" variable in deviation score form with a mean of zero.

Chapter Three

Results

Descriptive Data

Table 1 presents descriptive statistics including the means as well as the standard deviations and frequencies, where appropriate, on participant age, gender, ethnicity, and SES. The birth status groups were matched on gender, minority status, and SES. Nonsignificant chi square comparisons on these variables confirmed the success of the matching process.

The young age cohort group consisted of 62 participants with a mean age of 8.32 months while the old age cohort group was comprised of 48 children with a mean age of 43.56 months. Thirty-seven preterm and 34 full term males participated. Consistent with US census information, 61% of the preterm and 57% of the full term participants were Caucasian. Finally, all mothers included in this study had at least a high school education. Forty-four mothers of preterm children had greater than a high school education while 46 mothers of full term children had post high school education.

Factor Analysis, Scale Development, and Parent-Clinician Agreement

Tables 2-5 present eigenvalues for each of the four factor analyses as well as the patterns of loadings for the items. Factor analysis of the clinician report of children <18 months resulted in the following scales: Extreme Crying, Attention & Joy, Fear, and Discomfort. The Extreme Crying scale contains questions regarding difficulty consoling the child and child tantrums. The Attention & Joy scale reflects attention to and pleasure in the test materials. The Fear scale reflects demonstration of general fear as well as specific fear toward the test and examiner. Finally, the Discomfort scale includes items about general discomfort or the appearance of having a bad day.

Factor analysis of the parental report of children <18 months resulted in the following scales: Positive Mood, Tantrums and Easy Temperament. The Positive Mood scale reflects alertness, positive affect, and friendliness toward others. The Tantrums scale considers extreme crying, whining, and fussing as well as the frequency and duration of tantrums. The Easy Temperament scale includes enjoyment of being read to, independent play, and good sleep hygiene.

Factor analysis of the clinician report of children >18 months resulted in the following scales: Deliberation, Fear, Anger/Aggression, Respectful, and Engagement. The Deliberation scale contains questions about organization, independence, cooperation, attention to details, and demonstration of task-orientated behaviors. The Fear scale assesses fear of separation from caregivers as well as fear of the test materials and examiner. The Respectful scale

measures the child's interactions with the examiner specifically noting sarcasm, interruptions, and poor communication. Finally, the Engagement scale reflects positive interactions, good mood, and full participation during the evaluation.

Factor analysis of the parental report of children >18 months resulted in the following scales: Attentive/Deliberate, Tantrums, Fear, and Positive Mood. The Attentive/Deliberate scale reflects organization, attention to details, requests for clarification, independence, and efficiency. The Tantrums scale assesses inconsolability, extreme crying, and the frequency and duration of tantrums. The Fear scale considers the child's fear of strangers and novel situations as well as fear of separation from caregivers. Finally, the Positive Mood scale includes items regarding calmness and cooperation.

Table 6 presents coefficient alpha (α) estimates of the internal consistency of each scale derived from the factor analyses. Factors with $\alpha < .60$ were not included due to their low reliability. Tables 8 and 9 present the intercorrelations of the scales within reporting source as well as the correlations between parent and clinician reports. Here, the intercorrelations between clinician and parental reports were generally small for the younger (<18 months) children and ranged in magnitude from .00 to -.26 with a mean of .12. The one significant correlation was the negative relationship between clinician's report of Extreme Cry and parental report of Easy Temperament. Conversely, the intercorrelations were quite substantial for the older (>18 months) children with correlation coefficients ranging from -.01 to .56 with a mean of .28. Here, clinician and parental scales that reflected similar content domains tended to correlate highly.

Concurrent Prediction of Criterion from Birth status and Age

Childhood dysfunction was predicted for all scales whose reliability estimates were .60 or greater. Tables 9 through 24 summarize the results from each of several multiple regression analyses designed to assess concurrent prediction of childhood dysfunction. All regressions were run twice: once using chronological age for preterm children and once with corrected ages. In the young sample, no significant main effects of Chronological/Corrected Age or Group emerged. However, the regression of the interaction of Chronological Age x Birth Status (preterm versus full term) on parental report of Tantrums was significant $F(1,55) = 2.76$, $p < .05$. Figure 1 is a graph of the results that indicates the direction of the interaction. The dotted line represents premature children and the solid line represents full term children. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The figure shows that the preterm children demonstrated a slight increase in tantrum behaviors

with age while the full term children showed a substantial decrease in tantrums with increased age. No other significant interactions emerged in the young sample.

In the older sample, the regression of the interaction of Chronological Age x Birth Status on clinician's report of Respect was significant $F(1,42)=3.51$ ($p < .05$). Figure 2 is a graph that clarifies this interaction. For chronological age, the preterm children were rated as demonstrating more respect than the full term children at younger ages. However, this discrepancy became negligible as age increased. Here, preterm children decreased in respect with increasing age while the full term children increased in respect with increasing age.

Additionally, the interaction of Corrected Age x Birth Status significantly predicted clinician's report of Respect $F(1,38)=3.79$ ($p < .05$). The graph in Figure 3 clarifies this interaction. For corrected age, the preterm children were consistently rated as demonstrating more respect than the full term children at both age points. However, the gap in performance on this scale is greatest at the younger age point. Here, full term children increased in respect with increasing age while the performance of preterm children remained the same.

Also in the older sample, the regression of the interaction of Chronological Age x Birth Status on parental report of Attention/Deliberation was significant $F(1,42)=2.73$, ($p < .05$). Figure 4 is a graph that clarifies this interaction. For chronological age, the preterm children were rated as demonstrating more attention than the full term children at younger ages. However, this discrepancy decreased as age increased. Here, preterm children maintained their level of attention while the full term children demonstrated a slight increase in attention and deliberation with increasing age.

The interaction of Corrected Age x Birth Status $F(1,38) = 3.25$, ($p < .05$) significantly predicted parental report of Attention/Deliberation. Figure 5 is a graph that clarifies this interaction. For corrected age, the preterm children were consistently rated as demonstrating more attention/deliberation than the full term children at both age points. However, the gap in performance on this scale is greatest at the younger age point. Here, full term children increased in attention and deliberation with increasing age while the performance of preterm children decreased slightly. No other regressions in the old sample produced significant results.

Possible Roles of Gender, SES, and Minority Status

Tables 26 through 32 present significant results from multiple regressions analyzing the relationship between birth status, age, gender, SES, minority status, and childhood dysfunction. Results for the young age cohort group will be presented first followed by results for the older age cohort group.

Young Age Cohort. In the young sample, no significant main effects of group, age, gender, SES, or minority status appeared. Also, there were no significant three-way interactions. However, two-way interactions were noted for several criterion scales. An interaction of Corrected Age x SES significantly predicted clinician's report of FEAR $F(7,47) = 2.47$, ($p < .05$). Figure 6 provides a graph of this interaction. Here, children of lower SES were rated by clinicians as being more fearful than those of higher SES with the difference between the groups being most prominent at the lower age.

Two-way interactions of Corrected Age x Sex ($p < .05$) and Corrected Age x Race ($p < .05$) significantly predicted clinician's reports of DISCOMFORT $F(7,47) = 2.21$, $p < .05$. Figure 7 is a graph that clarifies the Corrected Age x Sex interaction. The boys were rated by clinicians as being more uncomfortable than girls at the younger age; however, this trend reversed as age increased.

Additionally, Corrected Age x Race ($p < .05$) was related to the clinician's reports of Discomfort. Figure 8 indicates the direction of this interaction. Overall, the minority children consistently exhibited more discomfort than the Caucasian children did. Here, the Caucasian children demonstrated more discomfort with greater age; therefore, the disparity between the two groups on this construct decreased substantially with increasing age.

Two-way interactions significantly predicted parent's reports of TANTRUMS $F(7,46) = 2.19$, ($p < .05$). Interactions of Birth Status x Sex ($p < .01$) and Birth Status x Chronological Age ($p < .05$) were significantly related to the criterion. Figure 9 is a graph that clarifies the Birth Status x Sex interaction. Here, full term boys were rated to have more tantrums than preterm boys while full term girls and preterm girls were rated similarly on this construct.

Additionally, a significant interaction of Birth Status x Chronological Age ($p < .05$) as depicted in Figure 10, indicates that preterm children demonstrated a slight increase in tantrum behaviors with age while the full term children showed a substantial decrease in tantrums with increased age.

Older Age Cohort. In the older sample, no significant main effects of birth status, gender, SES, minority status, or age appeared. Again, two-way interactions were noted for several criterion scales. Two-way interactions significantly predicted clinician's reports of FEAR $F(7,29) = 3.43$, ($p < .01$). An examination of the beta weights revealed that Birth Status x SES ($p < .01$) and Corrected Age x SES ($p < .05$) and Birth Status x Race ($p < .05$) were related to the criterion**.** Figure 11 is a graph depicting the Birth Status x SES interaction. Full term children of lower SES demonstrated more fear than preterm children of lower SES. However, this trend

changed with increased SES as the full term children of higher SES exhibited a decrease in fear while preterm children of higher SES showed an increase in fear.

According to the graph in Figure 12, which depicts the Corrected Age x SES interaction, children of higher SES consistently demonstrated more fear than children of lower SES. However, the discrepancy is most prominent at the lower age.

Regarding the significant Birth Status x Race interaction, as illustrated in Figure 13, preterm, Caucasian children demonstrated more fear than full term, Caucasian children. However, preterm, minority children demonstrated significantly less fear than full term minority children.

Two-way interactions significantly predicted clinician's reports of RESPECT $F(7,33) = 4.54$, ($p < .01$). Birth Status x Race ($p < .01$) and Birth Status x Chronological Age ($p < .01$) interactions were significantly related to the criterion. Figure 14 is a graph that clarifies the former interaction. Preterm and full term Caucasian children performed similarly on respect. However, minority full term children demonstrated significantly less respect than preterm minority children.

Figure 15 depicts the Birth Status x Chronological Age interaction. Here, preterm children demonstrated more respect than full term children at the younger age. However, full term children exhibited increasing respect with increasing age thereby slightly reversing the trend.

Two-way interactions significantly predicted clinician's reports of ENGAGED $F(7,33) = 3.34$, ($p < .01$). Figure 16 is a graph depicting the Birth Status x Sex ($p < .05$) interaction. Full term girls were more engaged than preterm girls**,** but preterm boys were more engaged than full term boys.

Figure 17 clarifies the Birth Status x SES ($p < .01$) interaction on clinician's reports of ENGAGED. Here, preterm children of lower SES were more engaged than full term children of lower SES. However, full term children of higher SES were slightly more engaged than their preterm counterparts.

Additionally, a significant Birth Status x Corrected Age ($p < .05$) interaction, as depicted by Figure 18, indicates that preterm children were consistently more engaged than full term children. However, this discrepancy is more apparent at the younger age because full term children demonstrated increased engagement with increasing age.

Finally, significant two-way interactions predicted parent's reports of ATTENTION/DELIBERATION $F(7,33) = 2.71$, ($p < .05$). Here, a significant relationship emerged between the criterion and the interactions of Birth Status x Sex ($p < .05$) and Birth

Status x Chronological Age ($p < .05$). Figure 19 indicates the direction of the Birth Status x Sex interaction. Here full term girls demonstrated more attention/deliberation than preterm girls; however, preterm boys performed better on this construct than full term boys.

Regarding the significant Birth Status x Chronological Age interaction, Figure 20 clarifies that the preterm children were rated as demonstrating more attention than the full term children at younger ages. However, this discrepancy decreased as age increased. Here, preterm children maintained their level of attention while the full term children demonstrated a slight increase in attention and deliberation with increasing age. Again, there were no significant three-way interactions.

Table 1 Descriptive Statistics

Age by Age Cohort Group

Group	N	Minimum	Maximum	Mean	Standard Deviation
Young (<18mos)	62	2	17	8.32	4.41
Old (≥18mos)	46	19	71	43.56	13.61

Sex by Group

Group	Male	Female	Total
Preterm	37	17	54
Full Term	35	19	54
Total	72	36	108

Race by Group

Group	African American	Caucasian	Asian	Hispanic	Native American	Total
Preterm	8 (15%)	33 (61%)	2 (3.7%)	9 (16.7%)	2 (3.7)	54
Full Term	7 (13%)	31 (57%)	1 (2%)	15 (28%)	0 (0%)	54
Total	15	64	3	24	2	108

Mother's Education by Group

Group	HS	>HS	Total
Preterm	10	44	54
Full Term	8	46	54
Total	18	90	108

Table 2 Eigenvalues and Factor Loadings for Clinician Report - young

Eigenvalues for Clinician Rating (<18months)

Factor	Total	% of Variance	Cumulative %
Extreme Cry	5.04	33.60	33.59
Attention	1.67	11.12	44.72
Fear	1.41	9.40	54.12
Discomfort	1.05	7.01	69.46

Rotated Factor Loadings for Factor Analysis with Clinician Report items (<18months)

	Extreme Crying	Attention & Joy	Fear	Discomfort
Can not be comforted when crying	**.90**	-.02	.00	-.07
Extreme tantrums, crying, or screaming	**.55**	-.02	-.03	.06
Demonstrated pleasure and joy while playing with toys	-.01	**.79**	.06	-.04
Sat up and attended to test materials	-.06	**.78**	-.05	.01
Showed fear of examiner or test materials	-.09	-.02	**-.89**	-.02
Stares fearfully	-.03	.02	**-.58**	.01
May have been ill, hungry or very uncomfortable	-.10	-.06	.01	**.77**
Seemed to be having a bad day today	-.12	.02	-.09	**.70**
So active and moving that it was difficult to test	-.03	-.13	.04	-.11
Threw toys and test materials excessively	-.01	.05	-.02	.05
Got upset and did not re-adjust to testing or examiner	.34	-.05	-.31	.15
Crying interfered with testing	.48	-.03	-.02	.47
Whining or fussing	.24	-.18	-.04	.41
Would not separate from parent or guardian/Clings to them	.20	-.07	-.47	.00
Good eye contact and visual tracking	.07	.57	.05	-.03

N=362

Table 3 Eigenvalues and Factor Loadings for Parent Report - young

Eigenvalues for Parent Rating (<18months)

Factor	Total	% of Variance	Cumulative %
Positive Mood	4.83	22.98	22.98
Tantrums	2.74	13.04	36.01
Easy Temperament	1.41	6.69	42.71

Rotated Factor Loadings for Factor Analysis with Parent Report items (<18months)

	Positive Mood	Tantrums	Easy Temperament
Happy while working/playing; smiles	**.82**	.02	-.07
Friendly and responsive to people	**.48**	-.13	-.08
Awake and alert while playing or working	**.44**	.13	-.02
Tantrums more than 4 times per week	.02	**.74**	.09
Extreme tantrums, crying, or screaming	-.05	**.62**	-.08
Whining or fussing	-.03	**.60**	-.09
Tantrums longer than 10 minutes	.01	**.58**	.09
Plays alone for five minutes	.09	-.02	**-.67**
Sleeps through the night	-.07	-.03	**-.56**
Likes to be read to	.06	.02	**-.46**
Shows little emotion	-.12	-.06	-.01
Withdrawn, depressed or sad during the day	-.07	.09	-.08
Calm, not agitated or jittery	.33	-.32	.05
Good moods; no big mood swings	.53	-.46	.07
Cooperates and follows directions	.00	-.17	-.14
Watches other children play	.21	-.02	-.22
Responds quickly to my directions	-.05	.03	-.10
Stays active most of the day	.23	.23	-.27
Hurts self when angry	.06	.13	.09
Vomits	.00	.39	.09
Has been asked to leave preschool/daycare due to behavior	.00	.16	.11

N=362

Table 4 Eigenvalues and Factor Loadings for Clinician Report - old

Eigenvalues for Clinician Rating (≥18months)

Factor	Total	% of Variance	Cumulative %
Deliberation	17.38	37.77	37.77
Fear	4.34	9.44	47.21
Anger	2.89	6.29	53.50
Respect	2.07	4.49	57.99
Engagement	1.30	2.84	60.82

Rotated Factor Loadings for Factor Analysis with Clinician Report items (≥18months)

	Deliberation	Fear	Anger/ Aggression	Respect	Engagement
Organizes and plans before beginning tasks	**.89**	-.08	-.01	-.03	-.12
Pays attention to details of task	**.87**	-.02	-.01	-.04	.03
Careful and interested in accuracy	**.85**	-.01	-.02	-.03	-.05
Pauses to think; does not “blurt out” responses	**.81**	.04	-.06	.09	-.08
Completes tasks in an efficient way	**.81**	-.02	-.04	-.04	.07
Pays attention to directions	**.79**	-.02	-.03	.03	.15
Lets me finish directions before starting	**.73**	.06	-.06	.14	.05
Independently completes tasks without constant reminders	**.72**	-.05	-.04	.06	.10
Stays on task without “pats on back”	**.71**	-.03	-.06	.10	.17
Asks for clarification when a task is not clear	**.70**	-.09	.03	-.05	-.15
Cooperates in following directions	**.69**	-.02	.01	.07	.30
Listens well	**.68**	-.02	-.06	.06	.20
Communicates clearly and effectively	**.67**	-.09	.06	-.05	.01
Refrains from constant touching of things that are “off limits”	**.61**	.09	-.06	.26	.01
Avoids daydreaming, noises, or distractions	**.57**	.03	.04	.23	.10
Eager and ready to work	**.51**	-.04	-.01	.09	.35
Is very cautious and wary of the examiner	.01	**.87**	-.08	.02	-.02
Is fearful of strangers	.01	**.85**	-.04	-.02	.10
Is afraid to be separated from parent(s)	-.02	**.76**	.00	.01	.03
Gives angry verbal responses to directions or tasks	-.04	-.01	**.82**	.00	.02
Aggressive, non-verbal behavior (foot stomping, slapping, hitting, pinching, biting)	.00	-.01	**.76**	.02	.15

Table 4 (continued)

Attempted to tear, break, or disassemble	-.11	-.06	**.66**	-.04	.13
toys or materials	.01	.03	**.58**	-.01	-.24
Gives objections or opposes directions					
Irritated or annoyed with tasks or items	-.11	.14	**.43**	.01	-.23
NOT quarrelsome	-.02	-.07	-.07	**.70**	.00
Complies without sarcasm	-.01	-.01	.02	**.70**	-.07
Does NOT interrupt me	.29	-.05	.02	**.63**	-.06
Responds quickly to my directions	-.11	.03	-.01	**.55**	.05
Interacts positively	.18	-.09	-.09	.15	**.50**
Good moods; no big mood swings	.12	-.17	-.12	.17	**.48**
Energetic consistently during the test	.30	-.10	-.06	.06	**.46**
Warms up to each new task quickly	.26	-.09	.00	.03	**.41**
Participated fully (not just watching) with me	.13	-.06	-.01	.10	**.39**
Very emotional or crying	.01	.46	.28	-.09	-.05
Talks and “chit-chats”	.38	-.14	.06	.02	-.08
Expresses willingness without whining	.31	-.06	-.15	.26	.20
Shows little emotion	.03	.09	.04	.01	-.05
Cooperates in following directions	.54	-.13	-.05	.06	.44
Friendly and responsive to people	.17	-.30	-.01	-.02	.45
Whines, fusses, or complains	-.08	.27	.35	.01	-.25
Does NOT “tune out” examiner	.31	-.03	-.01	.49	.06
Will stop activity for at least a few seconds when told “no”	.29	.06	-.05	.39	.05
Shows fear of failing difficult tasks	.20	.13	.30	-.01	-.06
Stayed active during the testing session	.01	-.06	.04	.24	.13
Awake and alert while working on the test	.00	-.08	-.01	.36	.18
Was NOT tired or overly fatigued from testing	.02	.05	.54	-.05	-.19

N =1085

Table 5 Eigenvalues and Factor Loadings for Parent Report - old

Eigenvalues for Parent Rating (≥18months)

Factor	Total	% of Variance	Cumulative %
Attention/Deliberation	15.63	25.62	25.62
Tantrums	6.90	11.31	36.93
Fear	2.82	4.62	41.55
Positive Mood	2.50	4.11	45.65

Rotated Factor Loadings for Factor Analysis with Parent Report items (≥18months)

	Attentive/ Deliberate	Tantrums	Fear	Positive Mood
Pauses to think; does not "blurt out" responses	**.83**	.00	-.02	.01
Organizes and plans before beginning tasks	**.82**	.04	-.08	-.02
Asks for clarification when a task is not clear	**.81**	.02	-.02	.07
Completes tasks in an efficient way	**.79**	-.02	.02	.01
Lets me finish directions before starting, does not interrupt me	**.73**	-.01	-.04	-.04
Independently completes tasks without constant reminders	**.71**	-.07	-.03	-.04
Careful and interested in accuracy on tasks	**.65**	-.01	.01	.01
Stays on task without "pats on the back" for more than 10 minutes	**.60**	.04	.04	-.05
Concentrates well while working at home	**.49**	.03	.08	.05
Avoids daydreaming	**.48**	.05	.01	.03
Pays attention to details of tasks	**.46**	-.02	.01	-.08
Pays attention to directions and instructions	**.33**	-.01	.02	-.04
Tantrums longer than 10 minutes	-.01	**.66**	-.02	-.15
Tantrums more than 4 times per week	-.12	**.61**	-.01	-.06
Cries to an extreme	-.04	**.60**	.02	-.01
Extreme tantrums, crying, or screaming	-.14	**.48**	.08	-.06
Can not be comforted when cries	.05	**.43**	-.03	.00
Hurts self when angry	.05	**.42**	.02	.07
Is fearful of strangers (frets, clings to parents)	-.07	-.06	**.87**	-.02
Stares fearfully or warily at strangers	-.05	-.06	**.78**	-.01
Is afraid to be separated from parent(s)	.02	.17	**.67**	.05
Is your child afraid to approach unfamiliar play situations or new children?	.07	-.09	**.50**	-.14

Table 5 (continued)

In a new play area or playground, if the parent or	-.06	.14	**.44**	.07
babysitter is out of sight, does your child get very	-.05	.00	-.01	**.58**
upset and cry?				
Happy while working/playing; smiles				
Friendly and responsive to people	-.02	.05	-.35	**.45**
Does your child need medicine to get to sleep?	.04	-.04	-.02	-.09
Does your child have nightmares more than once a	.00	.11	-.04	.07
week?				
Awake and alert while playing or working	-.02	.07	.07	.27
Responds quickly to my directions	.13	.01	.07	-.09
Stays active most of the day	.02	-.03	.04	.20
Warms up to each new task quickly	.20	-.05	-.11	.18
Participates fully (not just watching) with me	.21	.04	.00	.21
Sensitive to noise or distractions	.00	-.03	.08	.14
Calm, not agitated or jittery	.07	-.05	.10	.02
Relaxed and assured, not anxious	.06	.08	-.06	.02
Good moods; no big mood swings	-.09	-.30	-.09	.38
Cooperates and follows directions	.25	-.09	.01	.00
Interacts positively, not quarrelsome	.10	-.04	-.05	.36
Talks, “chit-chats” and communicates	.25	-.05	.03	.37
Listens and does not “tune out” parents	.20	.00	.07	.12
Complies without sarcasm or whining	.27	.01	-.01	.10
Refrains from constant touching of things that are	.38	-.05	.09	-.09
“off limits” or breakable				
Likes to be read to	.19	-.08	-.04	.15
Sleeps through the night	.07	-.08	-.13	-.05
Plays alone for five minutes	.12	.02	.00	.03
Plays with another child for at least 15 minutes	.33	.00	.08	.05
without adult interventions				
Watches other children play	-.11	.06	.08	.11
Will stop activity for at least a few moments when	.19	-.02	.13	.06
caregiver says “no”				
Withdrawn, depressed or sad during the day	.10	.16	.09	-.02
Irritated or annoyed with tasks or chores	.20	.00	.06	.01
Shows little emotion	.07	.08	.17	-.02
Angry or aggressive reactions (foot stomping,	-.08	.28	.15	-.05
slapping, hitting, pinching, biting)				
Whining or fussing	-.11	.20	.27	-.04
Odd or unusual sayings or repeated actions	.05	.21	.15	.06

Table 5 (continued)

Gets upset when daily routine is changed	-.01	.18	.11	-.03
Vomits	.06	.35	.02	.08
Hurts other children in play	-.04	.10	-.09	.07
Has been asked to leave preschool/daycare due to behavior	-.07	.14	-.04	-.11
Does not listen to directions in public	-.11	.11	.03	.03
After being in a new child-care location, does the child get really upset when parents return?	-.07	-.04	-.04	-.01
When your child has a new babysitter or a new child-care worker, does s/he cry for more than 10 minutes?	-.02	.08	.19	-.06

N =1085

Table 6 Internal Consistency of Factor Scales

Inter-item Reliability for Clinician and Parent Factors – Preterm and Full Term

	Factor	α	Factor	α
	(<18mos)		**(≥18mos)**	
Clinician	Extreme Cry	.68	Deliberation	.96
	Attention	.75	Fear (c)	.85
	Fear	.65	Anger	.80
	High Activity	.51	Respect	.75
	Discomfort	.72	Engaged	.90
Parent	Positive Mood	.62	Attention/	.96
	Tantrum	.77	Deliberation	
	Easy Temperament	.65	Tantrum	.82
	Withdrawn	.47	Fear (p)	.83
			Positive Mood	.63
			Sleep	.58
			Problems	

n = 108

Table 7 Means of Factor Scales

Means on Young Scale Items

	Preterm			Full term		
	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Extreme Cry	31	.01	.12	30	.05	.21
Attention	31	2.50	.59	30	2.40	.77
Fear	31	.05	.13	30	.04	.13
Discomfort	31	-.01	.14	30	.02	.13
Positive Mood	31	2.68	.27	29	2.70	.41
Tantrum	31	.46	.29	28	.39	.30
Easy Temperament	31	2.59	.42	29	2.52	.59

Means on Old Scale Items

	Preterm			Full term		
	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Deliberation	23	1.92	.60	23	1.90	.63
Fear (c)	23	.26	.35	23	.27	.43
Anger	23	.07	.12	23	.05	.12
Respect	23	2.60	.47	23	2.31	.88
Engaged	23	2.65	.41	23	2.64	.53
Attention/Deliberation	23	1.73	.55	23	1.41	.65
Tantrum	23	.27	.31	23	.29	.25
Fear (p)	23	.70	.47	23	.60	.40
Positive Mood	23	2.64	.31	23	2.48	.53

Table 8 Correlations - Young

Factor Correlations for Clinician Rating Form (<18 months)

Factor		Extreme Cry	Attention	Fear	Discomfort
	Extreme Cry	1.00	-.27	-.36	.43
	Attention	-.27	1.00	.33	-.36
	Fear	-.36	.33	1.00	-.36
	Discomfort	.43	-.36	-.36	1.00

n = 62

Factor Correlations for Parent Rating Form (<18 months)

Factor		Positive Mood	Tantrum	Easy Temperament
	Positive Mood	1.00	-.19	-.34
	Tantrum	-.19	1.00	.10
	Easy Temperament	-.34	.10	1.00

n = 62

Correlations between Clinician and Parent Ratings (<18months)

		Parent Factor		
		Positive Mood	Tantrum	Easy Temperament
Clinician Factor	Extreme Cry	-.04	.20	-.26*
	Attention	.00	.09	.15
	Fear	-.05	.04	-.10
	Discomfort	-.12	-.17	.25

*p<.05, n = 62

Table 9 Correlations – Old

Factor Correlations for Clinician Rating Form (≥18 months)

Factor		Deliberation	Fear	Anger	Respect	Engaged
	Deliberation	1.00	-.20	-.14	.47	.45
	Fear	-.20	1.00	.38	-.16	-.46
	Anger	-.14	.38	1.00	-.21	-.24
	Respect	.47	-.16	-.21	1.00	.39
	Engaged	.45	-.46	-.24	.39	1.00

n = 46

Factor Correlations for Parent Rating Form (≥18 months)

Factor	Attention/ Deliberation	Tantrum	Fear	Positive Mood
Attention/Deliberation	1.00	-.08	-.04	.14
Tantrum	-.08	1.00	.26	-.04
Fear	-.04	.26	1.00	-.07
Positive Mood	.14	-.04	-.07	1.00

n = 46

Correlations between Clinician and Parent Ratings (≥18months)

		Parent Factors			
		Attention/Deliberation	Tantrum	Fear (p)	Positive Mood
Clinician Factors	Deliberation	.63**	-.20	-.01	.32*
	Fear (c)	.09	.44**	.48**	-.22
	Anger	-.34*	.15	-.22	-.05
	Respect	.56**	-.32*	-.04	.31*
	Engaged	.39**	-.23	-.18	.43**

*p<.05, **p<.01, n = 46

Table 10 Regression of Age and Group onto EXTREME CRYING

Regression of Age and Group onto Extreme Cry (clinician rating <18 months) – Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.12	.02	.02	.02	.47
	Age	.04				
Step 2:	Age x Group	.11	.02	.01	.01	.38

n = 61

Regression of Age and Group onto Extreme Cry (clinician rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.11	.12	.01	.01	.38
	Age	.04				
Step 2:	Age x Group	.10	.13	.02	.00	.23

n = 61

Table 11 Regression of Age and Group onto ATTENTION

Regression of Age and Group onto Attention (clinician rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.08	.08	.01	.01	.18
	Age	.00				
Step 2:	Age x Group	-.03	.08	.01	.00	.03

n = 61

Regression of Age and Group onto Attention (clinician rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.06	.09	.01	.01	.24
	Age	-.06				
Step 2:	Age x Group	-.11	.12	.01	.01	.29

n = 61

Table 12 Regression of Age and Group onto FEAR

Regression of Age and Group onto Fear (clinician rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.01	.17	.03	.03	.89
	Age	.17				
Step 2:	Age x Group	.07	.18	.03	.00	.13

n = 61

Regression of Age and Group onto Fear (clinician rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.04	.26	.07	.07	2.05
	Age	.26*				
Step 2:	Age x Group	.15	.28	.08	.01	.57

n = 61

p<.05

Table 13 Regression of Age and Group onto DISCOMFORT

Regression of Age and Group onto Discomfort (clinician rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.11	.12	.01	.01	.42
	Age	.06				
Step 2:	Age x Group	.01	.12	.01	.00	.00

n = 61

Regression of Age and Group onto Discomfort (clinician rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.12	.15	.02	.02	.62
	Age	.08				
Step 2:	Age x Group	.01	.15	.02	.00	.01

n = 61

Table 14 Regression of Age and Group onto POSITIVE MOOD

Regression of Age and Group onto Positive Mood (parent rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.03	.09	.01	.01	.25
	Age	-.09				
Step 2:	Age x Group	-.15	.14	.02	.01	.66

n = 60

Regression of Age and Group onto Positive Mood (parent rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.01	.09	.01	.01	.23
	Age	-.09				
Step 2:	Age x Group	-.15	.13	.02	.01	.48

n = 60

Table 15 Regression of Age and Group onto TANTRUM

Regression of Age and Group onto Tantrum (parent rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.12	.13	.02	.02	.50
	Age	.04				
Step 2:	Age x Group	.30	.25	.06	.05	2.76*

n = 59

*p<.05

Regression of Age and Group onto Tantrum (parent rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.12	.13	.02	.02	.48
	Age	-.04				
Step 2:	Age x Group	.20	.18	.03	.02	.89

n = 59

Table 16 Regression of Age and Group onto EASY TEMPERAMENT

Regression of Age and Group onto Easy Temperament (parent rating <18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.07	.10	.01	.01	.28
	Age	-.07				
Step 2:	Age x Group	-.17	.16	.03	.02	.90

n = 60

Regression of Age and Group onto Easy Temperament (parent rating <18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.05	.14	.02	.02	.58
	Age	-.13				
Step 2:	Age x Group	-.25	.21	.05	.02	1.40

n = 60

Table 17 Regression of Age and Group onto DELIBERATION

Regression of Age and Group onto Deliberation (clinician rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.06	.20	.04	.04	.90
	Age	.20				
Step 2:	Age x Group	-.14	.23	.05	.01	.53

n = 46

Regression of Age and Group onto Deliberation (clinician rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.08	.20	.04	.04	.82
	Age	.21				
Step 2:	Age x Group	-.14	.23	.05	.01	.57

n = 46

Table 18 Regression of Age and Group onto FEAR

Regression of Age and Group onto Fear (clinician rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.07	.28	.08	.08	1.77
	Age	.28*				
Step 2:	Age x Group	.21	.32	.10	.03	1.20

n = 46

*p<.05

Regression of Age and Group onto Fear (clinician rating ≥18 months) – Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.11	.31	.10	.10	2.04
	Age	-.33*				
Step 2:	Age x Group	.15	.33	.11	.02	.63

n = 46

*p<.05

Table 19 Regression of Age and Group onto ANGER

Regression of Age and Group onto Anger (clinician rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.06	.10	.01	.01	.22
	Age	.09				
Step 2:	Age x Group	.15	.15	.02	.01	.59

n = 46

Regression of Age and Group onto Anger (clinician rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.05	.09	.01	.01	.15
	Age	.09				
Step 2:	Age x Group	.16	.15	.02	.02	.62

n = 46

Table 20 Regression of Age and Group onto RESPECT

Regression of Age and Group onto Respect (clinician rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.25*	.29	.08	.08	1.95
	Age	.21				
Step 2:	Age x Group	-.35	.39	.15	.07	3.51*

n = 46

*p<.05

Regression of Age and Group onto Respect (clinician rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.26	.28	.08	.08	1.63
	Age	.21				
Step 2:	Age x Group	-.36	.40	.16	.08	3.79*

n = 46

*p<.05

Table 21 Regression of Age and Group onto ENGAGEMENT

Regression of Age and Group onto Engaged (clinician rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.03	.12	.01	.01	.30
	Age	.12				
Step 2:	Age x Group	-.16	.17	.03	.02	.66

n = 46

Regression of Age and Group onto Engaged (clinician rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.05	.12	.02	.02	.30
	Age	.13				
Step 2:	Age x Group	-.16	.17	.03	.02	.58

n = 46

Table 22 Regression of Age and Group onto ATTENTION/DELIBERATION

Regression of Age and Group onto Attention/Deliberation (parent rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.28*	.29	.08	.08	1.92
	Age	.12				
Step 2:	Age x Group	-.31*	.37	.14	.06	2.73*

n = 46

*p<.05

Regression of Age and Group onto Attention/Deliberation (parent rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.29*	.28	.08	.08	1.60
	Age	.12				
Step 2:	Age x Group	-.33	.39	.15	.07	3.25*

n = 46

*p<.05

Table 23 Regression of Age and Group onto TANTRUM

Regression of Age and Group onto Tantrum (parent rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.06	.09	.01	.01	.16
	Age	-.08				
Step 2:	Age x Group	.08	.11	.01	.00	.18

n = 46

Regression of Age and Group onto Tantrum (parent rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.07	.12	.01	.01	.27
	Age	-.12				
Step 2:	Age x Group	.02	.12	.01	.00	.01

n = 46

Table 24 Regression of Age and Group onto FEAR

Regression of Age and Group onto Fear (parent rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.09	.18	.03	.03	.68
	Age	-.14				
Step 2:	Age x Group	.03	.18	.03	.00	.02

n = 46

Regression of Age and Group onto Fear (parent rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.04	.26	.07	.07	1.46
	Age	-.25				
Step 2:	Age x Group	-.14	.29	.08	.01	.54

n = 46

Table 25 Regression of Age and Group onto POSITIVE MOOD

Regression of Age and Group onto Positive Mood (parent rating ≥18 months) - Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.23	.24	.06	.06	1.16
	Age	.17				
Step 2:	Age x Group	-.03	.24	.06	.00	.03

n = 46

Regression of Age and Group onto Positive Mood (parent rating ≥18 months) - Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.20	.22	.05	.05	1.07
	Age	.13				
Step 2:	Age x Group	-.11	.23	.05	.01	.30

n = 46

Table 26 Regression of Group, Sex, Race, SES, and Age onto FEAR

Regression of Group, Sex, Race, SES, and Age onto Fear (clinician rating <18 months) –Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.10	.42	.18	.18	2.28
	Sex	-.10				
	Race	.15				
	SES	-.21				
	Age	.21				
Step 2:	Group x Sex	.52	.63	.40	.22	2.47*
	Group x Race	-.21				
	Group x SES	-3.54				
	Group x Age	.28				
	Age x SES	8.35 *				
	Age x Sex	-.25				
	Age x Race	-.14				
Step 3:	Group x Age x Sex	-.55	.68	.46	.06	1.73
	Group x Age x Race	-.64				
	Group x Age x SES	1.64				
n = 61						

*p<.05

Table 27 Regression of Group, Sex, Race, SES, and Age onto DISCOMFORT

Regression of Group, Sex, Race, SES, and Age onto Discomfort (clinician rating <18 months)-Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	-.07	.11	.01	.01	.12
	Sex	-.04				
	Race	.05				
	SES	-.04				
	Age	-.03				
Step 2:	Group x Sex	.52	.51	.26	.25	2.21*
	Group x Race	.11				
	Group x SES	3.13				
	Group x Age	.34				
	Age x SES	-3.33				
	Age x Sex	-.51 *				
	Age x Race	-.82*				
Step 3:	Group x Age x Sex	-.07	.51	.26	.00	.04
	Group x Age x Race	.09				
	Group x Age x SES	-.60				
n = 61						

*p<.05

Table 28 Regression of Group, Sex, Race, SES, and Age onto TANTRUM

Regression of Group, Sex, Race, SES, and Age onto Tantrum (parent rating <18 months)-Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.12	.22	.05	.05	.51
	Sex	.05				
	Race	-.06				
	SES	-.11				
	Age	-.11				
Step 2:	Group x Sex	1.00**	.53	.28	.24	2.19*
	Group x race	.16				
	Group x SES	-2.68				
	Group x age	.43 *				
	Age x SES	3.64				
	Age x Sex	.05				
	Age x Race	-.05				
Step 3:	Group x Age x Sex	.12	.60	.36	.07	1.58
	Group x Age x Race	-.31				
	Group x Age x SES	-8.75				
n = 59						

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

Table 29 Regression of Group, Sex, Race, SES, and Age onto FEAR

Regression of Group, Sex, Race, SES, and Age onto Fear (clinician rating ≥18 months) Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.26	.43	.19	.19	1.63
	Sex	-.12				
	Race	-.28				
	SES	-.32				
	Age	.07				
Step 2:	Group x Sex	-.40	.74	.55	.37	3.43**
	Group x Race	-.63*				
	Group x SES	4.07**				
	Group x Age	-.08				
	Age x SES	3.35*				
	Age x Sex	.20				
	Age x Race	-.07				
Step 3:	Group x Age x Sex	-.09	.78	.61	.05	1.18
	Group x Age x Race	.20				
	Group x Age x SES	-2.40				
n = 46						

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

Table 30 Regression of Group, Sex, Race, SES, and Age onto RESPECT

Regression of Group, Sex, Race, SES, and Age onto Respect (clinician rating ≥18 months)- Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.26	.44	.20	.20	1.97
	Sex	-.08				
	Race	-.35				
	SES	-.08				
	Age	.27				
Step 2:	Group x Sex	.46	.77	.59	.40	4.54**
	Group x Race	.90**				
	Group x SES	-1.23				
	Group x Age	-.65**				
	Age x SES	-1.14				
	Age x Sex	-.08				
	Age x Race	.14				
Step 3:	Group x Age x Sex	-.10	.78	.61	.02	.47
	Group x Age x Race	-.22				
	Group x Age x SES	.68				
n = 46						

**p<.01

Table 31 Regression of Group, Sex, Race, SES, and Age onto ENGAGED

Regression of Group, Sex, Race, SES, and Age onto Engaged (clinician rating ≥18 months)- Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.03	.19	.04	.04	.30
	Sex	-.02				
	Race	.13				
	SES	.10				
	Age	.10				
Step 2:	Group x Sex	.71 *	.66	.44	.40	3.34**
	Group x Race	.58				
	Group x SES	-3.13**				
	Group x Age	-.35				
	Age x SES	-1.46				
	Age x Sex	.05				
	Age x Race	-.08				
Step 3:	Group x Age x Sex	-.23	.68	.46	.02	.39
	Group x Age x Race	.11				
	Group x Age x SES	.42				
n = 46						

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

Table 31 (continued)

Regression of Group, Sex, Race, SES, and Age onto Engaged (clinician rating ≥18 months)- Corrected age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.03	.21	.05	.05	.34
	Sex	-.02				
	Race	.13				
	SES	.10				
	Age	.10				
Step 2:	Group x Sex	.71	.68	.46	.42	3.19*
	Group x Race	.58				
	Group x SES	-3.13				
	Group x Age	-.35*				
	Age x SES	-1.46				
	Age x Sex	.05				
	Age x Race	-.08				
Step 3:	Group x Age x Sex	-.23	.69	.47	.01	.20
	Group x Age x Race	.11				
	Group x Age x SES	.42				
n = 46						

*p<.05

Table 32 Regression of Group, Sex, Race, SES, and Age onto ATTENTION/DELIBERATION

Regression of Group, Sex, Race, SES, and Age onto Attention/Deliberation (parent rating ≥18 months)-Chronological age

	Model	β	R	R^2	R^2 Change	F for Change
Step 1:	Group	.28	.32	.10	.10	.92
	Sex	-.11				
	Race	-.13				
	SES	.03				
	Age	.15				
Step 2:	Group x Sex	.71*	.66	.43	.33	2.71*
	Group x Race	-.03				
	Group x SES	-1.27				
	Group x Age	-.49 *				
	Age x SES	-1.22				
	Age x Sex	.24				
	Age x Race	.35				
Step 3:	Group x Age x Sex	-.64	.73	.54	.11	2.26
	Group x Age x Race	-.08				
	Group x Age x SES	-2.54				
n = 46						

*p<.05

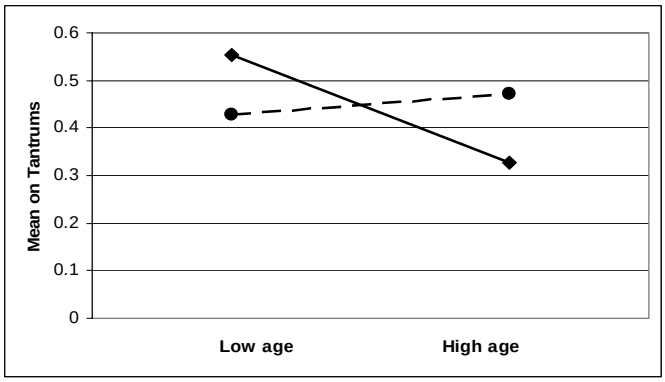

Figure 1. Graph of the interaction between chronological age and birth status on Tantrums. Numbers on the *y* axis represent scores on the Tantrums scale of the parent form for young participants. The dashed line represents preterm children and the solid line represents full term children.

Figure 2. Graph of the interaction between chronological age and birth status on Respect. Numbers on the *y* axis represent scores on the Respect scale of the clinician form for older participants. The dashed line represents preterm children and the solid line represents full term children.

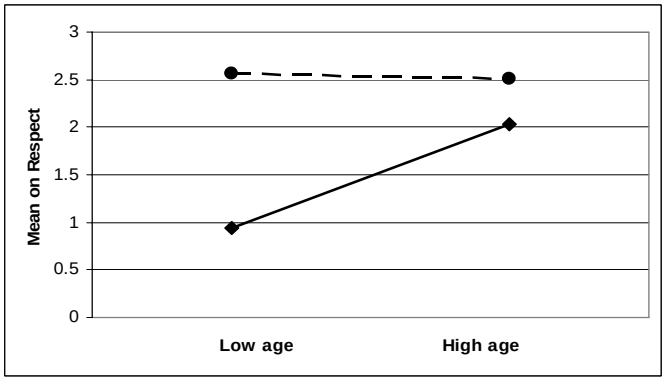

Figure 3. Graph of the interaction between corrected age and birth status on Respect. Numbers on the *y* axis represent scores on the Respect scale of the clinician form for older participants. The dashed line represents preterm children and the solid line represents full term children.

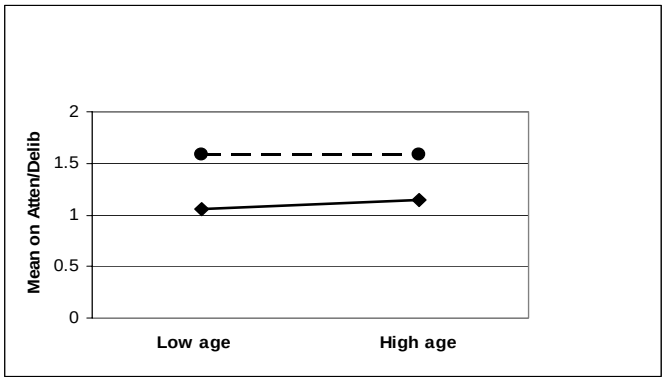

Figure 4. Graph of the interaction between chronological age and birth status on Attention/Deliberation. Numbers on the *y* axis represent scores on the Attention/Deliberation scale of the parental form for older participants. The dashed line represents preterm children and the solid line represents full term children.

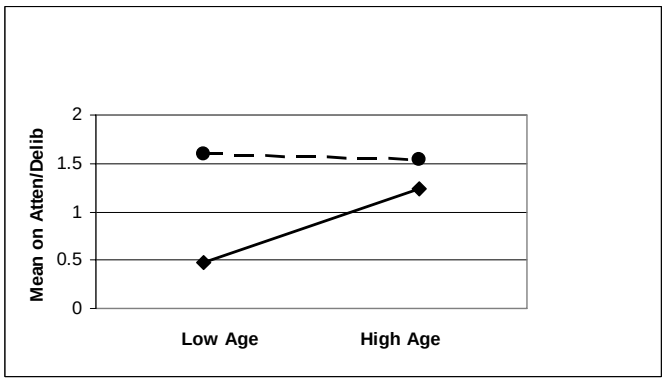

Figure 5. Graph of the interaction between corrected age and birth status on Attention/Deliberation. Numbers on the *y* axis represent scores on the Attention/Deliberation scale of the parental form for older participants. The dashed line represents preterm children and the solid line represents full term children.

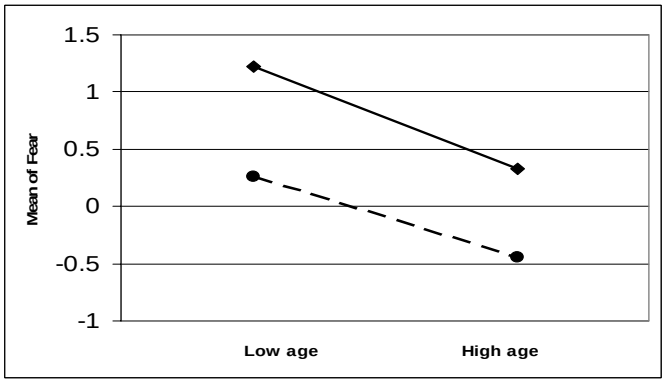

Figure 6. Graph of the interaction between corrected age and SES on Fear. Numbers on the *y* axis represent scores on the Fear scale of the clinician form for young participants. The dashed line represents children of mothers with more than a high school education and the solid line represents children of mothers with a high school education.

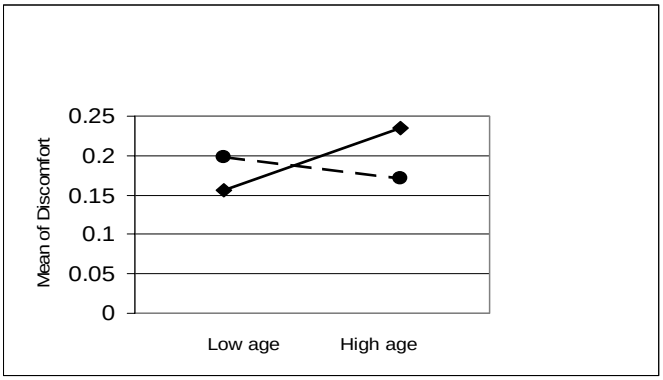

Figure 7. Graph of the interaction between corrected age and gender on Discomfort. Numbers on the *y* axis represent scores on the Discomfort scale of the clinician form for young participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents boys and the solid line represents girls.

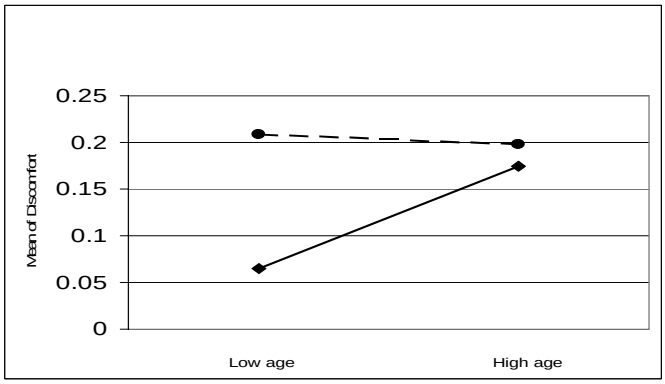

Figure 8. Graph of the interaction between corrected age and ethnicity on Discomfort. Numbers on the *y* axis represent scores on the Discomfort scale of the clinician form for young participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents minority children and the solid line represents Caucasian children.

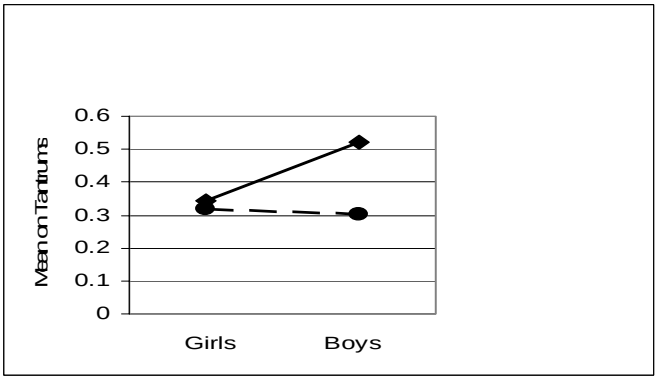

Figure 9. Graph of the interaction between gender and birth status on Tantrums. Numbers on the *y* axis represent scores on the Tantrum scale of the parental form for young participants. On the x-axis, the point closer to the origin represents girls while the point farther from the origin represents boys. The dashed line represents preterm children and the solid line represents full term children.

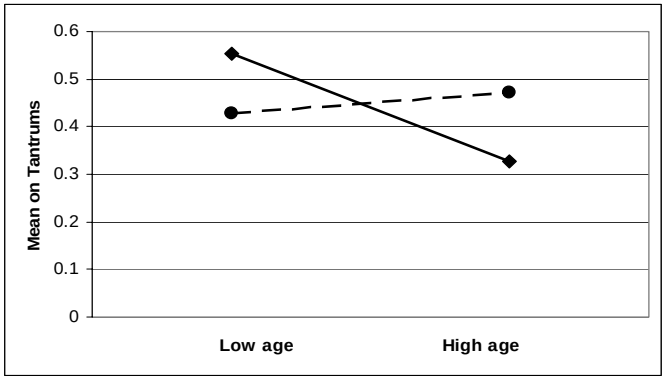

Figure 10. Graph of the interaction between chronological age and birth status on Tantrums. Numbers on the *y* axis represent scores on the Tantrum scale of the parental form for young participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents preterm children and the solid line represents full term children.

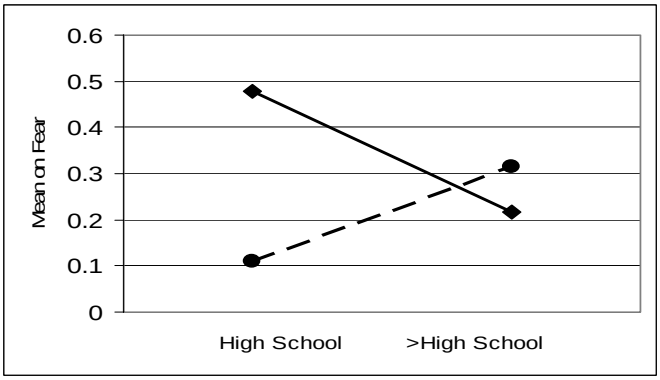

Figure 11. Graph of the interaction between SES and birth status on Fear. Numbers on the *y* axis represent scores on the Fear scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents participants whose mothers had a high school education while the point farther from the origin represents participants whose mother had greater than a high school education. The dashed line represents preterm children and the solid line represents full term children.

Figure 12. Graph of the interaction between corrected age and SES on Fear. Numbers on the *y* axis represent scores on the Fear scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents children of mothers with more than a high school education and the solid line represents children of mothers with a high school education.

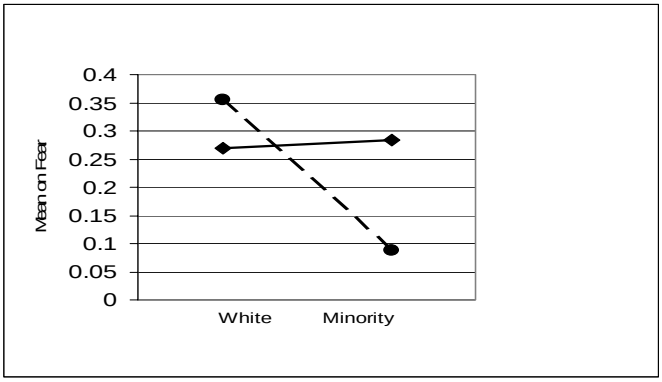

Figure 13. Graph of the interaction between Ethnicity and birth status on Fear. Numbers on the *y* axis represent scores on the Fear scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents Caucasian participants while the point farther from the origin represents minority participants. The dashed line represents preterm children and the solid line represents full term children.

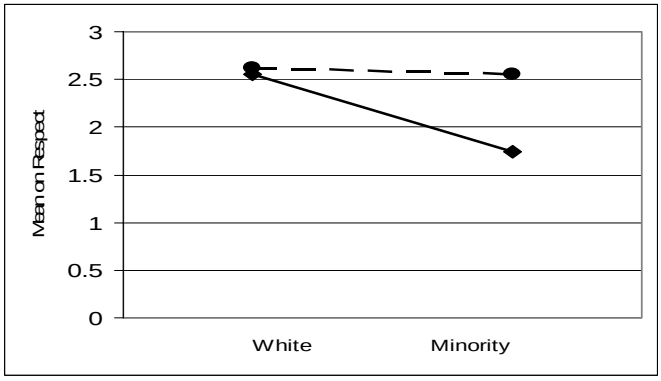

Figure 14. Graph of the interaction between Ethnicity and birth status on Respect. Numbers on the *y* axis represent scores on the Respect scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents Caucasian participants while the point farther from the origin represents minority participants. The dashed line represents preterm children and the solid line represents full term children.

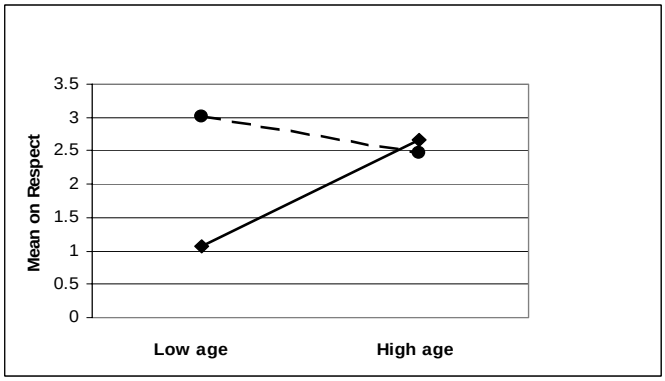

Figure 15. Graph of the interaction between chronological age and birth status on Respect. Numbers on the *y* axis represent scores on the Respect scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents preterm children and the solid line represents full term children.

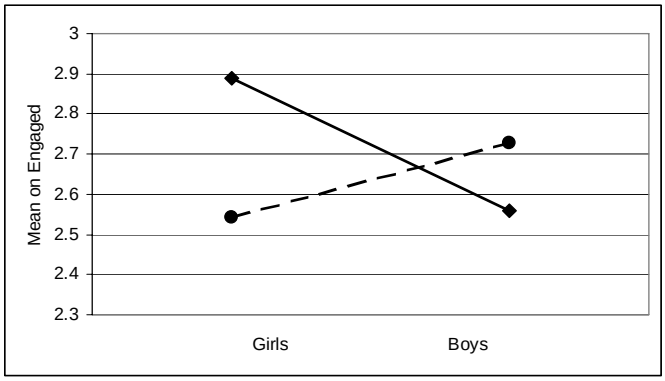

Figure 16. Graph of the interaction between gender and birth status on Engaged. Numbers on the *y* axis represent scores on the Engaged scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents female participants while the point farther from the origin represents male participants. The dashed line represents preterm children and the solid line represents full term children.

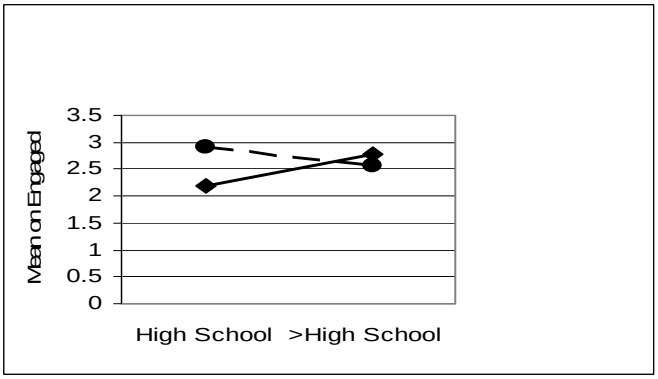

Figure 17. Graph of the interaction between SES and birth status on Engaged. Numbers on the *y* axis represent scores on the Engaged scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents participants whose mothers had a high school education while the point farther from the origin represents participants whose mother had greater than a high school education. The dashed line represents preterm children and the solid line represents full term children.

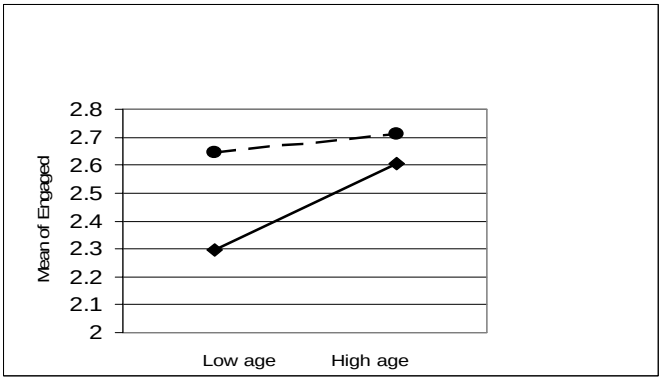

Figure 18. Graph of the interaction between corrected age and birth status on Engaged. Numbers on the *y* axis represent scores on the Engaged scale of the clinician form for older participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents preterm children and the solid line represents full term children.

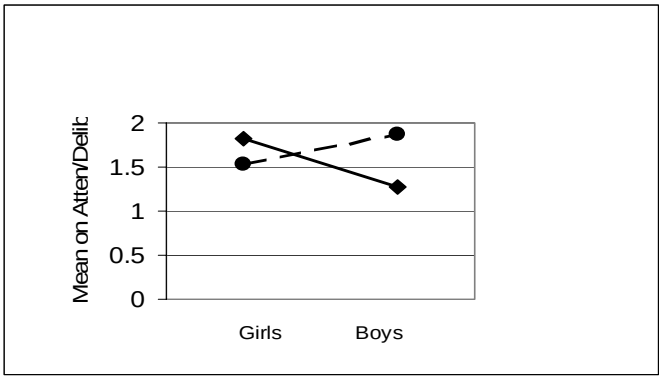

Figure 19. Graph of the interaction between gender and birth status on Attention/Deliberation. Numbers on the *y* axis represent scores on the Attention/Deliberation scale of the parental form for older participants. On the x-axis, the point closer to the origin represents female participants while the point farther from the origin represents male participants. The dashed line represents preterm children and the solid line represents full term children.

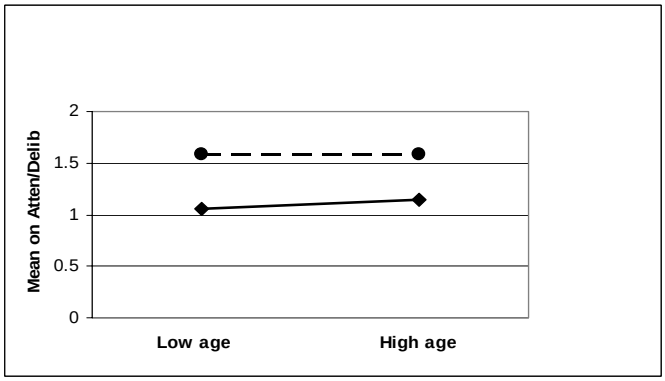

Figure 20. Graph of the interaction between chronological age and birth status on Attention/Deliberation. Numbers on the *y* axis represent scores on the Attention/Deliberation scale of the parental form for older participants. On the x-axis, the point closer to the origin represents participants with ages 1 standard deviation below the mean while the point farther from the origin represents ages 1 standard deviation above the mean. The dashed line represents preterm children and the solid line represents full term children.

Chapter Four

Discussion

The purposes of this study were to assess the age range at which differences in functioning are detectable in children of different birth statuses, to evaluate agreement between parent and examiner reports across a range of behavioral and emotional responses, and to consider the cumulative effect of birth status, gender, ethnicity, and SES on childhood dysfunction in preterm and full term children. This section includes a discussion of the results in light of the original hypotheses as well as limitations of the current study and recommendations for future work in this area.

Hypothesis One: Children of preterm birth will demonstrate more problems in functioning when compared to full term peers, with differences becoming more apparent with age.

The results of this study do not support this hypothesis. Although there were more significant differences between preterm and full term children in the older cohort, those differences did not reflect dysfunction by the preterm children. The specific differences pertaining to hypothesis one were as follows. In the young age cohort group, preterm children were initially rated as having fewer tantrums than full term children; however, with age preterm children were rated to have more tantrums as their full term counterparts decreased in their rate of tantrums. This finding may foreshadow the later development of externalizing disorders in preterm children. Understanding that children highly prone to frustration, but unable to adequately regulate it, may be at increased risk of noncompliance to parental commands, Stifter, Spinrad, and Braungart-Reiker (1999) studied the relationship between early emotional regulation and later compliance. In their study, researchers collected data regarding anger expressivity of children at 5-, 10-, and 18-months of age. These children were then brought back at 30-months of age for assessment of compliance. The results found that toddlers who had been highly reactive with few to no regulatory behaviors at 5-months-old were more defiant. Similar results persisted at 10- and 18-months of age as low levels of regulation resulted in noncompliance characterized by avoidance and/or defiance during the toddler evaluation (Stifter et al., 1999). Thus, it is possible that the full term children of the present study were demonstrating more successful acquisition of regulation skills than were the preterm children.

In the old age cohort group, preterm and full term children differed on only two scales: Respect and Attention/Deliberation. Interestingly, in both cases the preterm children tended to outperform the full term children on these scales. Although these findings were inconsistent with my hypotheses, they were similar to those of longitudinal studies that deny differences between preterm and full term children (McDonald, Sigman & Ungerer, 1989; Oberklaid et al., 1993;

Oberklaid, Oberklaid, Sanson, Pedlow & Prior, 1991; Schothorst & van England, 1996). Despite noted deficits in social competencies, Schothorst and van England found no difference between the total behavior scores of preterm children and those of their full term counterparts. Similarly, a study of 2-year-olds born at <32 weeks gestational age found that these children scored comparably to full term controls on parental ratings of behavior problems (Stoelhorst et al., 2003).

Interestingly, for preterm children in the older age cohort group, the age correction did not make much of a difference in their performance on the attentiveness scale. This finding is consistent with work by Siegel (1983), who suggests that age correction in the first year of life was more predictive of later dysfunction than was correction beyond the first year. Similarly, Ouden, Rijken, Brand, Verloove-Vanhorick, and Ruys (1991) purport that correction for prematurity is meaningful in the first but not in the second year of life.

Hypothesis two: Parent and observer ratings of behaviors will be moderately correlated.

This study considered dimensions of dysfunction as measured by parental report and clinician observations. Notably, a lack of agreement between parent and clinician observations emerged for the young age cohort group. The plausible assumption that parent observations are more accurate would lead one to conclude that clinicians' brief assessments of dysfunctional behaviors of infants this young lack validity.

Alternatively, the lack of agreement between parents and observers of young children may reflect the unique perspectives (Firmin et al., 2005) and expectations of child-development held by each rater. Variables such as depression (Towers, Neiderhiser, Hetherington, Plomin, & Reiss, 2000), lenient parenting style (El-Hassan Al-Awad, & Sonuga-Barke, 2002), and social desirability (Merydith, Prout, & Blaha, 2003) can affect parental reports of a child's behavior problems while education, training, and experience with an array of children may impact the clinician's ratings (Stringer, Starrett, & Parker, 1986). Thus, it is possible that the lack of agreement between parents and clinicians occurs because each source is providing information based on their perspective and background.

The high level of agreement for the older children suggests that parental and clinician perspectives converge with older children. Perhaps short-term clinician observations represent a more consistent sample of children's behavior as observed by parents. In addition, the dimensions identified by factor analysis appear to be quite recognizable as indicators of successful or unsuccessful functioning across childhood. It appears that one can reliably assess this type of dysfunction in children as young as 18 months of age.

Hypothesis three: Within the premature population, gender, ethnicity, and SES will collectively form a risk index for childhood dysfunction with males, minority children, and children of less educated parents demonstrating more problems than their counterparts.

Contrary to my hypothesis, birth status, gender, ethnicity, and SES did not collectively form a specific risk index for dysfunction. However, these factors did interact with each other to predict functioning on several scales. In fact, there were no significant main effects. Instead, predictors of dysfunction were interactions of variables such as birth status, age, gender, and ethnicity. This general finding illustrates the importance of taking into consideration all aspects of the child's situation when assessing her functioning.

In this study, SES interacted with other variables to predict functioning. In the young age cohort group, SES seemed to play a role in the clinician's ratings of fear as children of lower SES were rated as more fearful than those of higher SES with the difference between the groups being most prominent at the lower age. In the young age group, birth status did not seem to impact fear ratings. Conversely, in the old age cohort group, preterm children of lower SES were less fearful than their full term counterparts and children of higher SES consistently demonstrated more fear, as reported by parents, than did children of lower SES. Also in the old age cohort group, preterm children of lower SES were more engaged than full term children of lower SES while full term children of higher SES were slightly more engaged than their preterm counterparts. These mixed findings are consistent with work by Oberklaid et al. (1991), who reported no differences between the temperament of preterm and full term children. Instead, they suggest that prematurity may simply exacerbate the negative effects of a preexisting, unfavorable environment (Oberklaid et al., 1991). Similarly, research by Miller, Bowen, Gibson, Hand, and Ungerer (2001) found that behavior problems, when present, in preterm children were significantly linked to maternal level of education and family stress. Thus, the present findings, in conjunction with the work of other researchers, suggest that a focus on birth status, without consideration of other, interacting factors such as SES, home environment, family stress, and education may be insufficiently informative.

In the young age cohort group, gender based differences occurred in ratings of discomfort and tantrums. Here, boys were rated by clinicians as being more uncomfortable than girls at the younger age; however, the girls surpassed boys on this construct as age increased. Also, full term boys were rated to have more tantrums than preterm boys, full term girls, and preterm girls. The finding that boys were more vocal about their anger and frustrations is consistent with work by Fabes and Eisenberg (1992). Additionally, Klebanov et al. (1994) found that girls had fewer behavior problems than boys. Although full term girls, in the old age cohort

group, were more engaged, per clinician's rating, than preterm girls, the preterm boys were more engaged than full term boys and preterm girls. Also, preterm boys were rated by their parents as more attentive and deliberate than full term boys. These findings are again contrary to literature purporting increased susceptibility to problems in preterm males (Klebanov et al., 1994). However, these findings do offer practical confirmation of the congruence between parental and clinician assessments of functioning for older, preterm boys as the two constructs on which these boys did well were highly correlated with each other.

Regarding ethnicity, the minority children consistently exhibited more discomfort than the Caucasian children did; however, the disparity between the two groups on this construct decreased substantially with increasing age. Also, preterm, minority children were less fearful than full term, minority children and they performed similarly to their comparison group on respect. However, the preterm Caucasian children were more fearful than the full term Caucasian children while full term minority children were less respectful than preterm, minority children. These findings suggest that the influence of birth status, age, and ethnicity may vary depending on the emotional or behavioral outcome of interest.

Considering age and birth status in the old age cohort group, preterm children were consistently more engaged than full term children. However, this discrepancy is more apparent at the younger age because full term children demonstrated increased engagement with increasing age. Although preterm children exhibited more respect than full term children at the younger age, the full term children surpassed the preterm children on this construct as age increased. Findings about respect and engagement certainly speak to sociability and could suggest that discrepancies in social functioning seem to favor preterm children early on with full term children catching up and eventually surpassing them. These findings may serve as the precursor to perceived differences in social functioning as reported by other studies (Grunau et al. 2004; Hille et al. 2001; Klebanov et al. 1994). For example, in an elementary aged sample, Klebanov et al. found that deficits in social competence persisted in preterm children even after controlling for SES and familial variables.

For chronological age, the preterm children were rated as demonstrating more attention than the full term children at younger ages. However, this discrepancy decreased as age increased. Here, preterm children maintained their level of attention while the full term children demonstrated a slight increase in attention and deliberation with increasing age. Again, this trend of improved functioning with age in the full term group may be the precursor to the later discrepancies in functioning purported by many researchers (Horwood, Morgridge & Darlow,

1998; Huddy, Johnson, & Hope, 2001; Klebanov, Brooks-Gunn & McCormick, 1994; Levy-Shiff et al., 1994; Ross, Lipper & Auld, 1990).

The results of this study should be understood within the context of the study's limitations. One limitation of this study is the low power. In some cases, the magnitude of observed prediction was nontrivial; however, the small sample size precluded the attainment of statistical significance. Therefore, it is quite possible that this study underestimated the impact of premature birth status and age on the childhood dysfunction. For example, the interaction of age and birth status to predict parental rating of EASY TEMPERAMENT in the young age cohort group $F(1,42) = 1.40$, $p = .12$ is a nonsignificant but nontrivial effect that certainly merits further investigation. Thus, a larger sample size is necessary to increase the likelihood for uncovering real differences between preterm and full term children.

An opposing limitation was that numerous statistical tests were conducted, thereby increasing the risk of Type I error, i.e., finding non-replicable significant effects. It is possible that some of the significant effects reported here would not prove stable in replication studies. However, the low power of this study certainly reduces the risk of high levels of Type I error. On balance, researchers should consider significant findings reported here worthy of attention and replication.

Additionally, the study was cross-sectional. This design offers a snapshot of childhood dysfunction at two different age groups, but does not permit answers to questions regarding causation or persistence of functioning within the age cohort groups. Therefore, one is only able to consider relationships between variables and outcomes, but not able to pinpoint the cause of problems in functioning or to discuss the changes in the phenomena of interest as the child develops.

Another limitation of the current study is the restricted range of SES represented. Here, all mothers had at least a high school diploma; therefore, families without a high school diploma and from a presumably lower income status were not represented. Therefore, it is possible that the impact of SES as a contributor to risk for childhood dysfunction was attenuated. Use of a greater SES range would provide more information about the impact of SES on childhood dysfunction.

The present findings suggest several avenues for further research. Given that the factors that emerged for the older children in this study are reminiscent of the Five Factor Model (FFM) of Personality-neuroticism, extraversion, openness, agreeableness, and conscientiousness (McCrae et al., 2000); longitudinal research with the Merrill-Palmer Revised could provide personality functioning information that anticipates the personality dimensions used to describe

adolescents and adults. As a result, findings with the Merrill-Palmer Revised could help shed light on the long term impact of prematurity on functioning. Along these lines, Hagekull and Bohloin (1998, 2003) studied the prospective relationship between the temperament dimensions of Emotionality, Activity, and Sociability and the FFM. These researchers found that infant temperament predicted later extraversion/surgency while preschool emotionality was associated with neuroticism at school age, activity level was associated with later extroversion, and sociability was related to later extroversion and openness. However, their work excluded children of preterm birth. Premature children are faced with a variety of early challenges; therefore, research exploring whether the relationship between infant temperament and later personality functioning persists for this population is needed.

Another area of further research would be to explore the impact of medical diagnoses on the aforementioned dimensions of childhood dysfunction as reported by parents and examiners of preterm children. Medical frailty is a reality for many preterm infants with medical compromise potentially having a deleterious effect on behavioral outcomes (Zeanah, Boris, & Larrieu, 1997). The specific prenatal and perinatal hazards to which preterm children are exposed are heterogeneous (Schothorst & van England, 1996). For example, low birth weight children who experienced either Chronic Lung Disease (CLD) and/or more severe forms of Intraventricular Hemorrhage (IVH) were rated by their mothers as being less responsive to stimulation and less persistent on tasks (Landry, Chapieski, Richardson, Palmer, & Hall, 1990). Thus, augmenting work by Ross et al. (1990), research into the impact of respiratory and neurological compromise could highlight interesting links between these insults and later behavioral and emotional functioning.

Further research is also needed to assess the extent to which parental perceptions of preterm children affect parental reports of functioning and subsequent correlation with observer reports. Research by Stern and Karraker (1992) indicated that mothers of both preterm and full term babies hold stereotypes about premature infants describing them as less sociable and less cognitively competent than their full term counterparts. Medically fragile preterm children seem to receive particularly poor behavioral ratings by parents (Allen et al., 2003; Landry e al., 1990). Therefore, these biases could quite possibly impact the way a parent responds to questions about her child's behavior. However, the examiner, much like a teacher, has the opportunity to interface with more children thereby providing a larger comparison base. Thus, further research in this area is needed within the preterm population.

Chapter Five

Conclusion

As medical advances are made in the area of neonatology, more and more premature babies are surviving at younger gestational ages and lower birth weights. Certainly, the developmental outcome of these children is an important issue as professionals strive to create interventions to meet the unique demands of this population. Possible interventions for preterm children are vast in scope including programs to target deficits in physical, cognitive, and behavioral development. Early detection and intervention are critical for interrupting the negative trajectory of inadequate behavioral and emotional development as children who have difficulty adjusting to stimuli at an early age tend to carry this deficit to future developmental stages. Thus, research designed to clarify potential differences in childhood dysfunction and the earliest age at which these differences are noticeable has important implications for the development and fine-tuning of intervention strategies for preterm children.

The present study contributes to this field by purporting that differences in functioning, as reliably reported by parents and clinicians, become apparent in children as early as 18 months of age. Also, given that maternal stereotypes about premature infants seem to be amenable to change in the presence of information and education highlighting the similarities between full term and preterm children (Stern & Karraker, 1992), findings of the present study could help to disabuse parents of negative, sometimes self-fulfilling assumptions about their preterm children.

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