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Antecedents, Consequences and Pathways of Associations between Interparental Discord and Child Development in Infancy, Childhood and Adolescence: An Examination of Negative Emotionality, Child Cognitive and Socioemotional Functioning and HPA-axis activity

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ABSTRACT

Antecedents, Consequences and Pathways relating Interparental Discord and Child Development in Infancy, Childhood and Adolescence: An Examination of Negative Emotionality, Child Cognitive and Socioemotional Functioning and HPA-axis activity

Patricia Pendry

In three essays, this dissertation examined the associations between child characteristics, interparental discord and various aspects of child development and physiological functioning. In the first essay, using longitudinal, nationally representative data on infants and their families from the early childhood longitudinal study (ECLS-B), results revealed small, but significant associations between child-related conflict in infancy and child cognitive ability in toddlerhood. Associations between child-related conflict in infancy and later socioemotional functioning were moderated by child gender, suggesting decreased socioemotional functioning for girls living in higher-conflict homes. In the second essay, using the same data, I examined child effects on later high-conflict environments, and found that the association between negative emotionality during infancy and child-related conflict in toddlerhood was moderated by parental differences in child development knowledge in infancy. In both studies, significant associations were found while controlling for a wide range of potentially confounding variables, including prior child functioning and conflict. To explore whether associations between marital discord and child development are potentially mediated by children's physiological stress system activity, essay three investigated if aspects of marital discord were associated with cortisol levels of

kindergarten-aged children and adolescents in a normal, low-risk population. Higher marital discord was associated with higher average child cortisol levels for kindergartners and adolescents. Results also showed that kindergarten-aged children living in higher conflict homes had higher bedtime cortisol levels and flatter slopes of the curve of cortisol production across the day.

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CHAPTER ONE

INTRODUCTION TO INTERPARENTAL DISCORD AND CHILD DEVELOPMENT

Introduction

Research has consistently indicated associations between interparental conflict and child functioning (Buehler et.al., 1997; Cummings & Davies, 1994; Grych & Fincham, 1990). Associations have been found between interparental conflict and many indices of child maladjustment including internalizing and externalizing behavior problems, cognitive competence, social competence, post-traumatic stress symptoms, and problems with physical health, mood, academics and peer relationships (Grych & Fincham, 1990). However, the pathways that account for these associations remain unclear – by what common pathway, or set of mechanisms, does interparental conflict influence such a broad range of outcomes? Answering this complex question is challenging in part because we don't actually know for sure if interparental conflict *causes* child adjustment problems or if they simply co-occur. In fact, given that much of the interparental conflict research has been conducted cross-sectionally with relatively small and non-representative samples, the precise nature and magnitude of risk across various developmental periods posed to the population by interparental conflict remain unclear. Moreover, little is known about the extent to which individual and environmental risk and protective factors may influence the magnitude and direction of associations between interparental conflict and child development, when other preexisting individual differences in children and their environments are taken into account. Hence, despite the widespread belief that exposure to interparental discord is a serious stressor for children, much remains unknown about if, and exactly how this stressor translates into child development and well-being.

Overview

The primary goals of this dissertation center on 1) providing a precise estimate of the nature and magnitude of associations between child characteristics, interparental discord in infancy and child outcomes in toddlerhood and 2) exploring the potential existence of a physiological pathway underlying associations between interparental conflict and child adjustment. This goal is pursued through a series of three related, yet separate studies. The first study, presented in Chapter 2, examined effects of interparental conflict during infancy on children's cognitive and socioemotional functioning in toddlerhood, using two waves of data from the early childhood longitudinal study (ECLS-B) which involves a nationally representative sample of infants and their parents. Study 2, presented in Chapter 3, also using longitudinal data from the ECLS-B, examined children's individual characteristics during infancy as constituting a potential risk mechanism, in order to explain why, and under which circumstances, some children are exposed to later interparental conflict, while others are not. While Study 1 and 2 focused on measuring the nature and magnitude of associations between interparental discord and child functioning, the third study, presented in Chapter 4, explored whether associations between marital discord and child development are potentially mediated by activity of one of the body's major physiological stress-systems, the hypothalamic-pituitary-adrenal axis (HPA axis), as indicated by children's cortisol levels. The third study also investigated whether associations between marital discord and child cortisol levels were similar for kindergarten-aged children and adolescents.

This dissertation was conceived as a collection of three essays with a brief introduction and conclusion, a format common in the Program on Human Development and Social Policy; an agreed upon goal of the committee was to allow individual chapters to be freestanding. As such, each chapter has its own theoretical framework and literature review, specific to its research

questions and hypotheses, and features its own methods of inquiry and data. To avoid repeating theoretical and conceptual issues that are common to all chapters, the remainder of this chapter is primarily dedicated to describing the background against which this work is set, and discussing the broader theoretical perspectives guiding this work and its author.

Background and Policy Context

This dissertation is situated in the current pro-marriage policy climate and the accompanying controversy over the meaning and relevance of interparental conflict for child development and wellbeing. Prompted by concerns over dramatic changes in union formation and family structure of the last four decades, policy makers have enacted legislation resulting in a large number of programs aimed at turning these trends around (McLanahan et al., 2005). For example, the Temporary Assistance for Needy Families (TANF) Program, which was created by the 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), includes provisions and state block grants for extensive interventions, including the promotion of 'healthy marriages' to achieve the goal of improving child well-being. This program continues to grow; since TANF's passing, it added the African American Healthy Marriage Initiative (AAHMI), which not only promotes marriage, but also encourages cooperative parenting in unmarried as well as in married couples. In 2006, TANF reauthorization, which is part of the Deficit Reduction Act of 2005, provided $150 million per year for five years to fund, among other things, parenting, communication, and conflict resolution skills programs, which are run in 38 states.

Today's pro-marriage policy climate draws our attention to the concept of "healthy marriage" which has become a topic of great interest and controversy to researchers and policymakers. This is illustrated by the fact that researchers, policymakers and parents disagree

about what precisely constitutes a "healthy" marriage, what the significance of such a marriage is for the wellbeing of children, and whether (and how) government should play a role in promoting it. The topic of this dissertation, interparental conflict and child development, is uniquely relevant to these issues because it incites controversy. On the one hand, marital conflict is cited by divorce proponents as damaging to children and warranting the dissolution of the marriage for the sake of the children. On the other hand, marriage proponents argue that less than thirty percent of families experience marital conflict that is frequent or intense enough to pose a psychological threat to children, that marital conflict is usually temporary, and that divorce itself does not lead to an end of interparental conflict. Furthermore, interparental conflict is quite prevalent in American society and conservative estimates indicate that some form of interparental aggression (verbal or physical aggression) occurs in as many as 12 percent of American households containing children under 12. This dissertation's aim is to improve our understanding of antecedents of interparental conflict, its consequences for child development, and in particular our knowledge about the pathways by which interparental conflict may lead to child adjustment problems and vice-versa. As such, it may contribute to achieving the goal of improving child well-being by informing social policy aimed at prevention, remediation and treatment of conflict-related child adjustment problems.

Theoretical Framework

This dissertation is broadly situated in an ecological perspective, which considers interrelationships between persons and their environmental systems, as well as the adaptations people make to cope with their circumstances (Bronfenbrenner, 1979). While I agree that child development is the result of a dynamic interaction between genetic and biological predispositions of the child and ongoing experiences with environments, ranging from their immediate family,

schools and communities to political, cultural and policy influences (Bronfenbrenner & Morris, 1998; Sameroff, 2000), this dissertation is grounded in a micro-social approach to studying stress, focusing on identifying stressful aspects of individual and family contexts and their direct and indirect impacts on the child as well as influences of the child on family dynamics. This dissertation focuses primarily on influences of the mesosystem (i.e., connections between or among two or more microsystems that contain the child), by examining how aspects of relationship functioning between parents affect the child. In addition, influences of the microsystem, which involves direct influences of parents on children through close interactions in the home environment, are considered in each of the featured studies. In Study 1 and 2, meso- and microsystem influences were estimated while also accounting for broader contextual factors, which may contribute to individual differences in exposure to marital conflict, vulnerability to conflict, and child functioning across the domains under study.

Risk and Resilience Perspective

This dissertation was also guided by developmental perspectives including those of risk and resilience (Rutter, 1993; Margolin, Oliver and Medina, 2001), and developmental psychopathology (Cicchetti, 1993; Margolin, Oliver and Medina, 2001). The risk and resilience perspective considers how difficulties and protective factors add up or interact to influence individual outcomes (Cowan, Cowen & Schulz, 1996; Patterson, 2002). This perspective has been extensively used to propose processes whereby children steer through, or succumb to adverse life circumstances. Risk and resilience factors are thought to continually interplay to influence the quality of life and health across the lifespan (Smith & Carlson, 1997). Risk is defined as one or more factors that increase the probability of poorer developmental outcomes, whereas resilience refers to the capacity to use available resources to maintain competence and to

avoid unfavorable outcomes in the face of risk. Primary risk factors considered in this dissertation include interparental conflict, particularly child-related conflict, parent psychopathology i.e., depression, poor parenting, and parental differences in child development knowledge. In addition, rather than viewing children as passive recipients of various environmental influences, children's individual characteristics (e.g., age, gender, temperament) are recognized as having a major influence (Caspi, 2000) on children's own behavior, environment and development. Differences in children's individual characteristics (e.g., negative emotionality, age, gender) are also examined as risk mechanisms which may help explain why some children are exposed to and/or affected by exposure to interparental conflict, while others are not. Primary resilience factors included in the models, which by definition, may moderate these risks to maintain well-being and enhance resilience (Cowen et al., 1996) included effective parenting, father involvement, high marital satisfaction, being married, and higher child cognitive functioning and social skills.

Finally, the developmental psychopathology approach is reflected by examining how the consequences of interparental discord vary in intensity and form in different developmental stages and domains of functioning, and by considering how outcomes are multiply determined rather than uniquely the results of exposure to interparental discord. For example, since previous research indicates interrelatedness of interparental conflict and parenting (Erel & Burman, 1995), interparental conflict and parent emotional functioning (Whisman, 2001), and parent emotional functioning and parenting quality (Adam, Gunnar & Tanaka, 2004), studies examined contributions of interparental conflict on child functioning while simultaneously considering impacts of parent emotional functioning and parenting quality.

While the above-mentioned theoretical perspectives provide a broad theoretical framework for this work and this author, the specific research questions and hypotheses of the dissertation are informed by the literatures on marital discord and child development, and the physiological stress literature, which are introduced in the following sections and more thoroughly presented in each study's theoretical section.

Prior Empirical Evidence On Associations Among Marital Discord And Child Outcomes

Research has consistently indicated associations between marital functioning and a wide range of child adjustment problems in multiple domains across various developmental periods (Emery, 1982, 1989, 1999; Buehler et.al., 1997; Grych & Fincham, 1990, 2001). Exposure to interparental conflict has been associated with internalizing disorders, such as anxiety and withdrawal (Long, Slater, Forehand & Fauber, 1988) and depression (Johnston et al, 1987, Peterson & Zill, 1986), as well as externalizing disorders, such as aggression (Johnston, Gonzales & Campbell, 1987), conduct disorder, delinquency and anti-social behavior (Johnson & O'Leary, 1987; Emery & O'Leary, 1984, Peterson & Zill, 1986). Children exposed to interparental discord are also more likely to have problems in socioemotional domains of functioning including social competence (Emery & O'Leary, 1984), as well as in cognitive domains, including cognitive ability and academic performance (Long et.al., 1987).

While some may argue that the associations between interparental discord and child development are well-established, and as such do not require further study, estimates of these associations may be inaccurate due to various methodological shortcomings. For example, the majority of findings in this area are based on cross-sectional rather than longitudinal studies. In addition, results tend to be based on studies using relatively small samples, preventing researchers from adequately controlling for factors related to both interparental conflict and child

outcomes. Furthermore, few studies in this field are based on data from individuals randomly drawn from the population, which may lead to biased estimates due to selection and limits our ability to generalize results to the population. One shortcoming relevant to this dissertation is that the majority of the evidence is based on marital discord and child development studies conducted with families of children in middle childhood and/or adolescence, which limits our ability to make inferences about effects of interparental conflict on infants and very young children. In fact, there are relatively few studies that have examined effects of interparental conflict during infancy, and even fewer utilize longitudinal methods. This is unfortunate, since the transition to parenthood and the birth of a child is frequently accompanied by a decline in marital adjustment, increased conflict, withdrawal and negative parent-child interactions. A focus on this developmental period seems especially warranted because findings from the few studies conducted with infants suggest the presence of direct and indirect effects on various child outcomes including attachment security (Owen & Cox, 1997), greater sensitivity to conflict (DeJonghe, Bogat, Levendosky, Von Eye & Davidson, 2004), lower cardiac vagal tone (Porter, Wouden-Miller, Shizuko Silva, Earnest Porter, 2003), and lower cognitive functioning (Porter et. al, 2003).

Another aspect that is relatively underdeveloped in the current literature is the notion that bi-directional influences are operative; marital discord may be influenced by the extent to which the child exhibits adjustment problems. This is problematic given that theory and empirical evidence suggest that children are not passive recipients of various environmental influences; children's individual characteristics (e.g., age, temperament, behavior) are recognized as having a major influence (Caspi, 2000) on their environment and development. It is thus conceivable that certain aspects of children's personalities and behavior (e.g. fussiness, demandingness) may

spark conflict among parents, particularly child-related conflict. At the same, whether certain child characteristics and behaviors evoke child-related conflict, is likely to be affected by other child, parental and household factors including parents' effectiveness in dealing with difficult child behavior.

Thus, given the existing gap of knowledge on effects of interparental discord during infancy, and the limited understanding of the ways in which children's individual characteristics may contribute to shaping conflictual family environments, one of the objectives of this dissertation was to examine the nature and magnitude of associations between child characteristics, interparental conflict and child outcomes during infancy using causally sensitive methods (Studies 1 and 2).

Evidence On Pathways Underlying Associations Among Marital Discord And Child Outcomes

A second, equally important goal of this dissertation was to improve our understanding of the possible mechanism(s) that account(s) for associations between interparental discord and child functioning (Study 3). Several theories have been proposed, each emphasizing different mediating mechanisms. While some interparental conflict theories emphasize the role of children's cognitive appraisal as mediating effects of conflict on children (Grych & Fincham; 1990, 1993, 1998), others believe that the erosion of children's emotional security is the central mechanism by which exposure to marital conflict leads to child maladjustment (davies & Cummings, 1998). Others have focused their attention on one of the body's physiological stress systems, the sympathatic andrenal medullary system (SAM) (e.g., Gottman & Katz, 1989; El-Sheikh, Cummings, & Goetsch, 1989). This focus emerged from the belief that interparental conflict may have implications for children's cardiovascular functioning as well as other, related

physiological systems, which may affect children's immediate responses to future interparental conflict and subsequent development.

Surprisingly, although there has been considerable interest in integrating physiological measures into studies examining associations between interparental discord and child development, there are no previous published studies with children, that have found significant associations between interparental conflict and the activity of the body's other major physiological stress-system, the hypothalamic-pituitary-adrenal axis (HPA axis), and its major end-product, cortisol. An important goal of this dissertation was to examine the *potential* existence of an underlying physiological pathway between interparental conflict and child adjustment by examining whether significant associations exist between interparental discord and children's patterns of cortisol production.

Cortisol As A Marker Of Conflict Exposure

HPA axis activity, as indicated by children's cortisol levels, is well-suited to capture effects of cognitive appraisal and emotional arousal activated in response to conflict exposure; the HPA axis is especially active when a threat is perceived to overwhelm available coping resources (Kirschbaum & Hellhammer 1989). In addition, cortisol levels are extremely sensitive to social stressors and supports, particularly those emerging from close interpersonal relationships (Gunnar & Donzella, 2002; Repetti, Taylor & Seeman, 2002; Adam, Klimes-Dougan & Gunnar, 2006). Moreover, since cortisol levels can be derived non-invasively from saliva collected by study participants in their home, it provides a physiological indicator of a potential response to conflict exposure that is ecologically valid. In addition, cortisol levels are comparable across populations when similar collection protocols and assays are used. All these

factors make the study of children's cortisol levels a valuable tool to study children's individual differences in response to exposure to interparental conflict.

Cortisol And Its Implications For Child Development

Although Study 3 does not examine associations between child cortisol levels and child outcomes, frequent or chronic elevation of child cortisol levels is of interest in this dissertation as prior research shows it to have implications for children's immediate functioning as well as their long-term physical, cognitive and emotional development (Scerbo & Kolko, 1994; Repetti, Seeman & Taylor, 2002; Smider et al, 2002). For example, excessive amounts of cortisol can disrupt concentration, learning and memory (Lupien & McEwen, 1997; Lupien et al. 1999), affect synaptic plasticity and have deleterious functional and anatomical consequences (Sapolsky, 2000). As such, HPA-axis activity may serve as a powerful indicator of the physiological strain children are experiencing as a result of exposure to interparental conflict, as well as a potential mechanism by which marital conflict can affect children's cognitive and socioemotional functioning. As such, examining child cortisol levels in the context of interparental discord is of interest to this dissertation and may provide a first indication of the possibility that activity of the HPA axis may underlie associations between interparental discord and child adjustment.

Theorized Model And Goals

Figure 1.1 represents the model delineating associations and pathways among child characteristics, interparental discord and child development tested in this dissertation[1]. The pathways are identified with letter a through f, while numbers 1 through 3 refer to the study in

[1] Note that only selective results are presented in detail

which the identified variables are examined. The specific goals of each study are discussed in the order by which studies are presented.

A primary goal of Study 1 was to provide less-biased estimates of the associations between interparental conflict during infancy and young children's cognitive ability and socioemotional functioning by using a large nationally representative sample of infants and families and causally sensitive methods (see pathway a). Child cognitive ability and socioemotional functioning were examined as main outcomes of interest, because both are considered central and interdependent domains of child development; the social and emotional development of young children plays a critical role in later cognitive skill building, social competence, mental health, and overall wellbeing (Shonkoff & Phillips; 2000). Moreover, cognitive and socioemotional domains of development are important with regards to early school performance, which in turn has implications for later scholastic and employment success (Entwisle, Alexander, & Olson, 2003). Study 1 expands recent work by its focus on the role of thematic content of conflicts, by examining if child-related conflict during infancy predicted child functioning over and above the effects of general, non-child related conflict, marital status and marital satisfaction (see pathway a2). The decision to consider dimensions of interparental conflict was motivated by findings of previous research showing that certain aspects of conflict expression e.g., intensity, frequency, and thematic content - are important for understanding its impact on older children (Buehler et al., 1997). A third aim (see pathway b) of Study 1 was to examine whether interactions between child-related conflict and other developmental risk factors (both individual and environmental) explain individual differences in children's susceptibility to effects of child-related conflict in infancy. This aim was motivated by findings with older children, which consistently show that interparental conflict does not affect all children equally

(Grych & Fincham, 2001). This suggests that risk and protective factors exist which may act as moderators of the relationship between interparental conflict and child adjustment. Given previous theoretical and empirical evidence of the marital discord literature suggesting the importance and complexity of child gender as a potential moderating variable (see Davies & Lindsay, 2001), it constituted the main moderating variable of interest in Study 1. In addition, the potential role of child negative emotionality as moderating associations between interparental conflict exposure and child outcomes was explored. Finally, Study 1 examines contributions of interparental discord while accounting for aspects of parental functioning strongly related to interparental conflict (e.g., parenting, parent emotional distress), and a broad range of contextual factors. Study 1 thus provides an improved, less-biased estimate of associations between interparental conflict in infancy and child outcomes in early childhood in the population, than those previously presented in the literature.

In the belief that that bi-directional influences are likely to be operative in the relation between interparental discord and child adjustment, Study 2, presented in Chapter 3, subsequently examined children's individual characteristics during infancy as constituting a potential risk mechanism, useful in explaining why, and under which circumstances, some children are exposed to later interparental conflict, while others are not. The primary goal of Study 2, also using longitudinal data from the ECLS-B, was to examine the magnitude and nature by which aspects of child temperament i.e., negative emotionality at 9 months of age, contributed to the development of a home environment characterized by frequent child-related interparental conflict at 24 months of age (see pathway c). This was based on the idea that child temperament may affect the quality of parent- child relationships and interactions, which may feed back into the marital relationship and contribute to couple conflict (Rutter, 1983), as well as

to later child adjustment problems. Understanding which features of children's own characteristics will put them at increased risk for increased exposure to interparental conflict may broaden the understanding of clinicians and policymakers who are often eager to change children's environments to improve functioning in specific domains, but may underestimate the role of children's relatively stable characteristics in constituting a risk factor.

Of particular interest was to test whether differences in parents' knowledge of child development moderate potential effects of early negative emotionality on later child-related conflict (see pathway d). Focusing on the moderating role of interparental differences in *knowledge* of child development, rather than on childrearing *values* was motivated in part by the idea that childrearing values are considered to be more 'psychosocial' in nature, and as such change in values may be harder to achieve, and/or take longer to occur, than changes in knowledge of child development (Carter, 1996; Mann, Pearl, Behle, 2004). By exploring which *malleable* parental characteristics intensify 'risky' child characteristics, this work illuminates a facet of policy-relevant family dynamics overlooked in previous work. Study 2 complements previous work by focusing more attention on identifying vulnerability and protective factors located in the child and their immediate environment, and to consider the dynamic, bi-directional nature of associations among marital and child adjustment. Other strengths of this study are its use of longitudinal, nationally representative data and inclusion of ratings of both mothers and fathers on child-related conflict.

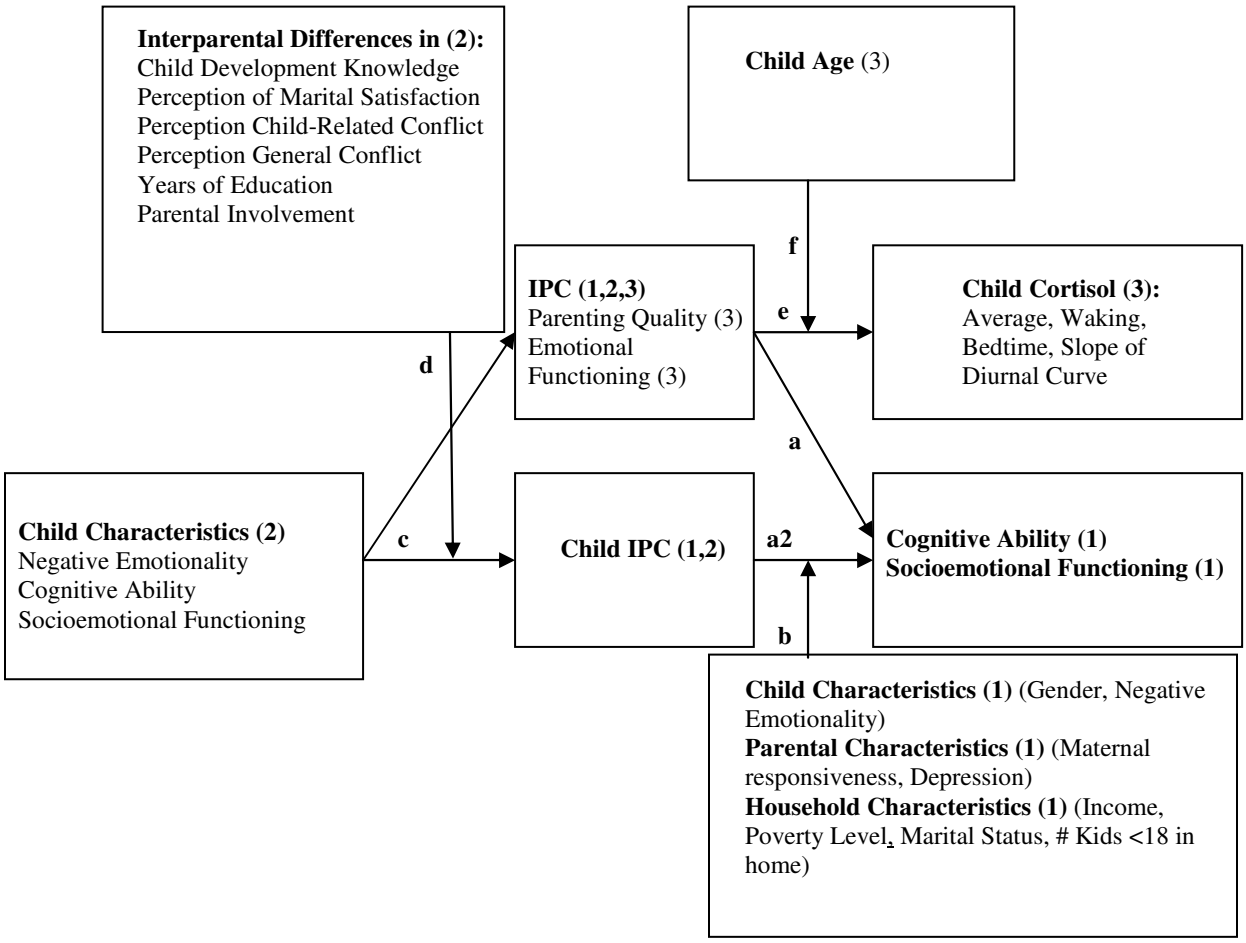
While Study 1 and 2 contribute to what has recently been termed 'first-generation' research, i.e., work that focuses on measuring the nature and magnitude of associations between interparental discord and child outcomes, the third study, presented in Chapter 4, takes a 'second-generation' approach. The main goal of Study 3 goal was to examine the *potential*

existence of a physiological pathway between interparental conflict and child adjustment by examining whether significant associations existed between interparental discord and children's individual variation in levels of cortisol (see pathway e).[2] I hypothesized that exposure to poor marital functioning, as characterized by low marital satisfaction and frequent, intense interparental conflict, constitutes a stressor powerful enough to activate the child's HPA axis, possibly leading to frequent and/or chronic elevations of children's cortisol levels. In addition, I proposed that child age would act to moderate associations between exposure to interparental conflict and children's cortisol levels (f). This was motivated by the idea that early childhood and adolescence represent distinct developmental periods in children's lives with regard to levels of dependence on parents in regulating emotional and physiological arousal, as well as their developing abilities to make cognitive attributions about negative interactions in the family. Therefore I examined whether interparental conflict was more salient for younger children's HPA axis functioning, or whether it was equally important for HPA axis functioning in both age groups. Study 3 was based on a primary data collection effort with which I assisted. Data were collected cross-sectionally from a low-risk community sample of parents and their kindergarten-aged children and adolescents. It represents a novel approach that may contribute to the establishment of a biopsychosocial model of interparental discord, a perspective currently undeveloped in the interparental conflict literature. In addition, by examining the role of physiological arousal in mediating the effects of interparental conflict on child functioning, this work may eventually inform decisions about potential avenues for intervention aimed at reducing stress exposure, helping children regulate their responses to such stress, and alleviating the consequences of frequent exposure to interparental discord.

[2] Full explication of this hypothesis requires simultaneous examination of child cortisol levels *and* child outcomes

Figure 1.1

Model delineating associations and pathways between interparental discord and child development examined in this dissertation



Note: IPC = Interparental Conflict

Child IPC = Interparental conflict about children also referred to child-related conflict

CHAPTER TWO

EFFECTS OF CHILD-RELATED INTERPARENTAL CONFLICT AT NINE MONTHS OF AGE ON COGNITIVE ABILITY AND SOCIOEMOTIONAL FUNCTIONING IN TODDLERHOOD, IN A NATIONALLY REPRESENTATIVE SAMPLE (ECLS-B)

ABSTRACT

Using longitudinal data of the early childhood longitudinal study – birthcohort (ECLS-B), a nationally representative sample of American infants and toddlers, this study examined the magnitude and nature of the association between child-related conflict at 9 months of age and child cognitive ability (N = 6019) and socioemotional functioning (N = 5077) at 24 months of age. This study also explored the role of individual and environmental risk and protective factors in altering the strength and/or direction of the relationship between child-related conflict in infancy and child adjustment in toddlerhood. Results indicated that higher child-related conflict at 9 months of age was significantly and negatively related to child cognitive ability at 24 months, when controlling for couple conflict about other, non-child-related matters, marital satisfaction and child cognitive ability at 9 months of age. Associations between frequency of child-related conflict at 9 months of age and later child socioemotional functioning were moderated by child gender; girls' socioemotional functioning at 24 months was significantly reduced by increased child-related conflict during infancy, whereas boys' socioemotional functioning at 24 months of age was not. There was no evidence to suggest that negative associations between child-related conflict at 9 months and child-related conflict at 24 months of age were significantly moderated by child temperament, quality of parent-child relationship or maternal mood.

Effects of Child-Related Interparental Conflict at Nine Months of Age on Cognitive Ability and Socioemotional Functioning in Toddlerhood in a Nationally Representative Sample (ECLS-B)

Research has consistently indicated strong associations between interparental conflict and various aspects of child development (see for review Buehler et.al., 1997; Cummings & Davies, 1994; Grych & Fincham, 1990). However, the vast majority of studies on interparental conflict and child development are conducted with families of children in middle childhood and adolescence. As a result, our ability to make inferences about the consequences of interparental conflict during infancy and early childhood is limited. Examining interparental conflict during these developmental periods seems especially warranted however, since the transition to parenthood and the birth of a child are frequently accompanied by a decline in marital adjustment and rise in interparental conflict, parental withdrawal and negative parent-child interactions (Belsky, Spanier & Rovine, 1983; Belsky & Rovine, 1990; Cox, Paley, Payne & Burchinal, 1999). In addition, infancy represents a distinct developmental period in children's lives with regard to levels of dependence on parents in regulating emotional and physiological arousal, development of attachment, as well as children's inability to make cognitive attributions about negative interactions in the family (Field, 1981; 1994; Bowlby, 1969/1982; Grych, 1990). As such, infants may be particularly vulnerable to the effects of interparental conflict.

The current study fills a gap in the current literature by examining associations between interparental conflict during infancy and children's cognitive and socioemotional functioning in toddlerhood, using longitudinal data drawn from a nationally representative sample of infants

and their parents.[3] Child cognitive ability and socioemotional functioning were examined as main outcomes of interest, because both are considered central and interdependent domains of child development that play a critical role in later cognitive skill building and academic achievement, social competence, mental health, and overall wellbeing (Shonkoff & Phillips, 2000). This investigation also examined the role of the thematic content of conflicts, by examining if *child-related* interparental conflict during infancy predicted child functioning over and above the effects of general, non-child related interparental conflict, marital status and marital satisfaction. This was motivated by findings of previous research showing that certain aspects of conflict expression e.g., intensity, frequency, and thematic content - are important for understanding its impact on older children (Buehler et al., 1997). Furthermore, the current study examined if the presence of developmental risk factors - individual and environmental - explained individual differences in children's susceptibility to negative effects of interparental conflict in infancy. The effects of child-related interparental conflict during infancy on future cognitive ability and socioemotional functioning in toddlerhood were estimated while accounting for potentially confounding influences such as individual, developmental, familial and broader contextual factors that may contribute to individual differences in exposure to marital conflict, vulnerability to conflict, and child functioning across the domains of interest. As such, this study provides an improved, less-biased estimate of associations between interparental conflict in infancy and child outcomes in early childhood, which can be generalized to infants in the American population.

Effects Of Interparental Conflict During Infancy

[3] This study focuses on 'intact families', a term used to refer to families who are headed by two romantically involved, co-residing parents (married or unmarried), who may or may not be biologically related to the child

The first aim of this study was to improve our understanding of the effects of interparental discord during infancy on socioemotional and cognitive functioning in toddlerhood. What is known about the effects of interparental conflict during infancy? Findings of the few studies that have examined effects of interparental conflict during infancy suggest that there are direct and indirect 'effects' on various child outcomes in both cognitive and socioemotional domains of development. Owen and Cox (1997) found that chronic marital conflict impaired sensitive, involved parenting which led to insecurity in the parent-infant attachment relationship, particularly between infants and fathers. They also found that chronic marital conflict predicted disorganized attachment behavior with both parents, which was not mediated by parenting quality. The authors suggested that when faced with interparental conflict, infants lack effective behavioral strategies to reduce distress caused by exposure to parents engaged in conflict.

There is also some evidence to suggest that infants who are exposed to intense and/or frequent conflict may over time become sensitized interparental conflict. For example, exposure to domestic violence, which can be conceptualized as an extreme form of interparental conflict, has been found to predict heightened sensitivity of infants - as indicated by displays of distress - to adult verbal conflict (DeJonghe, Bogat, Levendosky, Von Eye & Davidson, 2004). Results also suggest that sensitization to conflict can occur following exposure to less extreme forms of interparental conflict; mothers from a community sample who reported higher frequency of marital conflict tended to have infants with lower cardiac vagal tone (Porter, Wouden-Miller, Silva & Porter, 2003), which has been conceptualized as an indication of less effective regulatory ability (Gunnar, 1994; Gunnar & Vasquez, 2001). In addition to links between interparental conflict and child functioning in physiological and socioemotional domains, conflict has been associated with infants' cognitive development. In a cross-sectional study with 6 month-old

infants, higher levels of marital conflict were associated with lower cognitive ability as measured by the Bayley Scales of Infant Development (BSID II), whereas higher levels of marital harmony were found to be associated with higher levels of cognitive functioning (Porter et. al, 2003).

Associations Among Interparental Conflict, Parenting Quality And Parent Emotion

While the previous section suggests that exposure to marital conflict during infancy may have implications for infant development across socioemotional, physiological and cognitive domains, it is difficult to draw valid inferences about the effects of interparental conflict since few of these studies simultaneously considered potentially confounding influences such as the nature of parent-child relations, parenting behavior and parent depression. It is especially important to do so for the following reasons. First, while few studies have simultaneously explored associations between marital conflict, depressed mood and parenting behavior during infancy (McElwain & Volling, 1999; McElwain, Volling, San Juan, 1996), there is ample evidence from research with older children showing strong interrelations between marital and parent-child relations (see Erel & Burman, 1995 for review), marital relations and parental depression (see Whisman, 2001, for review) and parenting behavior and parent emotional functioning (Adam, Gunnar, Tanaka, 2004). Second, in addition to the increased likelihood of experiencing marital conflict (Cox, Paley, Payne & Burchinal; 1999), mothers of infants are at increased risk of experiencing depression (Weissman, 1987), which has been linked to impaired parenting behavior (Cohn, Campbell, Matias & Hopkins, 1990; Bettes, 1988) and to future child development (see Field, 1995 for a review). In addition, parenting quality (Gunnar, Brodersen, Nachmias, Buss, Rigatuso,1996; Gunnar, 1998; Gunnar & Donzella, 2002), parental withdrawal (Bugental, Martorell & Barraza, 2003) and depression (Ashman, Dawson, Panagiotides, Yamada,Wilkinson, 2002; Essex, Klein, Cho & Kalin; 2002; Halligan, Herbert & Goodyer &

Murray, 2004) have also been linked to children's physiological and emotional regulation, which have been suggested as an important pathway by which aspects of family functioning may influence child outcomes (Repetti, Taylor & Seeman; 2002). Taken together, these findings suggest that to accurately estimate independent contributions of interparental conflict to infant development, aspects of the parent-child relationship and parental mood must be considered simultaneously. Several studies with infants have examined the independent effects of at least two of these constructs on child outcomes (or similar, related ones) such as parenting stress and marital quality (Benzies, Harrison, Magill-Evans, 2004), postpartum depression and marital dysfunction (Roux, Anderson, & Roan, 2002); maternal depression and martial conflict (Essex, Klein, Cho & Kramer, 2003). To this author's knowledge however, no previous studies with infants have simultaneously explored associations between child outcomes and marital conflict, depressed mood *and* parenting behavior during infancy.

Dimensions Of Interparental Conflict: The Role Of Child-Related Content

A second aim of this study was to explore if the frequency with which parents engage in *child-related conflict* during infancy predicted child functioning over and above the effects of general conflict (e.g., conflict not about children and/or child-rearing) and marital satisfaction. This question was motivated by findings of previous research which has shown that certain aspects of conflict expression - chronicity, intensity, severity, frequency, resolution and thematic content - are critical for understanding its impact on older children (Buehler et al., 1997). For example, interparental conflict over child-rearing issues predicted child behavior problems (Snyder, Klein, Gdoski, Faulstich & LaCombe, 1988; Block, Block & Morrison, 1981) and internalizing behavior (Jouriles et al, 1991) after accounting for marital adjustment and conflict about issues unrelated to child-rearing. In a prospective study with toddlers, there was evidence

to suggest that child-rearing disagreements between parents when their (male) children were 2 years old, predicted behavioral problems at 5 years of age (Ingoldsby, Shaw, Owens & Winslow, 1999).

While the previous findings suggest that child-related conflict may be a risk mechanism explaining future child maladjustment, no previous studies have examined differential effects of child-related conflict on infants. In fact, it is unknown whether 9-month old infants have the cognitive ability to discern the thematic content of interparental conflict let alone make 'appraisal' about its significance (Grych & Fincham, 1993). There is however some evidence to suggest that they may; although conducted with slightly older infants, children as young as 18 months responded differently to mother-sibling conflict depending on the topic of the conflict (e.g., children laughed in response to conflict about family rules, but displayed negative affect when conflict centered on sibling aggression) (Dunn and Munn, 1985). Hence, while the current study did not fully explore the mechanisms underlying associations between reported child-related conflict and child outcomes, this investigation did examine if interparental conflict about child-related issues had more significant implications for child outcomes in cognitive and socioemotional domains than conflict about general non-child related topics for children as young as 9 months of age.

Developmental Risk And Ecological Context

A third aim of the current study was to examine interactions between marital conflict and other developmental risk factors to explain individual differences in children's susceptibility to effects of interparental conflict in infancy. This aim was motivated by findings with mostly older children, which consistently show that interparental conflict does not affect all children equally (Grych & Fincham, 2001). This suggests that risk and protective factors exist which may act as

moderators of the relationship between interparental conflict and child adjustment. Factors included in this study are those that have previously been identified in the marital discord literature as potential moderators, including aspects of parenting (Grych & Fincham, 2001), child gender (see Davies & Lindsay, 2001, for review), parental emotional adjustment (Cummings & Davies, 1994), child ethnicity and race (McCloyd, Harper and Copeland, 2001) and socioeconomic status[4] (Ingoldsby, Shaw, Owens, & Winslow, 1999).

Child Gender

Although a meta-analysis by Buehler et al. (1997) found that associations between marital discord and child outcomes were not moderated by child gender, child gender has assumed an increasingly prominent role as a potential source of variability in child outcomes. Two models have been proposed to explain the moderating effects of child-gender frequently noted in the literature. The differential reactivity model (Zahn-Waxler, 1993) hypothesizes that girls and boys experience relatively similar levels of distress, but that these levels of distress are manifested in different ways; boys exposed to increased levels of marital conflict may express that distress through anger aggression, behavioral dysregulation and externalizing symptoms, whereas girls distress may take the form of fear, dysphoria, over involvement in parental problems and internalizing symptoms. The male vulnerability model (Rutter, 1970) suggests that the association between conflict and child-adjustment is stronger for boys than girls, because boys are more susceptible to the harmful effects of marital conflict than girls. Recent perspectives emphasize that boys' and girls' responses to interparental discord are likely to vary as a function of a dynamic, transactional series of factors that include child-characteristics,

[4] Instead of using a composite variable for SES, I selected variables that constitute socioeconomic status such as maternal and paternal education, total household income etc.

interparental conflict dimensions, and domains of children's functioning. This study fills a gap in the current literature by examining the moderating of role of child gender during infancy, about which virtually nothing is known.

Child Temperament

Although marital discord researchers rarely explore the potential moderating role of child temperament, theory (Davies & Cummings, 1994; Grych & Fincham, 1990), some empirical research (e.g., Davies & Windle, 2001; Lengua, 2002; David & Murphy, 2007), including from studies examining effects of divorce on child development (Lengua, Sandler, West, Wolchik & Curran, 1999; Lengua, Wolchik, Sandler, & West, 2000) indicate that aspects of child temperament may also help explain why some children may be more likely to develop adjustment problems in response to conflict exposure. Temperament is defined as constitutionally based individual differences in emotion, motor, and attentional *reactivity* to stimulus events (measured by latency, intensity and recovery response) and *self-regulation* (processes that modulate reactivity) (Rothbart & Bates, 2006). Analysis of temperament factors by Clark and Watson (1999) describe two independent temperament factors, positive emotionality and negative emotionality. Positive emotionality relates to a propensity for positive mood states, high sociability and environmental engagement. Negative emotionality refers to a propensity for negative affect and cognitions, high levels of perceived stress, and encompasses a pattern of reactive behavior including fear, anger/frustration, discomfort and sadness (Ahadi, Rothbart & Ye, 1993; Rathbart, Ahadi, Hershey & Fisher, 2001). While many investigations have examined associations between negative emotionality to later child functioning, very few studies have examined the role of child temperament as potentially moderating the effects of interparental discord on child outcomes (Tschann, Kaiser, Chesney, Alkon, & Boyce, 1996;

Hetherington, 1989; Kennedy, 2000; David & Murphy, 2007) and the role of negative emotionality as moderating associations between interparental conflict and young children's cognitive ability and socioemotional functioning has been virtually ignored.

Negative emotionality is of interest in this study as it may exacerbate the negative impact of exposure to interparental conflict. First, since children high in negative emotionality are prone to high levels of perceived stress, they may be more sensitive to negative environmental cues and more likely to perceive mild disagreement and tension between parents as stressful. This may lead highly negative children to respond to interparental conflict with heightened physiological arousal more quickly than children low in negative emotionality (Nachmias, Gunnar, Mangelsdorf, Parritz & Buss, 1996). Since children who are high in negative emotionality are also prone to feeling sad and frustrated, heightened physiological arousal may reinforce these negative affective states. Since this in turn may lead these children to be less effective at soliciting support, they may find it more difficult to cope with conflict, leading them to experience feelings of lingering sadness, worry and frustration. Hence**,** the heightened physiological arousal, along with their propensity for negative affect, may further reinforce their sense of feeling overwhelmed by the conflict (Lengua, 2002; Lengua & Long, 2002). Temperamental traits may also influence children's behavioral responses to interparental conflict. Children who are prone to experience negative affect may respond to interparental conflict with withdrawal and sadness, while children with aggressive tendencies may be more likely to exhibit anger and aggression when exposed to interparental conflict. In addition, because highly negative children are more likely to experience negative cognitions, they may be more likely to make negative attributions about the cause of the conflict as well as the level of threat posed to them or their loved ones. All of these factors may lead children with high

negative emotionality to be more likely to become sensitized to conflict (experience increasingly greater arousal over time through repeated exposure).

The role of negative emotionality *during infancy* has not been examined in the context of martial discord. In fact, it is important to note that it is highly unlikely that the proposed pathways (describing how child negative emotionality may accentuate negative effects of interparental confict exposure), operate as such in infancy. For example, infants' cognitive abilities preclude them from making cognitive appraisal about the cause of the conflict, as well as the level of threat posed by the conflict at hand. It is more likely that the ways by which negative emotionality may influence children' responses to interparental conflict are determined mostly by individual differences in physiological responses to stress, (i.e., physiological arousal), and less informed by cognitive processes. There is some evidence with younger children indicating that certain aspects of child temperament may exacerbate negative effects of marital conflict on child adjustment. Two to five year-old children with 'difficult' temperaments (e.g., high negative emotionality, difficult to soothe, fearful) responded to high levels of family conflict with greater internalizing and externalizing behavior problems than children with 'easy' temperaments (Tschann, Kaiser, Chesney, Alkon & Boyce, 1996). Thus, the present study also examined the extent to which associations between interparental conflict and later child cognitive and socioemotional are moderated by individual differences in child negative emotionality. temperament.

Research Questions And Hypotheses

The current study was designed to answer the following research questions: 1) What is the association between interparental conflict at 9 months of age on child cognitive ability and socioemotional functioning at 24 months of age, when children's prior functioning, and

potentially confounding child, demographic, parental and household characteristics are controlled? 2) What is the association between *child-related* conflict at 9 months of age on child cognitive ability and socioemotional functioning at 24 months of age while controlling for general conflict frequency and the same set of covariates? 3) Are these associations moderated by risk and resilience factors including child gender and child negative emotionality? Based on empirical and theoretical findings presented in the previous section the following hypotheses are proposed: 1) Higher interparental conflict at 9 months of age will be negatively associated with child cognitive ability and child socioemotional functioning at 24 months when child cognitive ability at 9 months is controlled, 2) Higher child-related conflict at 9 months of age will be negatively associated with child cognitive ability and child socioemotional functioning at 24 months when *general* conflict at 9 months and prior child functioning are controlled, 3) Associations between child-related conflict at 9 months of age and child cognitive ability / socioemotional functioning at 24 months of age will be significantly moderated by developmental risk and resilience factors, including child gender and negative emotionality.

Method

Data Source

Data were derived from the Early Childhood Longitudinal Study - Birth Cohort (ECLS-B) which is conducted by the National Center on Education Statistics (NCES)[5]. The ECLS-B sample was selected using a clustered, list frame sampling design; the list frame was registered births in the National Center of Health Statistics (NCHS) vital statistics system. Births were sampled from 96 core primary sampling units (PSU's) representing all infants born in the United States in the year 2001. PSU's were counties and county groups and sampling was based on

[5] A succinct summary of the ECLS-B is provided by NCES and can be found at www.http://mces.ed.gov/ecls/birth.asp

occurrence of the birth as listed on the birth certificate[6]. While ECLS-B participants are eventually followed from birth through entry into kindergarten, information was only available from children and their parents for two rounds of data collection, when the children were about 9 months (N = 10,700), and again at about 2 years of age (N = 9,850). Experiences of children included in the ECLS-B sample are representative of approximately 3.9 million children born in the United States in 2001.

Procedure

Parent/guardian data were collected at 9 and 24 months through computer-assisted, personal interviewing in the home (CAPI), and respondents were asked to complete a self-administered questionnaire (SAQ) after the interview. The ECLS-B study design called for the child's biological mother to be the respondent for the parent instruments whenever possible, although respondents included fathers, stepparents, adoptive parents, foster parents, grandparents, relatives and non-relative guardians.[7] Parents and guardians were asked to provide information about the child, themselves, the home environment, parental characteristics and attitudes, and family characteristics, and answered questions regarding family structure and relationship functioning, parent emotional functioning, childcare use and household income. The parent interviews were conducted primarily in English, but provisions were made to interview parents who spoke other languages[8]. During the home visits, trained observers also assessed

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[6] Sampled children subsequently identified by the state as having died or who have been adopted after the issuance of the birth certificate were excluded from the original ECLS-B sample. Infants whose birth mothers were younger than fifteen years old at the time of the child's birth were excluded in response to the state confidentiality and sensitivity concerns.

[7] Only respondents who were resident mothers were included in this sample, which included biological mothers, and adoptive, foster and stepmothers.

[8] Approximately 8 percent of the Parent CAPI Instruments were conducted in a language other than English; about 79 percent of these non-English interviews were conducted in Spanish by bilingual field interviewers. Most interviews in other languages were conducted with the aid of interpreters or by interviewers who received special training. One-tenth of 1 percent of the parent interviews could not be conducted because of language

children's developmental skills in cognitive and socioemotional domains, and assessed the quality of parent-child interactions. Information on the date of birth, birth weight, gender, plurality (whether the child was part of a multiple birth) and prematurity, information on parents' age, education, race and ethnicity, and mother's marital status at birth were obtained from the child's birth certificate and verified or supplemented with information from the interview and questionnaires.

Sample

The subsample for this study was drawn from the ECLS-B sample based on various selection criteria. Children were included if their resident *mother* (biological or non-biological) had completed the computer-assisted personal interview (CAPI) at *both* the 9 and 24-month data collections, *and* the self-administered questionnaire (SAQ) at the 9-month data collection. Since this study is focused on examining the longitudinal effects of interparental conflict in *intact* families, only children of mothers who reported on relationship functioning and interparental conflict with the *same* resident spouse or romantic partner from birth through the 9 and 24-month data collection period were included, regardless of the mothers' marital status and/or the biological relatedness of the mother's romantic partner to the child. Furthermore, only children with complete assessment data on the dependent variable were included; children with missing data [9] on either dependent variable of interest were excluded for analyses pertaining to that

problems (e.g., respondent and family spoke Bengali and no interpreter was found; respondent spoke an unknown Asian language and no interpreter could be found).

[9] Assessment data was classified as missing if the assessment was not administered, or was unscoreable. Children's socioemotional functioning may have been unscoreable because the child was uncooperative, the video camera was located too far away from the parent-child dyad so that the audio level was too low, or the lighting level was too low to see facial expressions. Assessment data on children's cognitive functioning was considered unscoreable if less than 66 % of core items (i.e., 12 out of 19 items) on the BSF-R mental scale were administered.

outcome, while remaining in the sample for analyses for other child outcomes, when available[10]. This resulted in a sample of 6019 children for the analyses on child cognitive functioning, and a sample of 5077 children for analyses on children socioemotional functioning.

Descriptive statistics on child, parental and household characteristics of participant[11] and non-participant children, along with significance tests for differences between those two groups, are presented in Table 2.1. These tests suggest that the subsample is significantly more advantaged across various socioeconomic indicators.[12] Participants in our sample reported higher total household incomes (M = 59,307, SD = 45.32; t [8949] = 25.56, p = .00)[13] compared to non-participants (M = 29,071, SD = 29.99). Children in the sample were less likely to live below the poverty threshold at both periods (14.2 % at 9 months; 12.5 % at 24 months; t [8944] = -20.84, p = .00 at 9 months; t [8944] = -21.06, p = .00 at 24 months) compared to non-participating children (32.5% and 42.0% respectively). Mothers and fathers of children in our sample also reported having completed more years of education (M = 13.36, SD = 2.86 for mothers; t [8944] = 18.53, p = .00; M = 13.22, SD = 3.07 for fathers; t [8944] = 5.34, p = .00), than mothers and fathers of non-participating children (M = 11.82, SD = 2.47 for mothers; M = 1280, SD = 3.07 for fathers).

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[10] Percent of missing data for independent and control variables was small, never exceeding 10%. Missing data were imputed with the mean and indicator variables for these cases were included in all analyses. Results were similar when multiple imputation techniques (Allison, 1999) were used to impute missing data for those variables missing at least 5%.

[11] Sample descriptives and comparisons of means are based on sample cases for analyses on child cognitive functioning (N = 6019) and are virtually identical to sample statistics on cases for analyses on socioemotional functioning.

[12] Since the sample of children born in the United States during 2001 was only one of many possible samples of 2001 births that could have been selected, the sample data are weighted. The weights adjust for unequal selection probabilities at the child level (i.e., over sampling for twins and low-birthweight), as well as for probability of unit non response to the parent interview in both rounds. For all analyses, including descriptives, replication methods of variance estimation were used to reflect the actual sample design and sample selection; a form of the jackknife replication method (JK2) using 90 replicate weights were used to compute approximately unbiased estimates of the standard errors of the estimates, using AM Software version 6.0.

[13] Note that the reported mean is based on midpoints of income categories; for differences within each income category see Table 1.

The following demographic differences are noted: Mothers (M = 29.54, SD = 5.87) and fathers (M = 31.94, SD = 6.48) of participants were slightly older (t [8883] = 23.97, p = .00 for mothers; t [7056] = 6.21, p = .00 for fathers) than mothers (M = 25.27, SD = 6.01) and fathers (M = 29.94, SD = 6.96) of non-participant children. Participating children were less likely to be Black (t [8937] = -21.64, p = .00) and slightly younger at the 9-month (M = 10.36, SD = 1.91; t [8944] = -2.75, p = .004) and 24-month assessments (M = 24.31, SD = 1.07; (t [9458] = -5.78, p = .00), than non-participant children (M = 10.57, SD = 2.13 at 9-months assessment; M = 24.55, SD = 1.38 at 24-month assessment)[14]. Parents in our sample were also significantly more likely to be married (t [8880] = 34.91, p = .00) compared to non-participants.

However, since one of the primary selection requirements for inclusion in the current study was that participants live in intact families (couples had to have been together throughout both data collection periods), many of above reported differences are expected when comparing a sample of intact families to a sample with a representative sample which contains a substantial portion of single-parent households. In fact, when comparing participant and non-participant children from *intact* families on child, parental and household characteristics, the data show that socioeconomic and demographic differences between participants and non-participants are less pronounced.

Couples in our sample reported on average slightly higher total household incomes (M = 59,307, SD = 45.32; t [6530] = 4.87, p = .00) than non-participants (M = 45, 597, SD = 36.98). Mothers and fathers of children in our sample also reported having completed more years of education (M = 13.36, SD = 2.86; t [6530] = 4.88, p = .00 for mothers; M = 13.22, SD = 3.07; t [6530] = 3.96, p = .00 for fathers), than mothers and fathers of non-participating children (M =

[14] Note that child age at 9 months was adjusted for prematurity.

12.13, *SD* = 3.75 for mothers; *M* = 12.22, *SD* = 3.70 for fathers). There were no significant differences between participating and non-participating children in parents' marital status, maternal or paternal age, or the likelihood of the child being male or Black.

Participants

Participants who met the inclusion criteria were 6019 infants (51.6 % male) and their resident parents, 84.3 % of whom were married at the time of the 9-month assessment. The vast majority of participant children were living with their biological mother and biological father (98.8 %), while approximately 1% of children lived with their biological mother and a biologically, unrelated father-figure i.e., stepfather (.2 %), adoptive father (.2 %) or their mother's live-in partner (.7 %), and small percentage of children lived with two adoptive parents (.2%).

At the 9-month data collection, children in our sample had a mean chronological age of 10.4 months (*R* = 6.2 - 22.2, *SD* = 1.89). The mean age at the 24-month data collection was 24.3 months of age (*R* = 20.1 - 37.7, *SD* = 1.07). Most of the children (83.8 %) were between 8 and 11 months at the 9-month data collection; a small percentage (.3 %) were assessed before they were 8 months old, 5.5 % completed the 9-month assessment in the 12th month of life, and 9.4 % were assessed when they were 13 months or older. At the 24-month data collection, 92.3 % of children were within the target range of 23–25 months; 1.7% was assessed before they were 23 months old and 5.4 % of children were assessed at ages 26 months and older.

Dependent Variables

Descriptive statistics on individual scales and composite variables measuring children's cognitive ability and socioemotional functioning are described in Table 2.2.

Child General Cognitive Ability at 24 months was measured using the child mental scale of the Bayley Short Form Research Edition (BSF-R), a shortened version of the Bayley Scales of Infant Development-II (BSID-II; Bayley, 1993) which was designed for administration by highly-trained, field interviewers in the home. The BSF-R mental scale assesses children's cognitive development including early communication skills, expressive and receptive vocabulary, listening comprehension and early problem solving skills[15]. Child Cognitive Ability at 9 months was also assessed using the BSF-R which was used as a control variable for prior child functioning in those analyses predicting children's cognitive ability at 24-months.

Child Socioemotional Functioning was assessed at both data collection periods using a total of three convergent measures consisting of the Two Bags Task (at 24 months of age), the Behavior Rating Scale (BRS) of the Bayley Scales of Infant Development (BSID-II; Bayley, 1993) (used at 9 and 24 months of age) and the Nursing Child Assessment Teaching Scale (NCAST; Barnard, 1978) (at 9 months of age). In the following section, I will first describe the measurement and coding procedures for each measure. In a separate section, I will describe associations within and across individual scales of these measures across two data collection periods, and explain how (composite) dependent and control variables were created.

The Two Bags Task, used at the 24-months assessment, is a modification of the Three Boxes Task included in the NICHD Study of Early Child Care sponsored by the National Institute of Child Health and Human Development. The Two Bags Task is a video-taped, semi-structured play activity during which the parent-child dyad is asked to play with two different sets of toys, each placed within a separate numbered bag. Bag number 1 contained a children's picture book, 'Good Night, Gorilla,' by P. Rathmann (1994), and bag number 2 contained a set

[15] See Appendix A for details comparing structure of BSF-R to original BSID-II.

of dishes. The dyad was told that they had 10 minutes to play with the two toys, the only restriction being that they had to play with the toys in numerical order. A trained coder rated the quality and quantity of various child behaviors on a 7-point Likert-type rating scale that ranged from very low to very high, resulting in the following three scales:

Child Engagement of Parent reflects the extent to which the child shows, initiates, and maintains interaction with the parent, and the extent to which the child communicates positive regard or positive affect to the parent. *Child Negativity Toward Parent* measures the degree to which the child shows anger, hostility, or dislike toward the parent. At the high end, the child is repeatedly and overtly angry with the parent. The third scale, *Child Sustained Attention* assesses the child's ability to sustain attention to and involvement with objects. A child low on sustained attention could seem apathetic, bored, distracted, distressed, or aimless, while a child high on sustained attention is able to focus attention when playing with an object and appears involved in what he/she is doing. These three aspects of children's socioemotional functioning during a parent-child interaction have been shown to be important to the development of socioemotional functioning and security of attachment in children (Hartup 1985; Karen 1998) and to such cognitive skills as language acquisition (Snow 1994), preliteracy (Bus & Van IJzendoorn 1988; Whitehurst et al. 1994), and problem solving and exploration (Arend, Gove, and Sroufe 1979; Matas, Arend, and Sroufe 1978).

The second measure used to assess child socioemotional functioning is the *Behavior Rating Scale* which is used at 9 and 24 months of age. The BRS is a supplementary component of the BSID-II (BRS; Bayley, 1993) which consists of child observations completed by the interviewer on the basis of child behaviors seen during the BSF-R assessment described previously. The BRS assesses the child's attitude, interest, emotion, energy, activity, and

response to stimuli. Using a 5-point scale incorporating both the intensity and frequency of the target behavior, interviewers rated child behavior using 3 items [16] including *positive affect* (e.g., smiling and laughing); *negative affect* (e.g., crying and fussing) and *social engagement* with the caregiver and/or interviewer.

The Nursing Child Assessment Teaching Scale is part of a larger parent-child observation and intervention system called the Nursing Child Assessment Satellite Training (NCAST; Barnard, 1978). The version used for the 9-month ECLS-B assessment consists of a videotaped parent-child interaction during which the parent is asked to teach the child a task - such as stacking blocks - that is slightly beyond the child's current abilities and therefore creates some stress for the child. A trained and certified coder rated the quality and quantity of various child behaviors with a focus on the quality of interaction between parent and child, rather than the child's success or failure at learning the task. A high score on the child scale ($\alpha = .63$) [17] indicates that the child is communicating clearly with the caregiver and responds adaptively to the caregiver's cues.[18]

Data Reduction Socioemotional Functioning at 24 months

Scale scores derived from the Two Bags task and BRS at both time periods were reverse-scored to reflect higher scores for higher levels of socioemotional functioning. In addition to noting adequate reliability for each measure ($\alpha = .74$; for the BRS; $\alpha = .69$ for the Two Bags), associations between 24-month scale scores *across* the Two Bags and BRS scores were positive

[16] At 9 months, 9 out of 30 original BRS items were included and at 24 months, 13 items were included. The 3 items used in this investigation were selected based on the following criteria: the item had to 1) be completed by the interviewer (rather than the parent), 2) be present across both data collection periods and 3) to capture an aspect of children's socioemotional functioning. No additional items met these requirements.

[17] The NCAST assessment also yielded a total score (calculated by summing the parent and child scores) representing the overall quality of the mother-child interaction which are described in Table 2 and correlations among it and other primary variables are described in Table 3.

[18] For information on the reliability of individual subscales see Appendix B.

and significant (r = .287, p = .000). Considering the goal of predicting effects of interparental conflict on a global measure of socioemotional functioning, and to decrease collinearity among the items included in the model, scale scores from the 24-month BRS and the Two Bags Task were standardized and averaged to derive at the primary dependent variable for *Child Socioemotional Functioning at 24 months,* with higher scores reflecting increased socioemotional functioning (α = .71).

Controlling for child socioemotional functioning at 9 months

For analyses predicting child socioemotional functioning at 24 months, I created the following variables to control for children' prior socioemotional functioning. First, I used the child's scale score of the NCATS described in the previous section. Next, I created an additional control variable for child socioemotional functioning at 9 months by standardizing and averaging children's BRS scores at 9 months. Coefficient alpha for the 9 months BRS items was .63 suggesting moderate reliability. Scores from the NCATS and BRS at 9 months of age were included as separate control variables, rather than as a combined composite variable, because the resulting internal reliability would have been extremely low (α = .13); Associations across the NCATS and BRS at 9 months were extremely small (r = .012, p = .345), suggesting they may represent different aspects of child socioemotional functioning.

Independent Variables of Interest

Interparental Conflict at 9 months was measured using the self-administered questionnaire (SAQ) in which respondents were asked to indicate on a 4 - point scale (from *1 = often to 4 = never)* how often they and their partner argued about 10 conflict topics including chores and responsibilities, their children, money, not showing love and affection, sex, religion, leisure time, drinking, other men or women and in-laws. Scores for these items were reverse

scored and averaged to derive at a composite variable for *Interparental Conflict at 9 months* with higher scores reflecting increased conflict frequency. Coefficient alpha was .78, suggesting good reliability**.** To examine the extent to which the frequency of child-related conflict makes independent contributions to child functioning, a separate variable for *Child-Related Conflict at 9 months* was created indicating (on a scale from *1 = never to 4 = often*) the frequency by which respondents and their partners argue about their children. To examine the extent to which contributions of *Child-Related Conflict* are independent of exposure to other, non-child related arguments, I averaged scores of the nine, general (non child-related) conflict items (e.g., arguments about chores and responsibilities, arguments about money etc.) into a composite *Non-Child Related Conflict*. Coefficient alpha was .76, suggesting good reliability.

To examine effects of interparental conflict independent from parents' level of satisfaction with the couple relationship, *marital satisfaction* at 9 months was assessed through the self-administered questionnaire by asking respondents to rate if their marriage/ relationship is 'very happy,' 'fairly happy,' or 'not too happy.' Scores were reverse scored reflecting higher scores for increased marital satisfaction. Using information from the parent interview, an indicator was created *whether married* at 9 months which may be related to children's exposure to interparental conflict - general conflict and child-related related - as well as to children's cognitive functioning and should thus be controlled for when estimating effects of interparental conflict on child outcomes.

Additional Control Variables

Maternal authoritarianism at 9 months was assessed during the parent interview by asking respondents to identify statements about five different child-rearing topics, based on the extent to which the statement matched their ideas on childrearing. For example, 'you can spoil a

baby when you pick him up every time he/she cries' versus 'you cannot spoil a bay baby by picking him/her up every time he/she cries' and 'it is important to see that a young child does not form bad habits' and 'most mothers nowadays let their children get away with too much.' Indicator variables for each authoritarian statement were created (e.g. 'whether beliefs a baby can be spoiled by picking up crying baby' etc. *(1 = yes, 0 = no)* and scores across the five items were summed for each respondent to create a continuous score for *authoritarianism* ranging from *0 = low to 5 = high*.

Maternal responsiveness at 9 months was assessed using the *parent scale* of the Nursing Child Assessment Teaching Scale (NCATS) described in the previous section. Coders rated videotaped parent behavior to derive at scores for 4 subscales describing the caregiver's sensitivity to the child's cues (α = .19), the caregiver's response to the child's distress (α = .59), the caregiver's social-emotional growth fostering (α = .40) and the caregiver's cognitive growth fostering (α = .58) (Sumner & Spietz, 1994). Because the internal reliability of the individual subscales was low, the total parent score (α = .74) was used for the analyses predicting child socioemotional functioning.[19] A high score on the parent scale indicates that the parent is responsive to the child cues and needs, and provides a supportive learning environment.

Maternal Depressive Mood at 9 months was assessed using the self-administered questionnaire using a modified version of the Center for Epidemiologic Studies' Depression Scale (CES-D; Radloff, 1977) which assesses the frequency and duration of symptoms associated with depression in the preceding week. Respondents were asked to rate the extent to which they had experienced 12 symptoms of depression (e.g., not being able to shake of the

[19] Coefficient alphas reported in this section are based on averaging alpha values obtained from ECLS-B coders with those calculated by NCAST coders who conducted reliability coding (see Table 16 in Andreassen, & Fletcher; 2005)

blues, even with help from family and friends, feeling sad), anxiety (i.e., feeling fearful, trouble keeping mind on what they were doing) and somatization (i.e., experiencing restless sleep, loss of appetite), within the past week to be rated on a 1 to 4 metric (*1 = less than 1 day to 4 = most or all of 5-7 days*), with higher scores indicating more severe depressive symptoms. Raw scores were reversed where necessary and summed, reflecting higher scores for increased depressive mood. Chronbach's coefficient alpha in our sample was .85, suggesting excellent reliability.

Child Characteristics.

Age differences at the time of the 9 month assessment and potential effects of prematurity (i.e., when children were born at least 21 days early) were controlled. The amount of prematurity was subtracted from the child's chronological age at assessment and indicator variables were created based on child-prematurity-adjusted-assessment-age, each representing approximately 10 % of the population[20] (*1 = Lowest through 8.5 months of age, 2 = 8.6 - 8.8 months of age, 3 = 8.9 - 9.1 month of age* etc. Analyses were conducted using category 9 (i.e., *through highest*) as the reference category. In addition, to control for children's age at the 24-month assessment, the age-difference in months between the two assessment periods was calculated and entered into the model.

Using data from the birth certificate, indicator variables were created for children's gender (whether *male*), as well as children's birth status (whether the child was part of a *single* birth, whether part of *twin* birth, and whether part of *higher-order* birth e.g., triplets, quadruplets etc. Birth certificate information was also used to create indicator variables for children's birth weight (whether *normal* i.e., greater than 5.5 pounds, whether *moderately low* i.e., between 3.3 pounds to 5.5 pounds, and whether *very low* i.e., less than 3.3 pounds.

[20] Categorical rather than continuous child age variables were created to allow for non-linear effects

During the parent interview, respondents were allowed to indicate that the child belonged to one or more of 14 race categories, as well whether the child was of Hispanic or Latino origin. From this information, indicator variables for children's race/ethnicity were created (whether White, whether Black, Hispanic, Asian, Pacific Islander or American Indian)

Child Negative Emotionality was measured using mother reports on various aspects of child temperament ascertained during the parent interview, using seven items of the Infant/Toddler Symptom Checklist (ITSC; DeGangi, Poisson, Sickel, and Wiener, 1995). The parent was asked to rate the extent to which the child is 'fussy or irritable', 'goes from whimpering to crying', 'demands attention and company', 'wakes up 3 or more times', 'needs help falling asleep', 'is startled by loud noises', and 'cries for food or toys.' The parent could respond *never*, *used to be*, *sometimes*, or *most times*. Scores were subjected to an exploratory principal component factor analyses with varimax rotation and a composite score was derived by averaging variables that loaded on the negative emotionality factor (fussy or irritable, goes from whimpering to crying, demands attention or company, cries for food or toys). The scale showed good internal consistency ($\alpha = .73$).

Parental and Household Characteristics at 9 months

The parent interview at 9 months was used to obtain various parental and household characteristics including age of each resident parent (*maternal and partner age*)[21], as well each resident parents' years of education (ranging from *0 = no formal education* to *17 = 5 or more years of college).* The information about *total household income* was collected in the 9-month parent interview by asking broad-range and detailed-range income questions of all respondents from which a composite variable was created using thirteen income levels ranging from *$5,000*

[21] *Partner* refers to the resident spouse or resident, romantic partner of the mother who may or not be biologically related to the child

or less to *$200,000 or more.* To create a more easily interpretable (continuous) income variable for each participant, midpoints for each income level were calculated which were subsequently divided by 1000. Respondents were also asked to indicate the *number of household members under 18* years of age and an indicator variable was created to indicate whether the child primarily received parental care or whether the child was receiving childcare by a non-parent caregiver.

General Analytic Plan

To clarify, the dependent variables are *cognitive ability at 24 months,* which is measured by the BSF-R mental scale, and *socioemotional functioning at 24 months*, a composite variable based on three scales coded during the Two Bags Task, and observations made in the home during the 24 months BSF-R assessment. To answer my primary research questions, I conducted a series of lagged dependent regression analyses according to the following steps: I first examined the lagged effect of general interparental conflict at 9 months on children's cognitive ability at 24 months, while controlling for children's prior cognitive ability. This approach - controlling prior child ability - takes into consideration that rates of change may depend on children's initial status. Furthermore, the outcome at Time 1 captures unobserved heterogeneity in children that exist up to that point that may contribute both to interparental functioning and to later child outcomes. Next, I examined the lagged effect of child-related interparental conflict at 9 months on children's cognitive ability at 24 months, while controlling for children's prior cognitive ability *and* the frequency of other (non-child-related) interparental conflict. Finally, when the independent effect of child-related conflict at 9 months on children's cognitive functioning at 24 months was found to be statistically significant, I examined whether this effect was linear, by entering indicator variables for each frequency category of child-related conflict

into the model [22]and tested if the coefficients significantly increased in size as frequency of child-related conflict increased. All of these initial analyses were conducted while accounting for the quality of mother-child interactions and maternal emotional functioning, as well as controlling for child age, months between assessment and various missing variable indicators. Additional variables, including child, parental and household characteristics were entered hierarchically resulting in a series of three different models, of which only the final, complete model is presented in the text [23]. I subsequently examined whether the lagged effects of child-related interparental conflict on child cognitive were exacerbated or attenuated by child characteristics of risk or resilience. Variables tested as potential moderators were child gender and negative emotionality, but various additional child characteristics were tested as potential moderators (e.g., whether the child had low birth weight, is a twin), as well as various parental and household characteristics (e.g., number of children under 18 in household, whether the child lives below poverty threshold, quality of mother-child relationship functioning). An identical set of analyses was conducted to estimate associations between interparental conflict and the second dependent variable of interest, child socioemotional functioning at 24 months.

Results

Descriptive Statistics

The means and standard deviations of the primary dependent and independent variables included in the analyses are presented in Table 2.2. Independent samples t-tests were conducted to examine statistically significant differences in child outcomes at both time-periods by child, parental and household characteristics, which are selectively presented in the text and in more detail in Appendix C.

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[22] Coding was previously explained in the method section and entailed creating indicator variables for the whether respondents never, rarely, sometimes or often argued about their children)

[23] All models are presented hierarchically in the corresponding tables.

Mean level of children's cognitive ability at 9 months as indicated by their BSF-R score is 76.69 (*SD* = 9.67) and 127.90 (*SD* = 10.66) at 24 months of age. Independent samples t-tests indicate that there were statistically significant differences in children's cognitive ability at 24 months by child gender, although this difference emerged at 24 months of age; cognitive ability of boys at 9 months (*M* = 76.56, *SD* = 9.56) was similar (*t* [6018] = .79, *p* = .436) to that of girls (*M* = 76.83, *SD* = 9.79), whereas girls' BSF-R scores at 24 months of age (*M* = 129.89, *SD* = 10.01) were significantly higher (*t* [6018] = 9.19, *p* = .000) than those of 24 month-old boys (*M* = 126.04, SD = 10.03). Independent samples t-tests indicate that there were no statistically significant differences in children's socioemotional functioning at 9 months by child gender. There were however, significant differences in children's socioemotional functioning by child gender at 24 months of age; scores for boys (*M* = -.043, *SD* = .67) were significantly lower (*t* [5077] = -.895, *p* = .000) than those of 24 month-old girls (*M* = .161, *SD* = .60).

Mean level of interparental conflict at 9 months – frequency of arguments averaged across a wide variety of content areas - was relatively low (*M* = 1.78, *SD* = .44); respondents reported on a scale (*from 1 = never to 4 = often*), that they *hardly ever* argued. Respondents indicated that when they did argue, the three topics they were most likely to argue about, were 1) chores and responsibilities (*M* = 2.35, *SD* = .88), 2) money (*M* = 2.31, *SD* = .92) and 3) their children (*M* = 2.01, *SD* = .84). However, reported levels of conflict about these issues are still fairly low, with respondents indicating that on average they *hardly ever* argued about these issues. There are no statistically significant differences (*t* [6019] = 1.43, *p* = .157 in mean levels of child-related conflict based on a couple's marital status; married couples (*M* = 2.03, *SD* = .83) argued just as often about their children as non-married couples (*M* = 1.96, *SD* = .93).

Satisfaction with the couple relationship in the sample is high (M = 2.77, SD = .44) with most respondents reporting that they are *very happy* with their partner. Marital/ relationship satisfaction is significantly higher (t [6009] = 6.31, p = .000) for married couples (M = 2.80, SD = .42) compared to unmarried couples (M = 2.62, SD = .026).

Simple correlations among children's cognitive ability, socioemotional functioning and primary independent variables of interest are presented in Table 2.3. Intercorrelations among dependent variables, child, parental and household characteristics are presented in Table 2.4. Rather than reviewing these associations in detail, I focus on presenting the multivariate analyses testing the primary research questions of the study

Multivariate Associations Among Interparental Conflict, Maternal Parenting Quality And Emotional Functioning, And Child Cognitive Ability

I first examined if *Interparental Conflict at 9 months* affects children's cognitive ability at 24 months, *net* of the effects of prior child cognitive ability (as measured at 9 months of age). Note that the primary independent variable of interest represents the frequency of interparental conflict about a broad range of thematic content areas *including* child-related conflict. The model is a follows:

1) Child Cognitive Ability $_{\text{Time 2}}$ = B_0 + $\mathbf{B_1}$ **Child Cognitive Ability** $_{\textbf{Time 1}}$ + $\mathbf{B_2}$ **Interparental Conflict** $_{\textbf{Time 1}}$ + $B_{3,4}$ Maternal Parenting Quality$_{\text{Time 1}}$ + B_5 Maternal Depressive Symptoms $_{\text{Time 1}}$+ $B_{6\text{-}15}$ Child Characteristics $_{\text{Time 1}}$ + $B_{16\text{-}21}$ Maternal and Paternal Characteristics $_{\text{Time 1}}$ + $B_{22\text{-}36}$ Household Characteristics $_{\text{Time 1}}$ + $B_{37\text{-}i}$ Controls + ε_{T1i}

Results show that interparental conflict does not significantly predict Child Cognitive Ability at Time 2 when controlling for Child Cognitive Ability at 9 months (β = -.160, p = .406).

In the next models, presented in Table 2.6, I examined the effects of *child-related conflict* at 9 months on child cognitive ability at 24 months, *net* of the effects of prior child cognitive ability (as measured at 9 months of age), and net of the effects of interparental conflict about other *non-child-related* matters. The model is a follows:

2) Child Cognitive Ability $_{\text{Time 2}}$ = B_0 + **B_1 Child Cognitive Ability $_{\text{Time 1}}$** + **B_2 Child-Related Conflict $_{\text{Time 1}}$** + **B_3 Non-Child Related Interparental Conflict $_{\text{Time 1}}$** +$B_{4,5}$ Maternal Parenting Quality $_{\text{Time 1}}$ + B_6 Maternal Depressive Symptoms $_{\text{Time 1}}$+ $B_{7\text{-}16}$ Child Characteristics $_{\text{Time 1}}$ + $B_{17\text{-}22}$ Maternal and Paternal Characteristics $_{\text{Time 1}}$ + $B_{23\text{-}37}$ Household Characteristics $_{\text{Time 1}}$ + $B_{38\text{-}i}$ Controls + ε_{T1i}

Here, I find a significant negative association between child-related conflict at 9 months and future cognitive ability, indicating that a 1 SD increase in child-related conflict is related to a .365 point decrease (or .030 SD decrease) in child cognitive ability. It is important to note that this association is significant while controlling for the effects of more general, non-child related conflict (e.g., conflicts about money, in-laws, other men and women, etc.), a composite variable which is not independently and significantly related to child cognitive functioning at 24 months when child-related conflict is in the model (β = .075, p = .732). In other words[24], for each one-unit increase in the frequency of child-related conflict (from *never* to *hardly ever*, or from *hardly ever* to *sometimes*, or from *sometimes* to *often* arguing about the children), children's cognitive ability at 24 months is reduced significantly by 0.435 points on the BSF-R (β = -.435, p = .039).

[24] For ease of interpretation, this coefficient represents the effect size for the unstandardized variable

While the negative effect of early child-related conflict on later cognitive ability is statistically significant, its effect is very small (β = -.365), especially when comparing it to the effect size of various child characteristics on child cognitive ability; being male (β = -3.53, p = .000), Black (β = -3.21, p = .000), Hispanic (β = -3.50, p = .000) or Asian (β = -2.40, p = .000). The largest effects on future child cognitive ability were found for whether the child was born with very low birth weight (β = -4.17, p = .000) and children's cognitive ability at 9 months of age (β = 4.13, p = .000).

Next I examined whether the negative effect of child-related conflict during 9 months on child cognitive ability at 24 months was linear, by testing whether the effect increases incrementally as child-related conflict becomes more frequent, regardless of the initial level of child-related conflict. In other words, is the effect of increasingly frequent child-related conflict on child cognitive ability at 24 months *similar* when child conflict increases from *never* to *hardly ever,* compared to when child conflict increases from *hardly ever* to *sometimes*, compared to when child conflict increases from *sometimes* to *often*? Or, is the negative effect of child-related conflict on child cognitive ability entirely driven by increases in child-related conflict in the high range i.e., when child conflict increases from *never* to *often*? Using *whether never argued about children* as the reference category for these analyses, the model is as follows:

3) Child Cognitive Ability $_{\text{Time 2}}$ = B_0 + **B_1 Child Cognitive Ability $_{\text{Time 1}}$ + B_2 Whether Child-Related Conflict Occurs *Hardly Ever* $_{\text{Time 1}}$ + B_3 Whether Child-Related Conflict Occurs *Sometimes* $_{\text{Time 1}}$ + B_4 Whether Child-Related Conflict Occurs *Often* $_{\text{Time 1}}$ + B_5 Non-Child Related Interparental Conflict** $_{\text{Time 1}}$ +B_6 Materenal Parenting Quality $_{\text{Time 1}}$ + B_7

$$\text{Maternal Depressive Symptoms}_{\text{Time 1}} + B_{8\text{-}16}\,\text{Child Characteristics}_{\text{Time 1}} + B_{17\text{-}22}\,\text{Maternal and Paternal Characteristics}_{\text{Time 1}} + B_{23\text{-}37}\,\text{Household Characteristics}_{\text{Time 1}} + B_{38\text{-}i}\,\text{Controls} + \varepsilon_{T1ie}$$

Results presented in 2.6b [25] indicate that the negative effects of child-related conflict at 9 months on child cognitive ability at 24 months occurred at all levels of child-related conflict but show signs of non-linearity with effects being greater at higher levels of conflict. T-tests comparing coefficients indicated that there were no significant differences suggesting that effects of child-related conflict at 9 months of age on child cognitive ability at 24 months of age are continuous.

Last, I examined whether the association between child-related conflict at 9 months and child cognitive ability at 24 months was significantly moderated by various developmental risk and protective factors discussed in the prior section. I found no significant effects on child cognitive ability of the interactions between child-related conflict and child gender, child negative emotionality, maternal responsiveness or depressive symptoms. In addition, no significant effects were found for child cognitive ability of interactions between child-related conflict and marital status, income and poverty level, or the number of children in the family under 18 years of age.

Multivariate Associations among Interparental Conflict, Maternal Parenting Quality and Emotional Functioning, and Child Socioemotional Functioning

A similar series of analyses were conducted for the second dependent variable of interest, child socioemotional functioning at 24 months. I first examined if *interparental conflict at 9 months* predicted children's socioemotional functioning at 24 months, *net* of the effects of prior

[25] Analyses were conducted while controlling for all variables presented in Table 6

child socioemotional functioning, as measured at 9 months of age using the NCAST child score and the composite variable based on child observations made during the BSF-R assessment to control for prior socioemotional functioning[26]. Results are presented in the text and indicate that interparental conflict does not significantly predict child socioemotional functioning at 24 months of age (β = .019, p = .478), when controlling for child socioemotional functioning at 9 months (β = .008, p = .478). In the next model, I examined the effects of *child-related conflict* at 9 months on child socioemotional functioning at 24 months, *net* of the effects of prior child socioemotional functioning (as measured at 9 months of age) while also controlling for effects of general, non-child related conflict frequency and find no significant main effect of child-related conflict (β = -.030, p = .064) on later child socioemotional functioning.

Moderation by Child Gender And Child Negative Emotionality

I next examined whether associations between child-related conflict at 9 months and later child socioemotional functioning were significantly moderated by child gender or child negative emotionality. Interaction terms were calculated by multiplying the z-scores for child-related conflict with the unstandardized indicator variable for child gender (whether *male*), and the interaction between the two were entered into the regression. Similarly, an interaction term was calculated by multiplying the z-scores for child-related conflict with the z-scored score of child negative emotionality, which was also entered into the regression. Results presented in Table 2.7 and illustrated in Figure 2.1 indicate that child gender (β = .043, p = .013), but not negative emotionality (β = .01, p = .76), significantly moderated associations between child-related conflict in infancy and child socioemotional functioning at 24 months, suggesting that the effects

[26] The models predicting child socioemotional functioning at 24 months of age follow the same rationale as the models used to predict child cognitive ability and as such, the equations are not again featured in the text. Note that because the control variable for child prior socioemotional functioning is part of the score used to measure the quality of the parent-child relationship, these models include the NCATS *parent* - rather than total score - score as the independent variable measuring parent responsiveness to avoid multicollinearity in the model.

of child-related conflict on child socioemotional functioning differ for girls and boys. The nature of interaction effect suggests that higher levels of child-related conflict at 9 months significantly affect girls' socioemotional functioning at 24 months, while the effect of higher levels of child-related conflict on boys' socioemotional functioning does not. As illustrated in Figure 2.1, for each 1-unit increase (1 SD) in exposure to child-related conflict at 9 months, girls' socioemotional functioning decreases by approximately .038 SD, a small effect. Socioemotional functioning at 24 months of girls who experienced low levels (1 SD below the mean) of child-related conflict at 9 months, is significantly higher by .076 SD compared to girls who experienced a high level of child-related conflict in the home (1 SD above the mean). In contrast, boys' socioemotional functioning at 24 months of age appears not to be affected significantly by early exposure to child-related conflict; boys who lived in homes with low levels of child-related conflict (1 SD below mean level) have similarly low levels of socioemotional functioning at 24 months as those who experienced average or high levels of child-related conflict (1 SD above the mean).

Risk And Protective Factors

I found no significant effects on socioemotional functioning of interactions between child-related conflict and maternal responsiveness, maternal depressive symptoms or child characteristics such as child race, or birth weight and plurality status. In addition, I found that the effects of child-related conflict on child socioemotional functioning were not moderated by parents' marital status, income or poverty level, or the number of children in the family that are less than 18 years of age. Last, hypothesizing that boys who have 'difficult' temperaments, or boys who live in poverty, may be more sensitive to risk posed by child-related conflict than boys not experiencing these risk factors, I also tested three-way interaction models for these variables.

There were no significant three-way effects on child socioemotional functioning at 24 months of interactions between child-related conflict by gender by negative emotionality (β = .013, p = .758) or child-related conflict by gender by poverty status (β = -.007, p = .900).

Discussion

The primary objective of this study was to examine the association between interparental conflict during infancy (and child-related conflict in particular) and child cognitive ability and socioemotional functioning in toddlerhood. In addition, this study tested the potential moderating role of child gender and negative emotionality, and explored the role of other individual and familial risk and protective factors in moderating associations between child-related conflict in infancy and aspects of child adjustment in toddlerhood. As such, this study responds to calls in the field to focus attention on developmental periods that may be particularly vulnerable to the effects of marital conflict, to identify vulnerability and protective factors, and to examine adaptation across multiple developmental domains (Margolin, Oliver, Medina, 2001).

Child-Related Conflict and Child Cognitive Ability

In contrast to the study's first hypothesis, children's cognitive ability at 24 months was not associated with the total frequency by which couples engaged in interparental conflict when the child was 9 months of age. Child cognitive ability at 24 months was however significantly and negatively associated with the frequency of *child-related conflict*, regardless of how frequent the couple argued about other, non-child-related matters, or how satisfied they were in their relationship. It is important to note that this negative association was found after also taking into consideration child's cognitive ability at 9 months of age, suggesting that child-related conflict at 9 months of age may have a lagged or persistent effect on later child cognitive ability.

Negative effects of early child-related conflict on children's cognitive ability at 24 months were small; holding everything else constant, results indicate that children living in homes where parents reported *never* experiencing child-related conflict at 9 months, have cognitive ability scores on the BSF-R that are approximately 1.34 points higher than those living in homes where parents *often* argue about their children. Effects of child-related conflict are expected to be small however, since they represent independent effects observed *after* taking into account a wide series of significant negative contributions of child, parental and household characteristics frequently omitted in prior research.

Contrary to expected, this study found that negative associations between early child-related conflict and later child cognitive ability were not significantly moderated by individual or environmental vulnerability or protective factors; associations were similar for boys and girls, and no differential effects were found based on the child's temperamental characteristics or any other individual risk factors such as low birth weight or plurality status. In addition, children growing up in more advantageous environments, such as those enjoying more responsive and sensitive parent-child interactions, children whose mothers reported better emotional adjustment, children with older and better educated parents, children of married parents or those enjoying greater marital satisfaction- were not protected against the negative effects of child-related conflict compared to children living in environments characterized by higher risk. This signifies that exposure to child-related conflict during infancy has small and negative consequences for the cognitive development of all children, and should be considered a variable of interest for understanding optimal child development.

Child-Related Conflict and Child Socioemotional Functioning

Contrary to expectation, children's socioemotional functioning at 24 months was not significantly associated with the total frequency by which couples engaged in general interparental conflict frequency, or with child-related conflict when the child was nine months of age. Instead, associations between child-related conflict at 9 months and socioemotional functioning at 24 months were significantly moderated by child gender, suggesting that girls' socioemotional functioning at 24 months was significantly and negatively affected by increased exposure to child-related conflict during infancy, whereas boys' socioemotional functioning at 24 months was not. It is important to note that differential effects of child-related conflict at 9 months by child gender were significant even when additional individual or environmental vulnerability factors were considered through testing of higher order interaction models. Boys with 'difficult' temperament (high negative emotionality) and boys living below the poverty threshold, were equally unlikely to experience significant negative effects of child-related conflict on later socioemotional functioning as boys with 'easy' temperaments or boys not living in poverty. There was no evidence to suggest that associations between child-related conflict at 9 months and later socioemotional functioning were significantly attenuated or pronounced by other potentially 'risky' child characteristics such as negative emotionality, low birth weight, or plurality status. There is also no indication that less responsive parenting, poorer maternal emotional functioning, having unmarried parents or those with lower marital satisfaction, being poor, or having more children in the home affects puts children at greater risk of experiencing negative effects of child-related conflict in infancy on socioemotional functioning in toddlerhood.

The Relevance of Child-Related Conflict for Infants

Results suggest that children as young as nine months of age may 1) be able to discern differences in the content of interparental conflict and 2) may be more upset by child-related conflict than other, non-child related conflict. To address the first notion, it is important to note that there is no evidence to suggest that children this young have the cognitive and/or language ability to distinguish between the content of verbal exchanges based purely on its literal content. It is more likely that the meaning and relevance of this particular kind of conflicts is transmitted indirectly, through the infant's interpretation of the valence and intensity of verbal and emotional expressions of parents. For example, there is evidence that by the end of the first year of life, infants tend to rely on another person's emotional reaction to appraise an uncertain situation. In a socioemotional interaction known a social referencing for example, the caregiver's emotional expression influences whether a 1-year old will show wariness of strangers (Rosen, Adamson, & Bakeman, 1992), play with an unfamiliar toy (Klinnert,1983) or cross the deep side of an illusionary visual cliff (Sorce et. al, 1985; Walden & Ogan, 1988). In fact, the emotional cues given by the caregiver in moments of stress or uncertainty may be one of the reasons that he or she serves as a secure base for exploration (Ainsworth, Blehar, Waters & Wall, 1978). For example, research has shown that babies have a desire to remain within eyeshot of their mother, as if to secure access to her facial and vocal cues (Carr, Dabbs & Carr, 1975). Thus, during instances of interparental conflict (and/or immediately after) infants may observe parents' facial expressions and vocalizations - even when not directed at them - and 'appraise' the extent to which the conflict may pose a threat to their or their parents' security or goal(s). This may have affective as well as physiological consequences for the infant, which may through frequent or intense exposure have implications for cognitive development. Given the above, social

referencing may thus be one of the mechanisms by which the potential meaning of interparental conflict as a negative, upsetting event is transmitted to infants.

The findings also imply that children may be more affected by exposure to child-related conflict compared to exposure to other, non-child related conflict. Infants may be more upset by child-related conflict, because it tends to be more intense than conflict about other topics. For example, evidence from a study with older children (Papp, Cummings & Goeke-Moray, 2002) found that during child-related conflict, parents were more emotionally negative and less emotionally positive and were more likely to engage in destructive conflict behaviors (e.g., insulting, mocking, yelling) than during non-child related conflict. If the expression of child-related conflict tends to be more intense, these types of conflicts may be more upsetting to children, because they may experience physiological and emotional arousal in direct response to loud and emotionally charged exchanges between parents. Increased physiological arousal may interfere with the infants ability to regulate their emotional arousal, behavior and cognitions, which may increase infants' perception of the threatening nature of conflict and their ability to cope (Grych & Fincham, 1993). In addition, if child-related conflict tends to me more intense, it may also be more upsetting to parents. Parents' negative emotional state in response to the conflict may subsequently be signaled to infants during or immediately following the argument, which may constitute an additional stressor.

Or, are infants exposed to a greater proportion of child-related conflict? There is some evidence to suggest that by being in the presence of parents, infants may be exposed to a greater proportion of conflicts about children and as such be exposed to a disproportionate amount of intense rater than constructive conflict. As shown by Papp, Cummings & Goeke-Moray (2002), child presence tended to increase the proportion of arguments about the children and

childrearing. Although there is some corroborating evidence to suggest that the use of verbal aggression may mediate the link between mothers report of child-related disagreements and internalizing problems in preschool-aged boys (Lee, Beauregard & Bax, 2005), the assertion that negative effects of child-related conflict in infancy on child outcomes may be mediated by conflict intensity, should be further tested in subsequent studies by incorporating a broader theoretical and methodological conceptualization of construct of the child-related conflict

Differential Effects of Child-Related Conflict by Child Gender

Ho do we explain that effects of child-related conflict on child socioemotional functioning, however small, were significant for girls, but not for boys? It is important to note that gender differences were not a result of differences in the frequency by which child-related conflict was reportedly present in the home. While this does not preclude the possibility that boys and girls experienced different levels of *exposure* to child related conflict, previous results indicate that parents are not likely to successfully shield children from exposure to conflict based on their gender (Emery & O'Leary, 1982). Instead, results imply that *differential vulnerability* to child-related conflict may exist, particularly with regard to girls' socioemotional functioning.

Since little research has been done to examine if and how child gender may moderate associations between couple conflict and child functioning in infancy, results of this study may be best understood by examining findings from studies with older children, which suggest that various gender-specific pathways between interparental conflict and child development may exist (see Davies & Lindsay, 2001, for review). For example, several studies have found that girls may be more sensitive to certain aspects of couple conflict, as evidenced by girls exhibiting greater emotional distress to high-intensity conflicts (Grych, 1998) and increased parental hostility (Cummings, Vogel, Cummings, & El-Sheikh, 1989), including increased physiological

arousal as indicated by greater heart-rate reactivity in response to conflict exposure (El-Sheikh, 1994). In addition, girls who witnessed unresolved conflict also elicited greater perceived adult negativity during future conflict (El-Sheikh, Cummings & Reiter, 1996) compared to boys. Given that child-related conflict has been found to be more intense and more likely to elicit expressions of hostility (Papp, Cummings & Goeke-Moray, 2002), it is possible that the pronounced negative effects of child-related conflict for girls' socioemotional functioning reflects girls' greater sensitivity to the use of destructive conflict styles by parents. On the other hand, caution must be exercised in making such inferences based on previous studies, since most of the reported gender differences in sensitivity to intense conflict were found in experimental, not observational studies, and examined responses to *interadult* conflict rather than *interparental* conflict. Since the present study was focused mostly on determining *if* differential effects of child-related conflict on later the child functioning would be found, after controlling for direct effects of multiple developmental and contextual factors, further research is needed to identify the gender-specific pathways by which time and context-specific response patterns may differentially affect boys and girls socioemotional development in the context of interparental conflict.

Vulnerability And Protective Factors

Although there are theoretical and empirical reasons to expect that individual and environmental risk factors may moderate associations between interparental conflict, this study found no evidence to that effect, except for the moderating role of child gender on associations between child-related conflict and child socioemotional functioning. Although few marital conflict studies have previously examined the role of risk and vulnerability factors in infancy, these findings may be surprising, since interparental conflict is thought to allow existing

vulnerabilities in children to be realized as 'adaptational failures' (Fincham, Grych & Osborne, 1994). Since risk and vulnerability factors selected as potential moderator variables were chosen based on prior research (Grych & Fincham, 2001), guidelines for longitudinal, inclusive research design (Fincham, Grych and Osborne, 1994) and theoretical models (Davies & Cummings, 1994; Grych & Fincham, 1990), results about the role of these vulnerability and protective factors must be interpreted cautiously. First, because the transmission of developmental risk is considered to be non-linear (Seifer et al; 1992), it is possible that individual differences that make children particularly vulnerable to the effects of child-related conflict may have deleterious consequences *only* when a certain threshold is crossed. In addition, the study does not account for the ways in which multiple risk factors may interact to create high-risk environments, as such exacerbating negative child outcomes indirectly. This notion is important for this dissertation as there is evidence to suggest that child negative emotionality may play a role in creating higher-conflict environments in the home, especially when parents have greater differences in knowledge of child development (see Chapter 3). Hence, while child negative emotionality does not exacerbate possible negative effects of exposure to child-related conflict on child adjustment in cognitive or socioemotional domains, it should be considered as a potential riskfactor in increasing child-related conflict, and as such contributing to possibly negative child outcomes indirectly. As such, through the use of analytical techniques such as structural equation modeling, future work should continue to examine direct and indirect pathways by which child negative emotionality may play a role in affecting various aspects of children development. Similarly, the transmission of risk is not specific to any one particular set of risk factors. Risk conditions originate in different developmental domains- biological, social and/or psychological – and may occur simultaneously. In addition, risk factors may be exacerbated or attenuated by various aspects of the infants'

family system besides marital conflict (Rutter, 1987; Seifer, 1995). For example, while infants growing up in poverty are more likely to experience a combination of pervasive stressors and disadvantaged conditions such as poor medical care and inadequate nutrition (Halpern, 1993), less stimulating home environments (Duncan et. al, 1994), and more power-assertive discipline and physical punishment (McLoyd, 1990), not all poor children experience these conditions, and some may experience none of these disadvantages. In sum, while the results of this study indicate that the risk and protective factors under study do not appear to significantly moderate associations between child-related conflict in infancy and child cognitive ability and child socioemotional functioning in toddlerhood, future investigations should continue to investigate which of these characteristics and conditions may influence the magnitude and direction of potential negative effects marital conflict on child functioning in cognitive and socioemotional domains and if these processes differ for children of different ages.

Strengths and Limitations

This study makes a valuable contribution to a relatively small body of prior research on marital conflict and infant development by estimating the magnitude and nature of independent effects of child-related conflict in infancy on future child outcomes, and by exploring the role of several risk and protective factors in influencing the strength and/or direction of these links. A considerable strength of this study is its use of a large, comprehensive, longitudinal dataset collected from a nationally representative sample of infants, which allows results to be generalized to the population at large. In addition, this study combines the advantages of a large sample size with the use of in-home, developmental assessments by a trained observers on child cognitive ability, socioemotional functioning and parent-child relations. By considering various individual characteristics of children and their parents, as well as broader developmental and

contextual factors, this study limited the possibility that negative effects attributed to the frequency of the child-related conflict in the home are overestimated. In particular, one of the study's strengths is that results were obtained while controlling for prior child functioning. As such this study overcomes some of the methodological limitations of previous studies examining marital conflict in infancy.

This study has several limitations which merit consideration when interpreting its results. First, although this study examined longitudinal effects of child-related conflict at 9 months of age child outcomes at 24 months of age, the time difference between the two data collection periods was relatively small. Second, the primary independent variables of interest assessed the frequency and thematic content of interparental conflict based on self-report measures completed by resident mothers; other aspects of interparental conflict, including intensity, duration, and resolution were not assessed in this study, although previous studies have shown that these dimensions of interparental conflict may have important implications for child adjustment (Grych & Fincham, 1990). Given the findings of this study, incorporating other interparental conflict dimensions may have allowed for more specific interpretation about the nature of negative associations between child-related conflict frequency and child outcomes under study. Third, the recent attention and support for the notion that the coparenting relationship differs from the marital relationship (McHale et al., 2002) as evidenced by independent effects of the coparenting relationship on child adjustment (McHale & Rasmassen, 1998) and the infant – parent attachment relationship (Caldera & Lindsey, 2006), leads one to consider the nature of the theoretical construct of child-related conflict and the extent to which it relates and/or overlaps with the construct of coparenting. Since both concepts are related to child rearing issues and may be handled in front of the child or affect the child, negative effects of child-related conflict on

child outcomes examined in this study may have been more confidently interpreted as independent influences if the construct of coparenting had been considered and/or if father reports on child-related conflict frequency had also been considered.

Conclusion

Despite these limitations, this study provides new insights in understanding the magnitude and nature of risk posed by interparental conflict to the American infant population. The results also highlight the value of examining specific dimensions of conflict when examining effects of interparental conflict. In particular, this work highlights the importance of child-related conflict for very young children's cognitive and socioemotional functioning. Last, this study illustrates the enduring value of first-generation research in generating testable hypotheses and informing theory about interparental conflict and child development.

Table 2.1
Weighted Frequency Distributions And Descriptive Statistics By Participation Status

	Participants (N = 6019)		Non-Participants (N = 3669)		
Variable	*M*	*SD*	*M*	*SD*	*t-statistic*
Child Cognitive Ability					
BSF-R mental score Time 2	127.90	10.66	125.27	10.38	8.38**
BSF-R mental score Time 1	76.69	9.67	76.91	10.10	.63 ns
Child Socioemotional Functioning					
Socioemotional functioning Time 2	.100	.66	-.050	.071	7.22 **
Socioemotional functioning Time 1 (NCAST)	15.51	2.71	15.42	2.74	.83 ns
Socioemotional functioning Time 1 (BRS)	.072	0.74	.028	.75	-1.97 ns
Child Characteristics					
Child Assessment Age Time 1[27]	10.36	1.91	10.57	2.13	-2.75*
Child Assessment Age Time 2	24.31	1.07	24.55	1.38	-5.78
Whether Male	51.6%		50.0%		.90 ns
Child Negative Emotionality Time 1	1.49	.61	1.61	.63	-5.93*
Whether White	80.4%		54.5%		18.56*
Whether Black	8.5 %		35.7%		-21.64**
Whether Hispanic	24.5 %		26.8%		-1.57 ns
Whether Asian	4.4 %		3.2%		3.31 *
Whether Pacific Islander	.5%		.7%		-1.08 ns
Whether Native Indian	1.9%		2.8%		-2.10*
Whether Normal birth weight	93.5%		90.4%		6.57**
Whether Moderate to Low birth weight	5.4%		8.0%		-5.85**
Whether Very Low birth weight	1.1%		1.7%		-4.86**
Whether Twin	3.1%		2.7%		1.83 ns
Whether Higher-order birth	.2%		.1%		2.75*
Parental Characteristics					
Whether Married Time 1	84.3%		27.7%		34.91**
Maternal Age Time 1	29.54	5.87	25.27	6.21	23.97**
Paternal Age Time 1	31.94	6.48	29.94	6.96	6.208**
Maternal Education Time 1	13.36	2.86	11.83	2.47	18.54**
Paternal Education Time 1	13.22	3.07	12.80	1.99	5.34 **
Household Characteristics					
Total Household Income Time 1	59.31	45.32	29.07	29.99	25.56**
Whether below poverty threshold at Time 1	14.2 %		42.5 %		-20.84**
Whether Child in Parental Care only Time 1	54.3%		41.3%		7.37**
# of resident children under 18 Time 1	2.11	1.15	2.24	1.27	-3.63**

** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed)

[27] Child assessment age at Time 1 adjusted for prematurity

Table 2.2
Weighted Means and Standard Deviations of Primary Dependent and Independent Variables

Variable	*M*	*SD*	*Min*	*Max*
Child Characteristics and Functioning				
Cognitive Ability Time 1 (BFS-R)	76.69	9.67	32.04	124.74
Cognitive Ability Time 2 (BFS-R)	127.9	10.66	92.61	174.14
Socioemotional Functioning Time 1	0.00	0.74	-2.26	1.33
Observed Positive Affect Time 1(BRS)	3.57	1.08	1.00	5.00
Observed Negative Affect Time 1 (BRS)	2.17	1.15	1.00	5.00
Observed Social Engagement Time 1 (BRS)	3.40	1.08	1.00	5.00
NCAST Child Score Time 1	15.50	2.70	4.00	23.0
Socioemotional functioning Time 2	0.00	0.64	-2.89	1.49
Engagement with parent Time 2 (Two Bags)	4.64	1.14	1.00	7.00
Negativity toward parent Time 2(Two Bags)	1.31	0.71	1.00	7.00
Sustained Attention Time 2 (Two Bags)	4.54	1.15	1.00	7.00
Observed Positive Affect Time 2 (BRS)	3.53	1.06	1.00	5.00
Observed Negative Affect Time 2 (BRS)	2.56	1.27	1.00	5.00
Observed Social Engagement Time 2 (BRS)	3.52	1.10	1.00	5.00
Child Assessment Age Time 1	10.36	1.91	3.00	22.2
Whether Male	0.52	0.50	0.00	1.00
Child Negative Emotionality	1.41	0.67	0.00	3.00
Whether White	0.80	0.40	0.00	1.00
Whether Black	0.92	0.28	0.00	1.00
Whether Hispanic	0.25	0.43	0.00	1.00
Whether Asian	0.05	0.21	0.00	1.00
Whether Pacific Islander	0.01	0.07	0.00	1.00
Whether Native Indian	0.02	0.14	0.00	1.00
Whether Normal birth weight	0.94	0.25	0.00	1.00
Whether Moderate to Low birth weight	0.05	0.23	0.00	1.00
Whether Very Low birth weight	0.01	0.11	0.00	1.00
Whether Twin	0.03	0.17	0.00	1.00
Whether Higher-order birth	0.00	0.05	0.00	1.00
Parental Characteristics and Functioning				
Whether Married Time 1	0.84	0.36	0.00	1.00
Maternal Age Time 1	29.54	5.87	15.0	52.0
Paternal Age Time 1	31.94	6.48	17.0	75.0
Maternal Education (yrs) Time 1	13.36	2.86	0.00	17.0
Paternal Education (yrs) Time 1	13.22	3.07	4.50	17.0
Interparental Conflict Time 1	1.78	.49	1.00	4.00
Child-Related Conflict Time 1	2.01	.84	1.00	4.00
Non-Child Related Conflict Time 1	1.74	.46	1.00	4.00
Chores	2.35	.88	1.00	4.00
Money	2.31	.92	1.00	4.00
In-Laws	1.79	.88	1.00	4.00

Table 2.2 continued,

Variable	*M*	*SD*	*Min*	*Max*
Drinking	1.26	.61	1.00	4.00
Other Women/Men	1.15	.48	1.00	4.00
Sex	1.82	.90	1.00	4.00
Affection	1.82	.88	1.00	4.00
Leisure Time	1.79	.85	1.00	4.00
Religion	1.33	.68	1.00	4.00
Marital Satisfaction Time 1	2.77	.44	1.00	3.00
Maternal Depressive Symptoms Time 1	16.43	5.02	12.00	48.0
Mother-Child Interaction Quality Time 1 (NCAST)	50.54	5.78	23.00	70.0
Maternal Responsiveness Time 1 (NCAST)	35.03	4.47	15.00	49.0
Maternal Authoritarianism Time 1	1.92	1.08	0.00	5.00
Household Characteristics				
Total Household Income (in thousands) Time 1	59.31	45.32	< 5.0	200.00 or >
# of resident children under 18 Time 1	2.11	1.15	1.00	11.0
Whether child in Parental Care only Time 1	0.54	0.50	0.00	1.00

Table 2.3

Correlations Between Child Cognitive Ability, Socioemotional Functioning And Primary Independent Variables

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Cognitive Ability 2	1											
2. Cognitive Ability 1	.207	1										
3. Socioemotional 2	.536	.118	1									
4. Socioemotional 1	.133	.180	.170	1								
5. NCAST - total 1	.183	.156	.147	.064	1							
6. NCAST - parent 1	.184	.167	.156	.075	.891	1						
7. NCAST - child 1	.086	.057	.054	.012	.662	.249	1					
8. Depressive Symptoms	-.072	-.039	-.074	-.041	-.075	-.078	-.031	1				
9. Authoritarianism	-.109	.015	-.091	-.018	-.079	-.100	-.002	.062	1 .			
10. Negative Emotionality	-.062	.048	-.053	-.114	-.038	-.054	.007	.177	.079	1		
11. Interparental Conflict	-.045	-.010	-.026	-.039	-.065	-.067	-.028	.320	.019	.134	1	
12. Child-Related Conflict	-.047	.024	-.038	-.043	-.035	-.027	-.030	.188	.020	.112	.619	1

Note: Correlation coefficients > .028 are significant at the 0.05 level (2-tailed), coefficients > .036 are significant at the 0.051 level (2-tailed)

Table 2.4
Associations between Child Cognitive Ability And Socioemotional Functioning At 24 Months Of Age And Child Characteristics

Variable	*1*	*2*
1. Cognitive Ability	1	
2. Socioemotional Func.	.536	1
3. Male	-.180	-.159
4. Child age	.082	.036
5. White	.191	.119
6. Black	-.090	-.040
7. Hispanic	-.241	-.139
8. Asian	-.009	-.026
9. Pacific Islander	-.022	-.019
10. Native Indian	-.026	-.013
11. Normal BW	.127	.064
12. Low BW	-.092	-.048
13. Very low BW	-.101	-.047
14. Singleton	.067	.046
15. Twin	-.062	-.047
16. Higher order birth	-.026	-.002
17. Neg. emotionality	-.062	-.053

Note: Correlation coefficients > .028 are significant at the 0.05 level (2-tailed), coefficients > .036 are significant at the 0.051 le

Table 2.5

Associations Between Child Cognitive Ability, Socioemotional Functioning At 24 Months Of Age And Parental And Household Characteristics

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Cognitive ability	1									
2. Socioemotional func.	.536	1								
3. Mother Age	.094	.092	1			.				
4. Father Age	.046	.045	.747	1						
5. Mother education	.272	.195	.402	.289	1					
6. Father education	.257	.174	.371	.317	.648	1				
7. Married	.147	.138	.294	.250	.317	.312	1			
8. Poverty	-.160	-.121	-.222	-.157	-.369	-.340	-.237	1		
9. HH Income	.253	.174	.445	.348	.582	.565	.324	-.668	1	
10.# Children < 18	-.118	-.085	.205	.211	-.157	-.120	-.019	.225	-.082	1

Note: Correlation coefficients > .028 are significant at the 0.05 level (2-tailed), coefficients > .036 are significant at the 0.051 level (2-tailed)

Table 2.6

Effect of Child-Related Conflict Frequency At 9 Months on Child Cognitive Ability at 24 Months, While Controlling for Child Cognitive Functioning at 9 Months (N = 6019)

	Model 1		*Model 2*		*Model 3*	
Variable	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*
Constant	100.82	0.00	107.01	0.00	107.17	0.00
Child-Related Conflict Time 1	-0.54	0.00	-0.4	0.03	-0.37	0.04
Non-Child Related Conflict Time 1	0.42	0.06	0.29	0.18	0.07	0.73
Child Cognitive Ability Time 1	4.55	0.00	4.31	0.00	4.13	0.00
Maternal Responsiveness (NCAST) Time1	1.34	0.00	0.94	0.00	0.5	0.00
Maternal Authoritarianism Time1	-0.9	0.00	-0.53	0.00	-0.27	0.07
Maternal Depressive Mood Time 1	-0.57	0.01	-0.48	0.02	-0.25	0.21
Child Characteristics						
Whether Male			-3.53	0.00	-3.53	0.00
Whether Black			-3.64	0.00	-3.21	0.00
Whether Hispanic			-5.51	0.00	-3.5	0.00
Whether Asian			-1.5	0.00	-2.4	0.00
Whether Pacific Islander			-2.57	0.13	-1.25	0.39
Whether Native Indian			-1.55	0.12	-0.77	0.45
Whether Moderate to low birth weight			-1.57	0.00	-1.44	0.01
Whether Very low birth weight			-4.16	0.00	-4.17	0.00
Whether Twin Status			-1.58	0.00	-1.82	0.00
Whether Higher Order Birth			0.38	0.86	-0.27	0.89
Negative Emotionality Time 1			-0.34	0.02	-0.21	0.15
Parental and Household Characteristics						
Maternal Age Time 1					-0.07	0.78
Paternal Age Time 1					-0.27	0.30
Maternal Education Time 1					1.14	0.00
Paternal Education Time 1					0.42	0.04
Total household income Time 1					0.88	0.00
Whether Married Time 1					0.96	0.08
Marital Satisfaction Time 1					-0.2	0.19
# of household members under 18 Time 1					-0.28	0.08
Whether child in Parental Care only Time 1					-1.03	0.00
Control Variables						
Indicator Variable by Child Age at Assessment Time 1						
Missing Variable Indicators						
Months between Assessments						

Table 2.6b

Effect Of Child-Related Conflict Frequency Indicators At 9 Months On Child Cognitive Ability At 24 Months, While Controlling For Child Cognitive Functioning At 9 Months (N = 6019)

Variable	*β*	*SE*	*t-statistic*	*p-value*
Constant	73.27	4.97	14.74	0.00
R-Square = 0.272				
Whether parents engage in child-related conflict Time 1				
Never (reference category)	-	-	-	-
Hardly ever	-0.23	0.39	-0.59	0.55
Sometimes	-0.83	0.41	-2.02	0.05
Often	-1.34	0.95	-1.41	0.16
Non-Child Related Conflict Time 1	0.07	0.22	0.33	0.75

Note: These results are based on analyses conducted with all model 3 variables presented in Table 2.6

Table 2.7

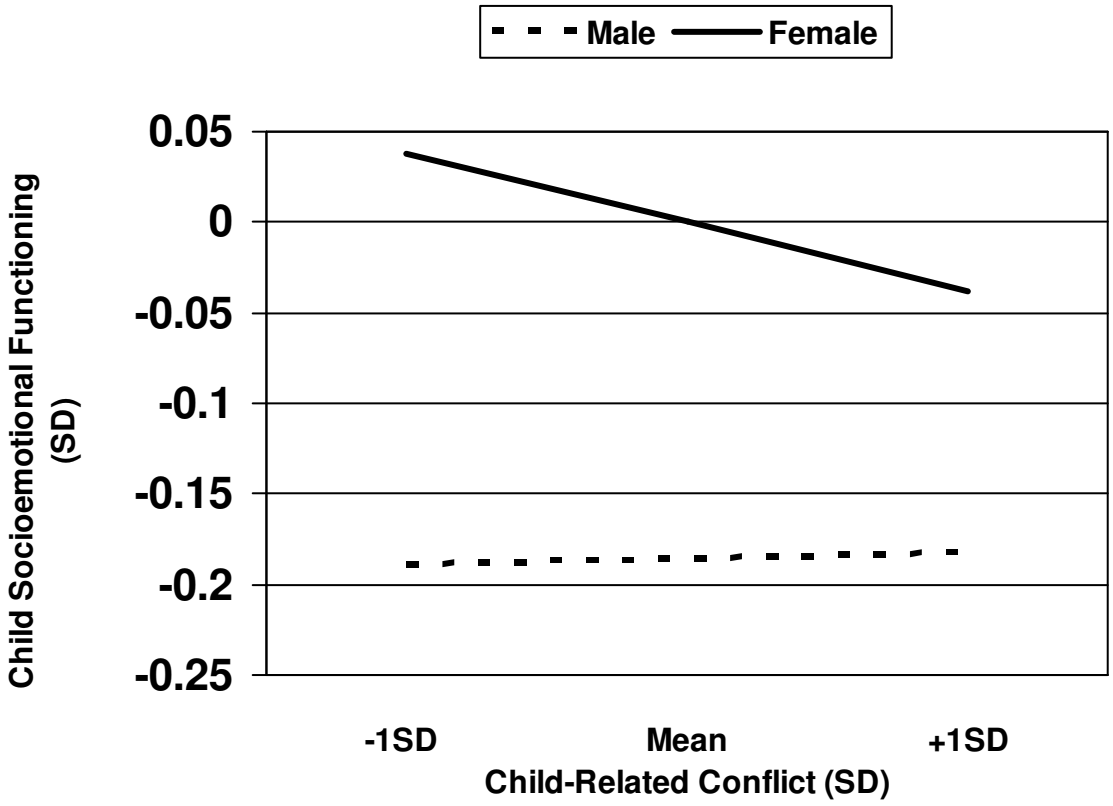
Effect of Child-Related Conflict Frequency at 9 Months on Child Socioemotional Functioning at 24 Months, While Controlling for Child Socioemotional Functioning at 9 Months (N = 6019)

	Model 1		*Model 2*		*Model 3*	
Variable	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*
Constant	-0.75	0.00	-0.58	0.00	-0.67	0.00
Child-Related Conflict Time 1	-0.03	0.06	-0.04	0.13	-0.05	0.07
Non-Child Related Conflict Time 1	0.02	0.13	0.02	0.16	0.02	0.16
Child Socioemotional Functioning Time 1	0.13	0.00	0.11	0.00	0.11	0.00
Child Clarity of Cues (NCAST) Time1	0.01	0.55	0.01	0.51	0.01	0.55
Maternal Authoritarianism Time1	-0.05	0.00	-0.03	0.00	-0.02	0.12
Maternal Depressive Mood Time 1	-0.04	0.00	-0.03	0.01	-0.02	0.14
Maternal Responsiveness (NCAST) Time 1	0.08	0.00	0.06	0.00	0.04	0.00
Child-Related Conflict x Whether Male Interaction			0.04	0.05	0.04	0.01
Child-Related Conflict x NE Interaction			0.00	0.82	0.01	0.76
Child Characteristics						
Whether Male			-0.19	0.00	-0.19	0.00
Negative Emotionality Time 1			-0.01	0.60	-0.01	0.70
Whether Black			-0.09	0.02	-0.07	0.12
Whether Hispanic			-0.17	0.00	-0.06	0.05
Whether Asian			-0.10	0.00	-0.16	0.00
Whether Pacific Islander			-0.11	0.42	-0.04	0.72
Whether Native Indian			-0.03	0.53	0.02	0.71
Whether Moderate to low birth weight			-0.03	0.39	-0.02	0.54
Whether Very low birth weight			-0.07	0.09	-0.06	0.09
Whether Twin Status			-0.11	0.00	-0.12	0.00
Whether Higher-order birth Status			0.16	0.15	0.12	0.29
Child Cognitive Ability Time 1			0.11	0.00	0.11	0.00
Parental and Household Characteristics						
Maternal Age Time 1					0.02	0.23
Paternal Age Time 1					-0.03	0.14
Maternal Education Time 1					0.04	0.01
Paternal Education Time 1					0.04	0.02
Total household income Time 1					0.02	0.14
Marital Satisfaction Time 1					0.01	0.44
Whether Married Time 1					0.10	0.04
Whether child in Parental Care only Time 1					0.01	0.84
# of household members under 18 Time 1					-0.02	0.13

Note: Controlling for Child Age, months between assessments, and missing variable indicators

Figure 2.1

Effects of child-related conflict at 9 months of age on child socioemotional functioning at 24 months of age by child gender



CHAPTER THREE

ANTECEDENTS OF CHILD-RELATED INTERPARENTAL CONFLICT IN TODDLERHOOD IN A NATIONALLY REPRESENTATIVE SAMPLE (ECLS-B): CONTRIBUTIONS OF CHILD NEGATIVE EMOTIONALITY AND WITHIN-PARENT DIFFERENCES IN KNOWLEDGE OF CHILD DEVELOPMENT

ABSTRACT

Using longitudinal data drawn from a nationally representative sample of infants and parents of intact [28] families (ECLS-B), this study focused on examining antecedents of child-related conflict in infancy and toddlerhood. This study examined associations between aspects of child temperament at 9 months of age (i.e., negative emotionality) and the frequency by which parents engaged in child-related conflict at 24 months of age, while exploring the role of environmental factors in the home (i.e., within family differences[29] in parents' knowledge of child development) in moderating the relationship between child negative emotionality at 9 months of age and child-related conflict in toddlerhood. Results indicated that associations between child negative emotionality at 9 months of age (based on report by mothers and trained observers) and child-related conflict at 24 months of age (joint parental report), were significantly moderated by differences in parents' child development knowledge at 9 months ($\beta = .062$, $p = .002$). Parents of children exhibiting higher levels of negative emotionality at 9 months (1 SD or higher above the mean), who reported greater differences in knowledge of child development by 1 SD or more, reported significantly higher frequency of child-related conflict at 24 months, compared to

[28] The term 'intact families' is used here to refer to families who are headed by two romantically involved, co-residing parents (married or unmarried), who may or may not be biologically related to the child

[29] For sake of brevity, the terms *differences in parents' child development knowledge* or *parental differences in child development knowledge* are used to refer to *within* family differences

parents of reporting smaller differences in child development knowledge (-1 SD or lower). This effect was not significant for children with lower or average levels of negative emotionality, for whom greater differences in parents' child development at 9 months of age did not significantly affect the frequency of reported child-related conflict in the home. These associations were found while controlling for levels of prior couple conflict (child and non-child related) and marital satisfaction, parental mood, parenting quality and father involvement, and other child characteristics including child cognitive ability and socioemotional functioning at 9 months of age. There was no evidence to suggest that associations between child negative emotionality at 9 months of age and frequency of *general* conflict at 24 months (e.g., about chores, in-laws, money, sex, other men and women, leisure time, showing affection) were significantly moderated by differences in parents' child development knowledge.

Antecedents Of Child-Related Interparental Conflict In Toddlerhood In A Nationally Representative Sample (ECLS-B): Contributions Of Child Negative Emotionality And Within-Parent Differences In Knowledge Of Child Development

Although associations between interparental discord and child adjustment are well documented (Buhler, Antony, Krishnakumar & Stone, 1997), the pathways that account for these associations remain unclear. Illuminating the underlying mechanisms that account for the associations between interparental discord and child adjustment is challenging in part, because we don't actually know for sure if interparental discord causes child adjustment problems, or if they simply co-occur. Although less frequently explored, it is also likely that bi-directional influences are operative; marital discord may be influenced by the extent to which the child exhibits adjustment problems. In fact, theory and empirical evidence suggest that children are not passive recipients of various environmental influences; children's individual characteristics (e.g., age, temperament, behavior) are recognized as having a major influence (Caspi, 2000) on their environment and development. It is thus conceivable that certain aspects of children's personalities and behavior (e.g. fussiness, demandingness) may spark conflict, among parents, particularly child-related conflict. At the same, whether child-related conflict is associated with 'difficult' child behavior may be affected by other parental and household factors.

Using a nationally representative sample of infants and parents, this longitudinal study examined children's individual characteristics as constituting a potential risk mechanisms which may help explain why, and under which circumstances, some children may be exposed to interparental conflict, while others are not. Of particular interest was to examine the magnitude and nature by which children's *negative emotionality at 9 months* of age contributed to the development of a home environment characterized by frequent *child-related interparental*

conflict at 24 months of age. It was hypothesized that associations between infant negative emotionality and future child-related conflict frequency would be moderated by parental differences in child development knowledge.

Why Study Child-Related Conflict?

Examining under which conditions certain early child characteristics during infancy may evoke child-related conflict in toddlerhood is warranted for various reasons. First, infants and very young children tend to spend a large amount of time in the presence of parents which provides opportunity for child-related conflict to occur, and to have it occur the in the child's presence. Although few studies have examined this, a recent study with older children, Papp, Cummings and Goeke-Moray (2002) found that parental conflict in the presence of children was more likely to be child-related. This is of concern as child-related conflict is likely to be more hostile and emotionally charged (Papp, Cummings and Goeke-Moray, 2002), which may be one explanation for why children are thought to be especially sensitive to child-related conflict (Grych & Fincham, 1990). Exposure to a disproportionate amount of hostile and intense conflict may pose particular challenges during infancy, since it represents a distinct developmental period in children's lives with regard to levels of dependence on parents in regulating emotional and physiological arousal, development of attachment, as well as children's undeveloped ability to make cognitive attributions about negative interactions in the family (Field, 1981; 1994; Bowlby, 1969/1982; Grych, 1990).

In fact, there is prior evidence to suggest that conflict during infancy (particularly intense conflict), has implications for child development in various domains. Owen and Cox (1997) found that chronic marital conflict predicted disorganized attachment behavior with both parents, which was not mediated by parenting quality. They posed that when infants are faced with

interparental conflict, they lack effective behavioral strategies to reduce distress caused by exposure to interparental conflict. As such, the infants' relatively underdeveloped ability to regulate emotional and physiological arousal necessary to reduce stress, and/or cope with it, may over time lead to sensitization to interparental conflict. In fact, there is some evidence to support the sensitization hypothesis showing that a history of exposure to intense conflict was associated with displays of distress to later verbal conflict between adults (DeJonghe, Bogat, Levendosky, Von Eye & Davidson, 2004) as well as lower cardiac vagal tone (Porter, Wouden-Miller, Shizuko Silva, Earnest Porter, 2003). In addition, interparental conflict has been linked to infants' cognitive ability; in a cross-sectional study with 6 month-old infants, higher levels of marital conflict were associated with lower cognitive ability as measured by the Bayley Scales of Infant Development (BSID-II), whereas higher levels of marital harmony were found to be associated with higher levels of cognitive functioning (Porter et. al, 2003).

In addition to consistent links between interparental conflict in infancy and (later) child adjustment, there is some recent evidence suggesting that *child-related* conflict during infancy, may have greater implications for development during toddlerhood than interparental conflict about other, non-child-related issues such as conflict about chores, money, religion, affection, etc. Using information from a nationally representative sample of infants and their parents collected at 9 and 24 months of age (see Chapter 2) results show that child-related conflict at 9 months of age was significantly and negatively related to child cognitive ability at 24 months, even after controlling for couple conflict about other, non-child-related matters, marital satisfaction and child cognitive ability at 9 months of age. Given the findings discussed in this section, it seems reasonable to further examine associations between marital adjustment, child-related conflict and child adjustment. In particular, before we conclude that given that child-

related conflict mediates the relation between marital adjustment and children's behavioral problems (O'Leary & Vidair, 2005; Fincham, Grych & Osborne, 1994; Jouriles, Murphy, Farris, Smith, Richters & Waters, 1991), it is important to examine the reciprocal, bi-directional nature of the aforementioned associations. It is especially important to do so while addressing some of the methodological shortcomings of prior studies which mostly employed cross-sectional design using small, convenience samples thus limiting the consideration of potentially confounding influences.

Contributions Of Negative Emotionality To Interparental Discord

This investigation explores the extent to which child-related conflict at 24 months of age can be predicted by individual differences in child temperament at 9 months. Temperament is defined as constitutionally based individual differences in emotion, motor, and attentional *reactivity* to stimulus events (measured by latency, intensity and recovery response) and *self-regulation* (processes that modulate reactivity) (Rothbart & Bates, 2006). Analysis of temperament factors by Clark and Watson (1999) describe two independent temperament factors, positive emotionality and negative emotionality. Positive emotionality relates to a propensity for positive mood states, high sociability and environmental engagement. Negative emotionality, also referred to negative affectivity, refers to a propensity for negative affect and cognitions, and high levels of perceived stress, encompasses a pattern of reactive behavior including fear, anger/frustration, discomfort and sadness (Ahadi, Rothbart & Ye, 1993; Rathbart, Ahadi, Hershey & Fisher, 2001).

This study investigated if parents, whose 9 month-old children exhibit high levels of negative emotionality (i.e., children who frequently display negative affect, who demand constant attention and company from parents, who frequently fuss, cry and whine), report having

more child-related conflict at 24 months of age, than parents of children who exhibit average, or lower levels of negative emotionality. This seems conceivable, as parents who have highly negative children, may frequently find themselves (either individually or jointly) forced to deal with disruptive and potentially highly arousing behavior. If parents find themselves in disagreement on how to handle such behavior, child-related conflict may ensue. It is plausible that over time, child-related conflict becomes prevalent not only in the context of solving 'momentary' child-rearing challenges, but also more chronically as a function of decreased marital and emotional well-being and increased interparental discord. For example, dealing with a difficult child may lead to feelings of inadequacy about parental competence, and dissatisfaction and disappointment about parenthood may arise. Furthermore, managing a highly negative child may increase time spent on child-rearing, leaving parents with decreased time and energy for spousal discussion and companionship. Furthermore, although it can not be implied that children of parents who disagree about their children always receive inconsistent parenting, the possibility cannot be ignored, and when present, may contribute to additional child behavioral problems (Patterson, 1982).

While no previous studies have examined contributions of child negative emotionality in infancy to general or child-related conflict between parents in toddlerhood, individual differences in child temperament have been suggested as having the potential in affecting the quality of the marital relationship (for review see Cowan & Cowan, 1988). It is however difficult to apply findings of this literature to the realm of child-related conflict, as associations between specific aspects of child temperament and marital adjustment during the transition to parenthood are found to be inconsistent. For example, Belsky and Rovine (1990) found that the *unpredictability* of the infant i.e., irregularity in daily rhythms of eating and sleeping, based on maternal reports

of temperament at 3 months of age, was significantly associated with maternal, but not paternal reports of later marital quality. Similarly, Wright et al. (1986) found that marital adjustment of mothers, three to four months after the birth, was predicted by lower temperamental difficulty. In contrast, using the same measures, Wallace and Gotlib (1990) found that these infant characteristics did not significantly predict marital adjustment at six month postpartum for mothers or fathers.

Inconsistency about the influence of child temperament on the marital relationship may in part be a result of a broad theoretical conceptualization of marital adjustment common in his literature. For example, many of these studies have used marital indices that sum across many dimensions of marital functioning (marital quality, marital satisfaction, quality of communication, conflict tactics). Hence, since marital researchers have begun to speculate that considering specific dimensions aspects of marital functioning may be important for understanding the development of child problem behavior (Jouriles et.al, 1991; Grych & Fincham, 1990), examining the extent to which child characteristics contribute to certain dimensions of marital functioning, such as child-related conflict, seems pertinent. On the other hand, prior research also suggests that the ways in which aspects of child temperament may exert influence over marital adjustment and interparental conflict are likely to be complex and possibly influenced by other aspects of family dynamics, which may include aspects of child-rearing.

The Role Of Parental Differences In Child Development Knowledge

This investigation proposes that the development of child-related conflict among parents of highly negative children is likely to be influenced by parental differences in child development knowledge. There are several ways in which parental differences in child development knowledge may act as a catalyst, increasing the effects of high negative

emotionality on the development of child-related conflict and perhaps general interparental discord. First, assuming that children high in negative emotionality present their parents with more frequent and more difficult problems, it is conceivable that parental differences in child's development knowledge may limit parents' ability to provide consistency (across parents) when dealing with undesirable child behavior. Since highly negative children have difficulties with self-regulation and are more dependent upon external feedback to regulate their behavior and arousal, the inconsistency of external feedback provided by parents of such children may aggravate child problem behavior, which in turn provides additional opportunity for conflict to occur. In addition, differences in parental child developmental knowledge may (directly and/or indirectly) influence parents' well-being in their parenting roles; if parents experience different levels of success in solving child problems, the 'successful' parent may find themselves the more frequent responder and resolver of child problem behavior, which may influence both the way the parents perceive each other and/or themselves with regard to parental competence. Furthermore, rather than recognizing that differences in parenting strategies are a function of differences in child development knowledge, parents may come to perceive their coparent to be unsupportive, which may lead to feelings of resentment and distrust. Such negative perceptions may lead parents to 'dig in their heels' about their preferred approach, thus accentuating differences and conflict about them. Differences in child development knowledge may also mediate parents' ability to avoid, manage and constructively resolve marital discord, through increased emotional and physiologically arousal during triadic interactions. Parents' increased arousal may lead them to be more negative and hostile during triadic interactions, which may also pose particular challenges to highly negative children, who may perceive this type of

emotional climate as more upsetting, compared to children who exhibit low levels of negative emotionality.

Interestingly, no previous studies have examined the extent to which *differences* in parents' child development knowledge may lead to child-related interparental discord. In fact, a review of the child development literature indicated that within family differences in parental *knowledge* of child development have not been examined as a construct of interest. Studies that have examined *knowledge* of child development knowledge as a construct of interest have done so by examining the role of objective level of child development knowledge (e.g., extent to which participants know at which age children reach certain developmental milestones) in the context of adolescent parenting (Tamis-Lemonda, Shannon & Spellman, 2002; Culp, Culp, Blankemeyer, Passmark, 1998; Stern & Alvarez,1992; Seymore, Frotingham, MacMillan & DuRant, 1990; Roosa, 1983) or explored its relevance to early childhood education and care (Lubeck, 2000; Bloch, 2000; Zimilis, 2000; Hearns, 1998). Others have examined the construct descriptively, by exploring the extent to which demographic characteristics predicted child development knowledge, including urbanicity (Sarma, Sing & Sidhu, 198) and race (Sistler & Gottfried, 1990). Only one study examined the construct of *shared* knowledge of child development, by describing the extent to which cultural, familial and generational factors predicted sharing of knowledge between mothers and grandmothers, but not parents (Sistler & Gottfried, 1990).

Parenting Alliance And Parental Agreement-Disagreement

While it may seem somewhat surprising that this construct has been infrequently explored, there is a literature that has examined several constructs that appear at first sight to be similar, or related to the construct of interest in this study. The first construct relevant to this

investigation is the construct of the parenting alliance (Abidin & Brunner, 1995), which concerns the ways in which spouses provide support and show respect for each other in parental roles and how they work together as a copoarenting team (Gable, Belsky & Crnic, 1992). A closely related term, often used interchangeably, is coparenting, which refers to the extent to which husbands and wives function as partners, or adversaries, in their parenting roles (i.e., the extent to which they support or undermine one another's parenting efforts) (Minuchin, 1985; Minuchin, 1974). While the parenting alliance refers the component of marital relationships that pertains to the overall quality of parenting together, the term coparenting is used to describe patterns of parenting behaviors and interactions related to joint problem solving when interacting with their children, and the affective climate during these interactions. Hypothesizing that the parenting alliance should be a more proximal determinant of the quality of parenting than other features of the marriage, the quality of the coparenting relationship was found to mediate the effects of general marital quality on parenting experiences (Floyd, Gilliom & Costigan, 1998).

The second construct relevant for this work is the construct of parental disagreement, also referred to as parental similarity, parental consistency, or shared parenting attitudes. Parental agreement refers to the degree of congruence (i.e., correlation) existing between the descriptions of child-rearing values, goals and practices, independently offered by mothers and fathers (Block, 1965; Block, Block, & Morrison, 1981). Research shows that the extent to which parents have discrepant childrearing-orientations has been associated with subsequent dissolution of the marriage and behavioral problems among children in early childhood (Block, Block & Morrison, 1981). Parental disagreement during early childhood was also found to predict psychological characteristics in adolescence (Vaugh, Block, Block, 1988). However, a recent study suggested that effects of parental agreement about child-rearing values, beliefs and practices on child

characteristics and/or family functioning may have been confounded with parenting quality (Deal, Halverson and Wampler; 1989). For example, Deal, Halverson and Wampler (1989) found that while parental agreement was associated with family functioning, it rarely predicted family functioning when parental effectiveness was controlled. In addition, when the quality of parenting was controlled, differences in child-rearing views and differences in use of discipline strategies were not significantly associated wit child behavior problems.

Why Study Differences In Child Development Knowledge?

This study's focus on examining contributions of parents' differences in child's development knowledge, complements the research on parental alliance and parental agreement in the following ways. This author views differences in child development knowledge among parents as a parental characteristic which may potentially influence the nature and quality of the parenting alliance, rather than constituting a component of it. This is supported by the notion that measures of the parenting alliance in previous work focus on parents' perceptions of the characteristics of the alliance (e.g., degree of mutual respect and support, satisfaction with shared values and goals for parenting, the extent to which the parent feels that the other is critical of his or her parenting actions) while parents' objective knowledge, or differences in knowledge are not assessed. While this study does not directly test whether differences in parents' child development knowledge predict the quality of the parental alliance, this study provides additional understanding about potential antecedents informing the emergence of the parental alliance, by examining child-related conflict. Examining contributions of differential knowledge of child development to child-related conflict specifically is useful, since dyadic satisfaction and consensus, positive communication, negative reciprocity, and spousal criticism reflecting the quality of the parental alliance, are likely to be a function of *how* parents act when they disagree,

rather than whether or not disagreement occurs. In contrast, this study may help us understand, which conditions may contribute to the frequency by which child-related conflict occurs. As such, this study brings greater specificity to examining associations among marital functioning, parenting and child adjustment.

In addition, this study's focus on differences in child development knowledge is likely to have distinctly different implications for intervention, compared to a study that focuses on parental agreements on child-rearing orientations. Differences in child's development knowledge among parents are measured through comparing parents' endorsements of clear-cut, unambiguous statements about developmental abilities of children in various domains, which are based on prior child development research. As such, parents' endorsements about children's abilities also reflect parents' objective level knowledge of child's development. Because actual levels of knowledge and differences in knowledge are quantifiable and objective, both can be changed; theoretically, differences in parental knowledge of child development can be reduced by providing both parents with the same information, while objective level of knowledge can be increased through providing parents with (correct) information. Both of these changes are likely to have positive consequences for parents, children and family functioning.

This is in sharp contrast to the construct of parental agreement, which is based on the extent to which parents endorse a similar set of inherently subjective statements about parental socialization attitudes and values (PAI; Block, Block & Morrison, 1981; CRPR, Block, 1965). Parents are asked to endorse the extent to which they engage in certain parenting behaviors (e.g., discipline practices, supervision, expression of affection) as well as share cognitive attributions about parenting and parenthood ('I wish my child's did not have to grow up so fast,' 'I feel a child should have time to think daydream and even loaf sometimes'). Longitudinal research has

also found high intraindividual stability of childrearing attitudes, as well as high stability of parental agreement-disagreement, despite changes in the child, the family and its composition (Roberts, Block & Block, 1984). Although no intervention studies have compared the extent to which differences in child development knowledge and differences in childrearing values can be significantly altered through intervention, efforts from parenting interventions (Carter, 1996) suggest that changing parenting attitudes and behavior may be more difficult to accomplish than providing parents with objective child development information.

Research Questions And Hypotheses

In sum, the current study was designed to answer the following research question: 1) Does child negative emotionality at 9 months predict child-related conflict at 24 months, or are associations between child negative emotionality at 9 months and child-related conflict at 24 months of age moderated by differences in parents' child development knowledge at 9 months of age? While not considered primary research questions, the following research questions reflect the study's effort to discount alternative explanations. 2) Is the effect of differences in parents' child development knowledge on the association between child negative emotionality at 9 months on later child-related conflict truly specific to interparental differences in child development knowledge, or might it be explained by differences between parents in other domains e.g., differences in general education, differences in perceptions of child - related conflict, differences in perceptions of general conflict and marital satisfaction, and differences in aspects of parental involvement? 3) Is the effect of differences in parents' child development knowledge on the association between child negative emotionality at 9 months and later child-related conflict specific to child negative emotionality or might other child characteristics i.e., child cognitive ability, child socioemotional functioning and child gender play a similar role as child negative

emotionality? 4) Is the association between child negative emotionality at 9 months and later *general* conflict also moderated by differences in parents' child development knowledge?

Based on empirical and theoretical findings presented in the previous section the following hypotheses are proposed: 1) Child negative emotionality at 9 months of age will not be significantly associated as a main effect with child-related conflict at 24 months of age, when child-related conflict at 9 months is controlled, but instead 1b) Associations between child negative emotionality at 9 months of age and child-related conflict at 24 months of age will be significantly moderated by differences in parents' child development knowledge, when child-related conflict at 9 months is controlled, with higher levels of child-related conflict in families with higher negative emotionality and higher differences in parents' child development knowledge, and 2) Associations between child negative emotionality and child-related conflict at 24 months of age will not be moderated by differences among parents in general education, differences in perceptions of child - related conflict, general conflict and marital satisfaction, and differences in aspects of parental involvement, and 3) Associations between differences in parents' child development knowledge and child-related conflict at 24 months of age will not be significantly moderated by child cognitive ability, child socioemotional functioning or child gender and 4) Associations between child negative emotionality at 9 months of age and *general* conflict at 24 months will not be moderated significantly by differences in parents' child development knowledge.

Method

Data Source

Data were derived from the Early Childhood Longitudinal Study - Birth Cohort (ECLS-B) which is conducted by the National Center on Education Statistics (NCES). The ECLS-B

sample was selected using a clustered, list frame sampling design; the list frame was registered births in the National Center of Health Statistics (NCHS) vital statistics system. Births were sampled from 96 core primary sampling units (PSU's) representing all infants born in the United States in the year 2001. PSU's were counties and county groups and sampling was based on occurrence of the birth as listed on the birth certificate.[30] While ECLS-B participants are followed from birth through entry into kindergarten, information for this study was collected from children and their parents during two rounds of data collection, when the children were about 9 months (N = 10,688), and again at about 2 years of age (N = 9,850). Experiences of children included in the ECLS-B sample are representative of approximately 3.9 million children born in the United States in 2001.[31]

Procedure

Parent/guardian data were collected at 9 and 24 months through computer-assisted, personal interviewing in the home (CAPI), and respondents was asked to complete a self-administered questionnaire (SAQ). The ECLS-B study design called for the child's biological mother to be the respondent for the parent instruments whenever possible, although respondents included fathers, stepparents, adoptive parents, foster parents, grandparents, relatives and non-relative guardians.[32] Respondents were asked to provide information about the child themselves, the home environment, parental characteristics and attitudes, and family characteristics, and answered questions regarding family structure and relationship functioning, parent emotional functioning and household income. The parent interviews were conducted primarily in English,

[30] Sampled children subsequently identified by the state registered as having died or who have been adopted after the issuance of the birth certificate were excluded from the original ECLS-B sample. Infants whose birth mothers were younger than fifteen years old at the time of the child's birth were excluded in response to state confidentiality and sensitivity concerns.

[31] A succinct summary of the ECLS-B is provided by NCES and can be found at www. http://nces.ed.gov/ecls/Birth.asp

[32] Only respondents who were resident mothers were included in this sample, which included biological mothers, and adoptive, foster and stepmothers.

but provisions were made to interview parents who spoke other languages [33]. During the home-visits, trained observers also assessed children's developmental skills and attributes in cognitive and socioemotional domains, and assessed the quality of parent-child interactions. Information on the date of birth, birth weight, gender, plurality (whether the child was part of a multiple birth) and prematurity, information on parents' age, education, race and ethnicity, and mother's marital status at birth were obtained from the child's birth certificate and verified or supplemented with information from the interview and questionnaires.

Sample

The sample for this study was drawn from the ECLS-B sample based on various selection criteria. Children were included if their resident mother (biological or non-biological) had completed the computer-assisted personal interview (CAPI) at both the 9 and 24-month data collections and if data from the self-administered questionnaire (SAQ) at both the 9-month and 24-month data collection was available from the child's resident mother and resident father. Since this study examined the role of early child temperament and differences in parental knowledge and involvement in predicting child-related conflict at 24 months in intact families, only children of parents who reported on relationship functioning and interparental conflict with the same resident spouse/ romantic partner from birth through the 9 and 24-month data collection period were included, regardless of the parents' marital status and/or their biological relatedness to the child. This resulted in a base sample of (N = 3758) children.

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[33] Approximately 8 percent of the Parent CAPI Instruments were conducted in a language other than English; about 79 percent of these non-English interviews were conducted in Spanish by bilingual field interviewers. Most interviews in other languages were conducted with the aid of interpreters or by interviewers who received special training. One-tenth of 1 percent of the parent interviews could not be conducted because of language problems (e.g., respondent and family spoke Bengali and no interpreter was found; respondent spoke an unknown Asian language and no interpreter could be found).

Descriptive statistics on child, parental and household characteristics from participant and non-participant couples, along with significance tests for differences between those two groups, are presented in the text[34]. Statistics indicated that couples included in our sample were slightly more advantaged than non-participant couples based on some demographic characteristics; participant couples (M = 58,874, SD = 44.93) were more likely than non-participating couples (M = 51,781 SD = 38.44) to report a higher total household income *(t* [7161] = 2.938, p = .004). However, while mothers (M = 13.39, SD = 2.83) in our sample reported having completed more years of education *(t* [7161] = 3.48, p = .001) than non-participant mothers (M = 12.59, SD = 3.55), fathers included in the study (M = 13.24, SD = 3.07) did not obtain significantly more years of education *(t* [7161] = 1.40, p = .165) than non-participant fathers (M = 12.89, SD = 3.40). There were also no significant differences between participating and non-participating children in parents' marital status, maternal or paternal age, or the likelihood of the child being male.

Participants

Participants who met the inclusion criteria were 3758 infants (51.6 % male) and their resident parents, 86.1 % of whom were married at the time of the 9-month assessment. The vast majority of participant children were living with their biological mother and biological father (98.7 %), while approximately 1% of children lived with their biological mother and a biologically, unrelated father-figure i.e., stepfather (.2 %), adoptive father (.2 %) or their mother's live-in partner (.7 %), and small percentage of children lived with two adoptive parents

[34] Since the sample of children born in the United States during 2001 was only one of many possible samples of 2001 births that could have been selected, the sample data are weighted. The weights adjust for unequal selection probabilities at the child level (i.e., over sampling for twins and low-birthweight), as well as for probability of unit non response to the parent interview in both rounds. For all analyses, including descriptives, replication methods of variance estimation were used to reflect the actual sample design and sample selection; a form of the jackknife replication method (JK2) using 90 replicate weights were used to compute approximately unbiased estimates of the standard errors of the estimates, using AM Software version 6.0.

(.2%). The subsample that is the focus of this study is 63.3% white – non-Hispanic, 22.8% Hispanic, 6.3% Black, 3.1 Asian, 3.4% Multiracial and 3.1 Asian, 1% American Indian and/or Pacific Islander[35].

At the 9-month data collection, children in our sample had a mean chronological age[36] of 10.3 months (R = 6.2 - 21.6, *SD* = 1.79) and a mean age of 24.2 months of age at the 24-month data collection (R = 20.1 - 37.7, *SD* = .95). Most of the children (85.0 %) were between 8 and 11 months at the 9-month data collection; a small percentage (.7 %) were assessed before they were 8 months old, 5.3 % completed the 9-month assessment in the 12th month of life, and 9.0 % were assessed when they were 13 months or older. At the 24-month data collection, 94.7 % of children were within the target range of 23–25 months; 1.5% was assessed before they were 23 months old and 3.8 % of children were assessed at ages 26 months and older.

Dependent Variable

Child-Related (Interparental) Conflict was measured at the 9-month and 24-month data collection using a self-administered questionnaire (SAQ). Mothers and fathers both were asked to indicate on a 4 - point scale (from 1 = often to 4 = never) how often they and their partner argued about their children. Scores for each data collection period were reversed to reflect greater levels of child-related conflict with increasing scores. Scores from the 24- month data collection were averaged across mothers and fathers to derive at a joint score for child-related conflict at 24 months. Individual child-related conflict scores for each mother and father obtained at the 9-month data collection were entered into the regression to control for prior child-related conflict.

Primary Variables of Interest

[35] Note that both ethnicity and race were considered in analyses
[36] Note that child age at 9 months in the analyses was adjusted for prematurity

Child negative emotionality scores were based on mother- reports of child temperament and observed temperament ratings by trained interviewers. Mother-reported temperament was ascertained during the parent interview using seven items of the Infant/Toddler Symptom Checklist (ITSC; DeGangi, Poisson, Sickel & Wiener, 1995). The parent was asked to rate the extent to which the child is 'fussy or irritable', 'goes from whimpering to crying', 'demands attention and company', 'wakes up 3 or more times', 'needs help falling asleep', 'is startled by loud noises', and 'cries for food or toys.' The parent could respond never, used to be, sometimes, or most times. Scores were subjected to a principal component factor analyses with varimax rotation and a single composite score for mother reported negative emotionality was derived by averaging unit weighted variables that loaded on the negative emotionality factor (i.e., fussy or irritable, goes from whimpering to crying, demands attention or company, cries for food or toys). Coefficient alpha was = .73 suggesting good internal consistency. This score was standardized and later combined with scores for observed emotionality described in the following section.

To calculate observed negative emotionality, a subset of items drawn from the Behavioral Ratings Scale (BRS; Bayley, 1993) was used, which is a supplementary component of the Bayley Short Form – Research Edition (BSID – II; Bayley, 1993) completed to characterize the infants' behavior while participants completed the Bayley to measure of infant cognitive development. Note that the observed emotionality ratings were completed by the interviewer after the home visit was completed. Using a 5-point scale incorporating both the intensity and frequency of the target behavior, interviewers completed 7 ratings of child behavior including the child 'displays positive affect', 'displays negative affect', 'is adaptable to a change in materials', 'shows interest in materials', 'pays attention to tasks', 'displays social engagement' and 'shows

control of movements.' A principal components analysis of these ratings indicated three components were necessary to reproduce the associations among the ratings. Components captured positive affect (displays positive affect, shows interest in materials, pays attention to tasks, displays social engagement), and negative affect (displays negative affect, extent to which is adaptable to a change in material) and the third factor motor control (showing control of movements). Composite scores for observed negative and positive affect were created keyed in the direction of negative affect and scores were standardized. For the sake of simplicity of presentation, mother-reported and observed scores of child negative emotionality were combined into a single composite which was used for regression analyses[37].

Difference in Parental Knowledge of Child Development was assessed during the parent interview for mothers and through completion of the self-administered father questionnaire. Each parent was asked to endorse a series of 4 statements about general child development including 'all infants need the same amount of sleep', 'a young brother or sister may start wetting the bed or thumb sucking when a new baby arrives in the home', 'a child thinks they are speaking correctly even when he or she says words and sentences in an unusual way (example given)', and 'children learn all of their language by copying what they have heard adults say.' Each parent indicated whether they agreed or disagreed with the statement or whether they were not sure. In addition, each parent was asked to endorse 7 additional statements about the age at which young children attain certain abilities or concepts in moral, cognitive, language, motor, play and social development domains by indicating whether they agreed, disagreed, or were unsure, and if they disagreed, to indicate whether the child was older or younger than indicated by the statement. Statements included 'a baby knows right from wrong at 1 year of age', 'a baby will begin responding to his or her name at 10 months', 'most infants are ready for toilet training at 1 year

[37] Results using only mother-reports of child negative emotionality were similar

of age', 'a baby of 12 months can remember toys he has watched being hidden', 'one-year-olds often play and share things when they play together, 'a baby is about 7 months before they can reach for and grab things', and 'a baby usually says his first real word by 6 months of age.'

I first compared parents' answers on each of the eleven statements and assigned indicator variables indicating whether parents differed (0 = parents agreed,1 = parents differed). Next, a total difference score for each couple was calculated by summing the number of times parents made divergent statements after which a standardized was calculated.

To examine the extent to which each parent's *objective* level of knowledge about child development (i.e., whether the statement identified by the parents was correct or incorrect) may influence the frequency of future child-related conflict, a score for (objective) child development knowledge was created for each parent by given each parent one point for each *correctly endorsed* statement. For example, a parent who indicated that a child is likely to be older than 1 year of age before having the ability to know right from wrong was given a 1-point score for this 'correct' answer, whereas a parent who mistakenly indicated that a child younger than 1 year of age had the ability to know right from wrong received zero points. Scores for each parent were summed across the eleven items and standardized reflecting higher scores for greater child development knowledge.

Additional Independent Variables: Parental Involvement And Parenting

Various aspects of *parental involvement* were assessed using the parent interview for mothers, and the self-administered questionnaire for fathers. Since the nature and content of questions regarding parental involvement varied between mothers and fathers, I will first describe how various aspect of involvement were assessed, followed by a description and rationale for calculating composite variables.

Mothers and fathers were both asked [38] how often (1 = more than once a day, 2 = about once a day, 3 = a few times a week, 4 = a few times a month, 5 = rarely, and 6 = not at all) they engaged in various play activities with their child in the past month, including 'play peek-a-boo', 'tickle or move their legs/arms around in playful way', and 'take child for a walk, to the park or playground.' Scores of these 3 items were reverse scored and averaged for each parent reflecting higher scores for greater *parental play*.

Mothers were asked how often (1 = not at all, 2 = once or twice, 3 = 3 to 6 times, and 4 = every day) they or any other family members engaged in various cognitive stimulation activities with their child in a typical week, including 'reading books to your child', 'tell stories to your child', 'sing songs', and 'take child along when doing errands.' Fathers were also asked about these activities but they were asked to indicate how often they themselves engaged in these activities in a typical week. Scores of these 4 items were averaged across parents resulting in a variable for *cognitive stimulation*. Scores for cognitive stimulation were z-scored and combined with standardized scores of parental play to derive at a total *parental involvement* score for each couple reflecting higher scores for greater parental involvement.

Fathers, but not mothers, were also asked how often (1 = more than once a day, 2 = about once a day, 3 = a few times a week, 4 = a few times a month, 5 = rarely, and 6 = not at all) in the past month they engaged in 7 daily care activities including 'changing diapers', 'preparing meals or bottles', 'feeding the child', 'holding the child', 'putting the child to sleep', 'washing or bathing the child' and 'dressing the child.' Scores of these 7 items were reverse scored and averaged across to derive at a *paternal daily care* score for each father, with higher scores reflecting greater involvement in daily care.

[38] These are the only *identical* involvement-related questions

Fathers, but not mothers, were also asked when 'things happen or need to be done' how often (1 = always, 2 = often, 3 = sometimes, 4 = rarely and 5 = never) are they the parent who does the following: 'getting up when child wakes at night', 'soothing the child when upset', 'taking the child to the doctor', 'staying home when the child is ill' and 'taking the child to or from sitter or center.' Scores of these 5 items were reverse scored and averaged across to derive at a *crunch time involvement score* for each father, reflecting higher scores for greater involvement. In the father questionnaire, fathers also indicated how many hours per month they take care of the child without the mother present. Because the variable was extremely highly skewed due to outlier values, values were z-scored and winsorized at 3.5 standard deviations above and below the mean. Z-scores for fathers' daily involvement, crunchtime involvement and total hours of independent care were averaged to derive at a single composite score for *father involvement*.

Maternal Parenting

Maternal responsiveness at 9 months was assessed using the parent scale of the Nursing Child Assessment Teaching Scale (NCATS), which is part of a larger parent-child observation and intervention system called the Nursing Child Assessment Satellite Training (NCAST; Barnard, 1978). The version used for the 9-month ECLS-B assessment consists of a videotaped parent-child interaction during which the parent is asked to teach the child a task - such as stacking blocks - that is slightly beyond the child's current abilities. Coders rated videotaped parent behavior to derive scores for 4 subscales describing the caregiver's sensitivity to the child's cues ($\alpha = .19$), the caregiver's response to the child's distress ($\alpha = .59$), the caregiver's social-emotional growth fostering ($\alpha = .40$) and the caregiver's cognitive growth fostering ($\alpha = .58$) (Sumner & Spietz, 1994). Because the internal reliability of the individual subscales was

low, the total parent score (α = .74) was used for the analyses predicting child-related conflict. A high score on the parent scale indicates that the parent is responsive to the child cues and needs, and provides a supportive learning environment.

Maternal authoritarianism at 9 months[39] was assessed during the parent interview by asking respondents to identify statements about five different child-rearing topics, based on the extent to which the statement matched their values on childrearing. For example, mothers were asked to choose between 'you can spoil a baby when you pick him up every time he/she cries' versus 'you cannot spoil a bay baby by picking him/her up every time he/she cries,' and 'it is important to see that a young child does not form bad habits' and 'most mothers nowadays let their children get away with too much.' Indicator variables for each authoritarian statement were created (e.g. 'whether beliefs a baby can be spoiled by picking up crying baby' etc., (1 = yes, 0 = no) and scores across the five items were summed for each respondent to create a continuous score for authoritarianism ranging from 0 = low to 5 = high.

Child characteristics in cognitive and socioemotional domains were assessed during the home-visit by highly-trained field interviewers. The child mental scale of the Bayley Short Form Research Edition (BSF-R), which is shortened version of the Bayley Scales of Infant Development-II (BSID-II; Bayley, 1993) was used to represent children's *cognitive ability* including early communication skills, expressive and receptive vocabulary, listening comprehension and early problem solving skills[40].

Socioemotional development was assessed using the child scale of the Nursing Child Assessment Teaching Scale described previously (NCAST; Barnard, 1978). A trained and

[39] These questions were not asked from fathers which is extremely unfortunate, as it would have allowed for the calculation of a score reflecting parental agreement of childrearing orientations which would have allowed me to estimate the extent to which differences in *knowledge* are independent from difference in *values* (see introduction)
[40] See Appendix A for details comparing structure of BSF-R to original BSID-II.

certified coder rated the quality and quantity of various child behaviors with a focus on the quality of interaction between parent and child, rather than the child's success or failure at learning the task. A high score on the child NCATS scale ($\alpha = .63$)[41] indicates that the child is communicating clearly with the caregiver and responds adaptively to the caregiver's cues.

Using data from the birth certificate, indicator variables were created for children's gender (*whether male*), as well as children's birth status (*whether the child was part of a single birth, whether part of twin birth,* and *whether part of higher-order birth* (e.g., triplets, quadruplets). Birth certificate information was also used to create indicator variables for children's birth weight (i.e., *whether normal* - greater than 5.5 pounds, *whether moderately low* - between 3.3 pounds to 5.5 pounds, or *whether very low* - less than 3.3 pounds). Parents were also asked to indicate their child's health status on a 5-point scale (from 1 = excellent to 5= poor) which was used to control for child health problems, reflecting higher scores for increased *health problems*.

During the parent interview, respondents indicated that the child belonged to one or more of 14 race categories, as well whether the child was of Hispanic or Latino origin. From this information, indicator variables for children's race/ethnicity were created (*whether White (reference category), whether Hispanic-White, whether Black, whether Hispanic-Black, Hispanic – no race specified, Hispanic – Multiracial, Asian, Pacific Islander, American Indian, Multiracial*).

Age differences at the time of the 9 month assessment and potential effects of prematurity (i.e., when children were born at least 21 days early) were controlled. The amount of prematurity

[41] Coefficient alphas reported in this section are based on averaging alpha values obtained from ECLS-B coders with those calculated by NCAST coders who conducted reliability coding (see Table 16 in Andreassen, & Fletcher; 2005)

was subtracted from the child's chronological age at assessment and indicator variables were created based on *child-prematurity-adjusted-assessment-age*, each representing approximately 10 % of the population (1 = Lowest through 8.5 months of age, 2 = 8.6 - 8.8 months of age, 3 = 8.9 - 9.1 month of age etc.). Analyses were conducted using category 1 as the reference category. In addition, to control for children's age at the 24-month assessment, *the age-difference in months* (Time 2 – Time 1) between the two assessment periods was calculated and entered into the model.

Parental Relationship Functioning was assessed using the self-administered questionnaire at 9 months; mothers and fathers were asked how frequently (on a scale from 1 = never to 4 = often) they argued about nine topics including chores and responsibilities, money, not showing love and affection, sex, religion, leisure time, drinking, other men or women, and in-laws. Scores obtained were reverse scored and averaged across the nine items to derive at a composite variable for *General Interparental Conflict* at 9 months for mothers ($\alpha = .76$) and fathers ($\alpha = .73$) with higher scores reflecting increased general conflict frequency. Marital satisfaction at 9 months was assessed through the self-administered questionnaire by asking mothers and fathers to rate if their marriage/ relationship is 'very happy,' 'fairly happy,' or 'not too happy.' Scores for each mother and father were reverse scored reflecting higher scores for increased *marital satisfaction*. Using information from the parent interview, an indicator was created *whether married* at 9 months which is used to control for family structure.

Maternal And Paternal Depressive Mood at 9 months was assessed for each parent using the self-administered questionnaire, using a modified version of the Center for Epidemiologic Studies' Depression Scale (CES-D; Radloff, 1977), which assesses the frequency and duration of symptoms associated with depression in the preceding week. Mothers and fathers were asked to

rate the extent to which they had experienced 12 symptoms of depression (i.e., not being able to shake off the blues, even with help from family and friends, feeling sad), anxiety (i.e., feeling fearful, trouble keeping mind on what they were doing) and somatization (i.e., experiencing restless sleep, loss of appetite), within the past week to be rated on a 1 to 4 metric (1 = less than 1 day to 4 = most or all of 5-7 days), with higher scores indicating more severe depressive symptoms. Raw scores were reversed where necessary and summed, reflecting higher scores for increased depressive mood. Chronbach's coefficient alpha in our sample was .85 for mothers and .84 for fathers, suggesting excellent internal consistency.

Parental and Household Characteristics were obtained during the parent interview at 9 months including age of each resident parent (*maternal age* and *paternal age*), as well each resident parents' highest level of *education* in years (ranging from 0 = no formal education to 17 = 5 or more years of college). The information about *total household income* was collected in the 9-month parent interview by asking broad-range and detailed-range income questions of all respondents from which a composite variable was created using thirteen income levels ranging from $5,000 or less to $200,000 or more. To create a more easily interpretable (continuous) income variable for each participant, midpoints for each income level were calculated which were subsequently divided by 1000. Respondents were also asked to indicate the *number of household members under 18 years* of age and an indicator variable was created to indicate *whether the child primarily received parental care* or whether the child was receiving childcare by a non-parent caregiver. Fathers were asked to indicate whether they paid child support to children living outside the home. An indicator variable was assigned to indicate whether the child was exclusively in the care of parents (0 = no, receive some non-parental care, 1 = receives

parental care only).

General Analytic Plan

Analyses proceeded in several steps. I first prepared descriptive statistics for all dependent and independent variables, including individual constructs and items, and composite variables. I then conducted a series of independent samples t-tests to examine if there were statistically significant differences in the mean levels of dependent and primary independent variables of interest by child, parental and/or household characteristics. Following this, I calculated simple correlations among the primary constructs of interest.

To answer the research questions, I conducted a series of hierarchical lagged dependent regression analyses according to the following steps: In the first model, I examined the direct (lagged) effects of the main variables of interest (i.e., child negative emotionality at 9 months, parental differences in child development knowledge at 9 months) on child-related conflict at 24 months. These effects were estimated while simultaneously examining whether the lagged effects of negative emotionality at 9 months on child-related conflict in toddlerhood were exacerbated or attenuated by parental differences in child development knowledge, by including an interaction term of child negative emotionality at 9 months and differences in child development knowledge at 9 months in the model. Taking into consideration that rates of change may depend on couples' previous engagement in child-related conflict, analyses in Model 1 were conducted while controlling for maternal and paternal reports of prior child-related conflict at 9 months, as well as other aspects of couple relationship functioning including general, non-child-related conflict and marital satisfaction. Furthermore, including the outcome at Time 1 captures unobserved heterogeneity in couples that exist up to that point that may contribute both to child negative emotionality , differences in parental knowledge of child development, and to

interparental conflict about children at 24 months of age. Next, in Model 2, important child characteristics were added while parent and household characteristics were added in Model 3[42]. I then conducted F-tests to examine if the interaction term added significance variance to the direct effects model and examined significance levels by testing the simple slopes of interactions.

The next analysis was done to test the specificity the results derived from aforementioned analyses. In Model 4, I verified whether the significant effect of the interaction of differences in parents' child development knowledge on the association between child negative emotionality at Time 1 on child-related conflict at Time 2, was indeed based on *differences in child development knowledge*, rather than on *differences among parents in other domains*. In other words, does child-related conflict at 24 months of age increase because higher levels of negative emotionality poses greater challenges to parents with increased differences in childrearing knowledge? Or, do differences between parents' in child development knowledge reflect other underlying differences between parents - across other domains - which may potentiate child-related conflict through 'spillover' of non-child-related discord among parents? Hence, to test the robustness of the interaction effect found in Model 1, 2, and 3, I calculated interaction terms between negative emotionality at 9 months and various parental difference indicators at 9 months[43] including, differences in levels of parental (play) involvement, differences in parental education, differences in parents' perception about general conflict frequency, differences in parents' perception about child-related conflict and differences in parents' perceptions of marital satisfaction. These variables were entered into the model (while simultaneously estimating their direct effects), to examine if the effect of the interaction between negative emotionality and

[42] Each of the variables included in the presented models were measured at 9 months
[43] Difference indicators were chosen based on availability of parental reports and their potential influence on conflict frequency

difference in child development knowledge effect remained significant, and, whether adding these terms significantly improved the model's explanatory power.

Similarly, in Model 4 I also verified whether the significant effect of the interaction of differences in parents' child development knowledge on the association between child negative emotionality at Time 1 on child-related conflict at Time 2, were possibly the result of other 'challenging' child characteristics, such as whether male, lower cognitive ability and/or lower socioemotional functioning at 9 months. Do high levels of child negative emotionality constitute a unique challenge to parents with different levels of child development knowledge or do lower cognitive ability and socioemotional functioning in the same context (i.e., difference in child development knowledge between parents) constitute similar risk factors for the development child-related conflict? To examine this, I calculated an interaction term for child cognitive ability and differences in parental child development knowledge, as well as for differences in parental child development knowledge and child gender and child socioemotional functioning, and added them into the model simultaneously to examine the extent to which they altered previous estimates of the interaction effect between negative emotionality and difference in child development knowledge. Testing this increases confidence in previous results by reducing the chance that the role of negative emotionality (which is partially based on maternal report) may be over or under-estimated by shared variance with child gender, child cognitive ability and/or socioemotional functioning. In addition, if child functioning in these domains significantly alters the association between differences in child development knowledge and child-related conflict at 24 months, and/or is found to have significant moderating effects independently, it cast some doubt on the notion that differences in parental child development knowledge exacerbate child-

related conflict related through coparenting challenges related specifically to high negative emotionality.

Understanding which child characteristics (indirectly) contribute to the development of child-related conflict matters, because the implications for child-related conflict and potentially future child outcomes vary; child functioning in cognitive and socioemotional domains at 9 months of age has only recently begun to emerge and as such may have greater potential for change through maturation, compared to negative emotionality, which is thought to be well established by 9 months age and considered to more stable over time[44]. In other words, moderating effects of parents' differences in child development knowledge on the association between cognitive and socioemotional functioning and child-related conflict at 24 months of age, may be present i.e., specific to a short time-period - which can be 'outgrown' , whereas moderating effects of parents' differences in child development knowledge on the association between negative emotionality and child-related conflict (or gender) may be more likely to pose ongoing 'risk' to the development of child-related conflict, and as such, may influence implications of these findings with regards.

Last, I hypothesized that the moderating effect of differences in developmental knowledge should be greater for child-related conflict at 24 months of age, than in moderating the association between child negative emotionality and general, non-child-related conflict at 24 months of age, even though associations among these variables are significant. Hence, I conducted a lagged-dependent variables analysis using the same models described previously, to predict joint report of parents' general, non-child related conflict at 24 months and verified that the interaction effect was not significant in this model.

[44] Findings of studies that have examined the stability of negative emotionality are mixed and will thus be referred to in more detail when discussing the results

Result

Descriptive Statistics

The means and standard deviations of the primary dependent and independent variables included in the analyses are presented in Table 3.1. Next, independent samples t-tests were conducted to examine statistically significant differences in primary dependent and independent variables by child, parental and household characteristics. Mean level of couple reports of child-related conflict at 24 months was relatively low (M = 2.26, SD = .69); respondents reported on a scale (from 1 = never to 4 = often), that they hardly ever or sometimes argued about their children. Mothers reported slightly higher mean levels of child-related disagreements (M = 2.28, SD = .85) than fathers (M = 2.23, SD = .84), but these differences were not statistically significant. Mother and father report on child-related conflict were positively associated (r = .327, p = .000). Mean level of general, non-child-related interparental conflict at 24 months was relatively low also (M = 1.86, SD = .42) and no significant differences were noted. Respondents indicated that when they did argue, the three topics they were most likely to argue about, were 1) chores and responsibilities (M = 2.51, SD = .70), 2) money (M = 2.42, SD = .75) and 3) their children (M = 2.26, SD = .69).

Parents of boys (M =*2.29*, SD = .684) reported higher levels of child-related conflict at Time 2 than did parents of girls (M = 2.22, SD = .671) *(*t [3757 = 2.516, p = .0014). Parents whose children were White, reported lower frequency of child-related conflict (M = 2.22, SD = .643) *(*t [3757) = 3.385, p = .001) compared to those whose children were not White (M = 2.33, SD = .744).

Differences between parents levels of child development knowledge were found by child race as well; parents whose children were White reported less such differences (M = -.100, SD = .959) than parents whose children were not White (M = .052, SD = 1.61); *(t* [3757) = -3.383, p = .001). Parents of boys did not have significantly greater differences in child developmental knowledge than parents of girls. Married parents (M = -.069, SD = .986) reported significantly lower differences in child development knowledge than parents who were not married (M = .110, SD = 1.074).

Several statistically significant differences were noted in levels of child negative emotionality [45] by child and household characteristics. Children whose parents were married (M = -.024, SD = .986) had significantly lower levels of negative emotionality *(t* [3757] = 2.253, p = .027) than children whose parents were not (M = .138, SD = 1.057). Children with normal birth weight (M = .135, SD = 1.013) had significantly lower levels of negative emotionality *(t* [3757] = -2.144, p = .035) than children who did not (M = -.008, SD = .999) and these differences were especially pronounced for children with very low birth weight (M = .193, SD = 1.014; t [3757] = -3.039, p = .003). There were also significant differences noted in levels of negative emotionality by birth status; children who were part of a multiple birth (e.g. twin or part of higher-order birth) had significantly higher (M = .213, SD =1.017) levels of negative emotionality *(t* [3757] = .3445, p = .001) than singleton children (M = -.004, SD = .999).

Several differences in negative emotionality by child race were noted; children who were White (M = -.051, SD = .996) had lower levels of negative emotionality *(t* [3757] = -2.684, p = .009) than those were not (M = .087, SD = 1.001). Children who were Asian (M = .147) or Native American Indian (M = .593) and significantly higher levels of negative emotionality (t [3757] = 2.346, p = .021 for Asian, *(t* [3757] = 2.308, p = .023 for Native Americans). No

[45] Note that child negative emotionality scores are standardized

statistically significant differences in levels of negative child emotionality were found for boys and girls. Simple correlations among the primary variables of interest are presented in Table 3.2.

Multivariate Associations

Results of multivariate associations among child negative emotionality, differences in child developmental knowledge and child-related conflict at 24 months are presented hierarchically in four different models in Table 3.3., reflecting the research questions guiding this study.

To answer the first research question, child negative emotionality at 9 months of age, differences in child development knowledge at 9 months of age, and their interactions, were examined simultaneously in a regression model to estimate their independent effects on child-related conflict at 24 months, net of the effects of prior levels of both maternal and paternal levels child-related conflict, marital satisfaction and general conflict (as measured at 9 months of age). The interaction term was calculated by multiplying the z-scores for negative emotionality at 9 months with the standardized variable for difference in child development knowledge and entered into the regression along with appropriate controls. Child characteristics and parental characteristics were added hierarchically in Model 2 and Model 3.

As hypothesized, results indicated that parents of highly negative children at 9 months of age did not report increased levels of levels of child-related conflict when their children were toddlers (Table 3.3., Model 3). Instead, findings showed a significant effect of the interaction between negative emotionality and differences in child development knowledge at 9 months of age ($\beta = .060$, $p = .002$), suggesting that the effect of negative emotionality at 9 months on future child-related conflict, varied depending on having parental differences in child

development knowledge. Parents of children with high levels of negative emotionality (1 SD above mean), who at 9 months had greater differences (1 SD *above* mean) in child development knowledge, reported *higher* levels of child-related conflict at 24 months of age by .18 SD compared to parents of children with high levels of negative emotionality, who at 9 months had *few* differences in child development knowledge (1 SD *below* mean level). T-tests of the simple slopes (Aiken & West, 1991; Preacher, Curran & Bauer; 2006) indicated that slopes for parents whose children displayed high levels of negative emotionality were significantly different (p = .011). Note that these estimates were calculated while levels of child-related conflict at 9 months of age were included in the model. In addition, these results were also independent of contributions of parents' objective child development knowledge, which were not significantly associated with child-related conflict at 24 months, suggesting that results are not merely a reflection of less-informed parenting behavior. [46]

The associations between negative emotionality, differences in child development knowledge at 9 months and child-related conflict at 24 months are presented in Figure 3.1. The graphed lines, and the slope values they represent, were derived using the regression equations resulting from the analyses, and illustrate differences in the steepness of the slope of associations among parental differences in child development and child-related conflict for children with high, average and low levels of negative emotionality . Note that parents of children with high negative emotionality (1 SD above the mean), who were 1 SD *below* the mean on differences in child development (i.e., parents who had few differences in child development knowledge and attitudes), reported significantly lower frequency of child-related conflict at 24 months of age by .18 SD, compared to parents of highly negative children whose parents were 1 SD *above* the mean on differences in child development (i.e., parents who had many differences in child

[46] This statement assumes that child development knowledge partially inform parenting quality

development knowledge and attitudes). For each 1-unit increase (1 SD) in differences in child development knowledge at 9 months, child-related conflict between parents of children with high levels of negative emotionality increased approximately by .1 SD, a small effect. The figure also illustrates that slopes for parents of children with average or low levels of negative emotionality were only slightly steeper as differences in parental child development increased, an effect which was not significant (p =.769 for mean levels, p =.071 for low levels). This suggests that increased parental differences in child development knowledge did not significantly influence the extent to which parents argued about their children, when children had average or low levels of negative emotionality.

Can These Results Be Accounted For By Parenting Behavior That May Be Related To The Primary Variables Of Interest?

As mentioned previously, the described interaction effect was independent of contributions of prior child-related conflict of mothers and fathers each of which had significant, positive associations with future child-related conflict; 1 SD higher mother-reported child-related conflict at 9 months of age was related to .190 SD higher child-related conflict at 24 months (p = .000), and 1 SD higher father-reported child-related conflict at 9 months of age was related to .198 SD higher child-related conflict at 24 months (p = .000). This suggests that child-related disagreements during infancy are not merely a feature of the transition to parenthood but instead change between 9 months of age and toddlerhood. In addition, the effect was significant while controlling for the effects of more general, non-child related conflict (e.g., conflicts about money, in-laws, other men and women etc.), a composite variable which was also significantly related to child-related conflict at 24 months when child-related conflict was in the model (β = .051, p = .038 for mother-reports; β = .039, p = .044 for father reports). T-tests were conducted

to examine whether there were statistically significant differences in the size of estimates for maternal and paternal child-related conflict, and between maternal and paternal general conflict, revealed that the size of coefficients for both constructs were similar were similar *(t* [3758] = -.247, p = .798 for child-related conflict; t [3758] = .358, p = .721 for general conflict). This suggests that mothers and fathers perceptions of general marital conflict may 'spillover' to contribute to childrearing disagreements, but only to a small extent, when prior contributions of child-related conflict are considered.

With regards to other influences of interparental relationship functioning, results indicated that paternal, but not maternal marital satisfaction was significantly and negatively related to child-related conflict at 24 months, suggesting that fathers who reported greater marital satisfaction, tended to report having fewer interparental disagreements about their children (β = -.051, p = .004). In addition, mothers' depressive mood at 9 months was significantly and positively associated with child-related conflict at 24 months, suggesting that mothers who reported experiencing more depressive symptoms, reported more frequent child-related conflict (β = .049, p = .021).

Several interesting findings emerged regarding associations between other child characteristics and child-related conflict at 24 months of age. There are significant positive effects for child race and ethnicity i.e., whether Asian (β = .244, p = .000), on child-related conflict at 24 months, indicating that compared to parents of White children, parents of Asian children perceive greater levels of child-related conflict in toddlerhood. There was also a significant negative effect of for the child being Black (β = -.219, p = .002), on child-related conflict at 24 months, indicating that compared to parents of White children, parents of Black children reported lower levels of child-related conflict in toddlerhood. Interestingly, no

significant associations were found between child-related conflict at 24 months of age and children cognitive ability (β = -.004, p = .901), socioemotional functioning (β = .010, p = .569), although there was a trend for the effects of child gender (β = .065, p = .065), suggesting that parents of boys reported slightly higher levels of child-related conflict than those of girls, however, this associations was not statistically significant at the .05 level.

Parental characteristics were mostly not associated with child-related conflict frequency at 24 months, although maternal education was significantly and negatively associated (β = -.068, p = .009), suggesting that child-related conflict at 24 months was reduced by .068 SD for each additional year of maternal education. Neither couple marital status (whether married), nor father education, nor total household income, was significantly associated with later child-related conflict (β = .026, p = .660 for whether married; β = .034, p = .232 for father education; and β = -.016, p = .381 for income), suggesting that child-related conflict cannot be predicted by aspects of socioeconomic status when other process variables are in the model.

Several aspects of parenting appeared to be related to child-related conflict at 24 months of age; parental involvement (i.e., greater play by both parents and greater cognitive stimulation in the home) was found to be significantly and negatively related to child-related conflict (β = -.090, p = .004), while an independent negative effect was found for father daily care involvement (β = .081, p = .007). This suggests that greater father involvement in daily care, (i.e., daily care, greater responsibility for crunch time activities and greater number of hours spent with the child without the mother present), was associated with higher frequency of arguments between parents about their children. Interestingly, parents whose children were exclusively in parental care at 9 months of age, reported a .081 SD increase in child-related conflict at 24 months compared to children who received non-parental care. This association

however, was independent of associations of father involvement and later child-conflict, which are also positive and significant, suggesting that influences of father involvement on child-related conflict may not just reflect effects of fathers providing childcare.

In Model 4, I verified whether the significant interaction of differences in parents' child development knowledge on the association between child negative emotionality at Time 1 on child-related conflict at Time 2, was indeed based on *differences in child development knowledge*, rather than on *differences among parents in other domains*. To test the robustness and divergent validity of the interaction effect found during step 1, I calculated interaction terms between negative emotionality at 9 months of age and various parental difference indicators at 9 months[47] including, differences in levels of parental (play) involvement, differences in parental education, differences in parents' perception about general conflict frequency, differences in parents' perception about child-related conflict and differences in parents' perceptions of marital satisfaction and adding these interaction terms into the model.

I also verified whether the significant effect of the interaction of differences in parents' child development knowledge on the association between child negative emotionality at Time 1 on child-related conflict at Time 2, could be (partially) explained by child gender, cognitive ability or socioemotional functioning at 9 months, rater than negative emotionality. Hence, I calculated interaction terms for child cognitive ability and differences in parental child development knowledge, as well as for differences in parental child development knowledge with child gender and child socioemotional functioning, and added them into the model.

Comparing Models 3 and 4, results showed that the size of the regression coefficient for the interaction between negative emotionality and difference in child development knowledge

[47] Difference indicators were chosen based on availability of parental reports and their potential influence on conflict frequency

remained virtually unchanged (β = .060), and that the interaction effect remained significant at the .005 level (p = .003) (table, 3.3). This suggests that parents of highly negative infants may argue more about their children in toddlerhood, because interparental differences in child development knowledge exacerbate strain posed by dealing with a highly negative child, rather than strain posed by parental differences in other domains. Results showed that associations between negative emotionality and child-related conflict at 24 months were not significantly moderated by parental differences in general education, extent to which they perceive disagreement about their children or other topics, differences in marital satisfaction, or differences involvement with the child. It also suggests that results were not accounted for by associations between child cognitive ability, gender and socioemotional functioning and child-related conflict at 24 months, or by interactions between these variables, none of which were statistically significant.

Next, to further test the validity of my findings, I hypothesized that the moderating effect of differences in developmental knowledge on associations should be stronger for associations between negative emotionality and child-related conflict, than in moderating the association between child negative emotionality and *general, non-child-related conflict* at 24 months of age. To test this, I conducted a lagged-dependent variables analysis using the model described previously (Model 3) predicting *joint report of parents' general, non-child related conflict at 24 months.*

Results presented in Table 3.4 showed that the size of the coefficient for the interaction effect on *general* conflict at 24 months (β = .037, p = .136) was significantly smaller, compared to the coefficient for the interaction effect on *child-related* conflict at 24 months (β = .062, p = .002). In addition, there was no significant association between negative child emotionality at 9

months of age and general conflict at 24 months of age (β = -.002, p = .938) nor was the association significantly moderated by other parental difference variables such as differences in parental education (β = .010, p = .785), differences in marital satisfaction (β = -.009, p = .687), differences in play (β = -.009, p = .683), differences in perception of general conflict (β = -.000, p = .994) or differences in perceptions of child-related conflict (β = -.045, p = .115). This suggests that the rationale for predicting the interaction between negative emotionality and parental difference in knowledge on child-related conflict was reasonable; if a similar interaction effect had been found in moderating associations between negative emotionality and *general* conflict, the specificity of the model would be reduced. In particular, it would have difficult to account for a moderating effect on general conflict, unless child-related conflict at 24 months functioned as a mediating variable.

Further bolstering the specificity of previously presented models are results showing significant main effects of parental differences in conflict perception (β = -.056, p = .015), suggesting that parents who have increasingly different perceptions of the frequency about which they argue about general, non-child-related issues when their child is at 9 months of age, reported lower frequency of general conflict at 24 months of age. Hence, if one parent perceives there to be frequent general conflict, while the other parent perceives infrequent conflict, it is understandable that joint reports of general conflict at 24 months are lower. In contrast, when parents have increasingly different perceptions about the frequency by which they argue about their children, general conflict increases (β = .105, p = .001).

In addition, there are strong and positive associations between reports of general conflict at Time 1 and later general conflict at 24 months of age for both mothers (β = .517, p = .000) and fathers(β = .249, p = .000). Interestingly, the direction of associations between child-related

conflict at 9 months and general conflict at 24 months for age differs by parent gender; for each 1 SD increase in mothers' perception of child-related conflict at 9 month, general conflict at 24 months decreases by .06 SD. While this is a small 'effect', it contrasts with the effects of fathers' perception of child-related conflict at 9 months on general conflict at 24 months (β = .517, p = .000), which suggest a significant .124 SD increase in general conflict for each SD increase in child-related conflict at 9 months of age.

Discussion

This study used longitudinal data collected from a nationally representative sample of infants and their parents, to examine the extent to which individual differences in child negative emotionality at 9 months of age, predicted child-related conflict at 24 months of age, over and above effects of prior child-related and general conflict, marital satisfaction, and important child, parent and household characteristics. The primary goal of this study was to test the potential moderating role of differences in parents' child developmental knowledge in attenuating or exacerbating effects of early negative emotionality on later child-related conflict. As such, this study responds to calls in the marital discord literature to focus more attention on identifying vulnerability and protective factors, and to consider the dynamic, bi-directional nature of associations among marital and child adjustment (Margolin, Oliver, Medina, 2001).

The results of the present study offer statistically significant support for the major hypothesis originally presented, and such extending findings from previous investigations of child-marital linkages. Results showed that individual differences in child temperament i.e., negative emotionality at 9 months of age (i.e., frequent crying, fussing, whining and demandingness), did not significantly predict child-related conflict at 24 months of age. Instead, the potentially adverse effects of negative emotionality on later child-related conflict were

amplified as a function of parental differences in knowledge of child development; Parents of highly negative children reported significantly higher levels of child-related conflict at 24 months, when they reported greater parental difference in knowledge of child development. In contrast, varying levels of parental differences in child development knowledge did not affect the frequency of later child-related conflict of parents whose children had average or low levels of negative emotionality. By revealing that parental differences in child development knowledge moderate associations between negative emotionality in infancy and child-related conflict in toddlerhood, this study illuminates a new facet of family dynamics overlooked in previous work.

Before proceeding to further discuss the results of this study, with regards to the brief summary of results just provided, significant associations revealed in this study were by no means overwhelming. Although the significant finding was consistent with the hypothesis predicting significantly greater negative effects of negative emotionality on later child-related conflict when differences in parents' knowledge of child development were high, the impact of this interaction was small. It would therefore be a mistake to conclude that individual differences in child temperament and greater differences between parents in child development knowledge result over time in *major* influences on child-related conflict. On the other hand, it must be noted that a small effect size is to be expected as effects were calculated while controlling for prior levels of child-related conflict at 9 months, as such reflecting change between 9 and 24 months of age. Also, 'effects' of parental differences in knowledge in moderating associations between negative emotionality and child-related conflict were robust and specific and not accounted for by parental differences in other domains of development. In addition, parental differences were significant in moderating effects on child-related, but not general, non-child related conflict. This gives some credence to the notion that negative emotionality uniquely influences aspects of the

parental relationship related to coparenting. Given that statistically reliable evidence emerged using longitudinal data from a large, nationally representative sample of infants and their parents, which facilitated highly controlled modeling, the results of the present study are worth mentioning, despite the small magnitude of found 'effects.'

How Do High Levels Of Negative Emotionality And Parental Differences In Child Development Knowledge Interact To Predict Increased Child-Related Conflict?

In attempting to account for the positive associations between parental differences in child development knowledge at 9 months and child-related conflict at 24 months, found for highly negative children, the following process explanation is suggested. First, highly negative children frequently require their parents to problem-solve in the presence of the child, which is more difficult to do when parents have differences in child's development knowledge. The reason for this difficulty is twofold. First, within the context of immediate responding to the child's crying, fussing and whining, differences in parental knowledge may accentuate differences in parents' responses to the child, which are likely to detract from parents' ability to intervene effectively; parents are more likely to take issue with the other parents' approach, which may lead them to voice criticism and/or intervene in the midst of a highly-charged parent-child interaction, which in turn may lead to escalation of the child's behavior. Furthermore, research has shown that male-female differences in managing arousal associated with interparental conflict lead to different styles of behavior during couple conflict; women tend to 'open up' the issues, whereas men tend to 'stonewall' (Gottman & Levenson, 1992). These stylistic differences may further increase expression of negative affect and hostility *in the child's presence*, and interfere with resolution, which likely further fuels the type of child behavior that led to the conflict to begin with, as well as future conflict.

On the other hand, when highly negative children exhibit challenging behaviors in the context of parental *similarity* in child development knowledge, parents may be more likely to use compatible problem-solving strategies. Parents who approach challenging childrearing situations in a similar manner, may be less likely to interfere with the other parent and more likely to express support and encouragement to the other parent. The similarity in approach, as well as the level of perceived support, may lead parents to be more effective (e.g., patient, persistent) in helping highly negative children regulate their arousal. Without the added tension imposed by differences in knowledge, interactions in the presence of the child are also less likely to be negatively charged and hostile. If parents perceive one another as partners, rather than adversaries, after the immediate challenge has been diverted or resolved, they may be more likely to engage in discussion about the difficulty they may experience, and evaluate which strategies were effective, which may enhance parents' ability to manage and cope with future difficult child behavior.

Parents of highly negative children, who frequently experience the previously described chain of events, may in the long run respond in several different ways, which may, directly or indirectly, increase child-related conflict. First, parents who differ in knowledge, may develop feelings of not being 'on the same side', which may generate negative feelings about their perception of the parenting alliance, which may in turn fuel additional child-related conflict. Informed by the notion that negative emotionality will increase over time when parent are in dissatisfying marriages (Belsky, Fish & If, 1991), it is easy to see how the interplay between highly negative behavior and parental differences in knowledge can influence family dynamics.

Second, parents of highly negative children who have greater differences in knowledge, may be more likely to steer clear of triadic interactions, or withdraw from them, when difficult

child behavior occurs. This may lead to different levels of parental involvement, particularly with regards to regulating difficult child behavior, which may lead to the 'involved' parent's perception that he or she bears an unfair part of the parenting responsibility. In fact, there is some evidence to suggest that the mothers of infants with low thresholds for reactivity reported less role reciprocity with fathers (Kaulinen, Laippala & Paunonen, 1998), although it was not clear whether this reflected actual lower father involvement in infant care, or the mother's perception that the father's participation was less than needed, given that challenging circumstances. Since the current study controlled for father involvement and parental involvement, which had significant main effects on child-related conflict, it is less likely that parental differences in knowledge could be accounted for by reduced father involvement, although maternal reports of father involvement were not obtained. In fact, results may have differed if parents had also been asked to report comprehensively on involvement of their coparent, rather than their own involvement.

Third, another process by which differences in parenting knowledge may exert an influence on the frequency of child-related conflict in homes with highly negative infants, is by exacerbating changes in parents' perceptions of competence and self-efficacy. Since the ability to console or sooth ones' infant has been considered the cornerstone of parenting self-efficacy (Crockenberg & Leerkes, 2001), parents might easily attribute the difficulty to soothe their child to their inability to parent. In fact, in a study with colicky infants, who are characterized by excessive crying, Fish Stifter and Belsky (1991) found that mothers rated themselves as lower on parenting self-efficacy than mothers whose infants did not have colic. That perception of incompetence or low self-efficacy is thought to be similar for parents of highly negative infants (Hubert, 1989; Papousek & Von Hofacker, 1998), and may be further strengthened, if frequent

challenges to problem-solving strategies on behalf of the other parent are made, as may be the case with parents with differences in knowledge. Interestingly, while mothers' perceptions of competence and self-efficacy were reduced in the context of difficult child behavior, the opposite was found to be true for fathers. Van Egeren and Lower (2001) found that increased child fussiness was positively associated with fathers self-efficacy. This may imply that fathers may experience an increased sense of competence when involvement is increased due to increased opportunity (or necessity) for responding such is the case with highly negative children. Hence, it is possible that parental difference in knowledge further exacerbate parental differences in other parenting domains, which may contribute to further child-related conflict between parents of highly negative children.

While this study did not employ methodological strategies of behavioral genetics to estimate the extent to which the results can be accounted for by genetically-based factors, it is conceivable that heritable characteristics of children and their parents play a role in contributing to previously described family processes. For example, according to a child evocative effects model, it is likely that genetic predispositions for negative emotionality present in the child may evoke reactions from parents that in turn amplify the child's traits into distinctive features of negative emotionality. In fact, previous work with older children has found small to moderate genetic influences on parental monitoring of their children and their attempts and success in controlling misbehavior (Reiss, 2001). Similarly, genetic factors thought to influence child negative emotionality are partially shared with genotypic and phenotypic characteristics of parent personality, which may influence how parents react when parenting stress and parental disagreement emerge, as well as how they manage and resolve conflict when it occurs. In fact, there is some previous evidence that suggests that heritable features of children influenced

martial conflict about children between parents (Reiss, 2001), which may partially explain the findings of this study.

Although tests of the simples slopes revealed that the steepness in slope for parents of children low on negative emotionality was not significantly different from zero, the direction of the findings as presented in Figure 3.1 are somewhat counter-intuitive and require some thought. Why would low levels of negative emotionality and low levels of parental differences in child development knowledge be associated with higher frequency of child-related conflict? It is reasonable to suggest that children low in negative emotionality at 9 months of age (e.g., who cry or fuss infrequently, who do not demand constant attention from their parents, who adapt easily to change) are less likely than highly negative infants to require *joint* parental assistance with regulation of arousal and emotion and management of negative behavior. While this may provide less opportunity for conflict to occur about parenting-strategies and problem-solving, child-related conflict may be reduced for parents with greater differences in child development knowledge, because of the belief that their differences do not have significant consequences for their child, because the child is 'easy.' As such, parents may be better able to avoid conflict, because disagreements that surface, are perceived as being somewhat irrelevant and as such may evoke little emotional arousal. On the other and, parents of children low on negative emotionality, who have fewer differences in child development knowledge, may not find themselves disagreeing about child-related topics related to child problem behavior, but instead, come to argue about the quality of the parenting alliance, which may include disagreements about perceived differences in parental involvement and division of child-related chores. Another explanation concerns the qualitative meaning and implication of low negative emotionality; is this classification useful in predicting meaningful variance in this study? In other words, are

children with lower than average negative emotionality better adjusted or are they possibly less engaged with their environments? These are questions that future work may consider.

Stability Of Negative Emotionality And The Role Of The Family Context

While the findings of this study increase our understanding about the extent to which child negative emotionality at 9 months of age contributes to the prevalence of child-related conflict at 24 months of age, this study cannot account for factors in the first 9 months of life that may have contributed to negative emotionality. Is negative emotionality at 9 months a relatively stable, mostly genetically determined, feature of temperament that under certain conditions influences family dynamics including child-related conflict? Or, have features of the family environment in the first 9 months of life shaped child negative emotionality and if so to what extent? This is an important consideration as there is a lack of consensus about the stability of negative emotionality in the first year of life. Although several investigators argue that negative emotionality in across infancy is relatively stable (Campos, Campos & Barrett, 1989; Gunnar , Mangelsdorf, Larson & Hertsgaard; 1989; Matheny, 1986; Matheny, Riese, & Wilson, 1985; Riese, 1987), evidence of moderate stability and inconsistent stability (Belsky, Rovine, Fish, 1989; Isabella, Ward & Belsky, 1985, Riese, 1987) are present throughout literature . Important for this study is whether to consider instability of negative emotionality a function of measurement error (Hubert, Wachs, Peters-Martin, & Gandour, 1982; Belsky-Pensky, 1988), or stage-determined changes in expression of temperament (Riese, 1987), or, as others suggest (Belsky, Fish & Isabella, 1991) feature of *lawful discontinuity.* They argue that much of the stability and instability in negative emotionality from 3 to 9 months of age could be accounted for by prenatal and distal measurements of the family environment (including marital satisfaction) and proximal measurement of parent-child interaction; infants low on negative

emotionality at 3 months of age with fathers who were less positive about their marriage before the infant was born, were more likely to have children high on negative emotionality at 9 months of age. Thus, it must be considered that parents' perception of marital quality may have influenced child negative emotionality from birth through the period of the first assessment either indirectly - through parental emotional functioning (e.g. depression, anger, anxiety, self-esteem), or insensitive parenting - or directly - through exposure to interparental conflict (child-related or otherwise) that may have occurred in the first 9 months. On the other hand, the extent to which stability of negative emotionality in infancy can be accounted for by aspects of interparental relationship functioning remains unclear, as these findings have not been replicated; in a similar study examining stability of negative emotionality in the first 5 months of life, Fish, Stifter and Belsky (1991) found that infants high on negative emotionality at birth, low on negative emotionality at 5 months of age, had mothers who reported *lower*, rather than higher marital satisfaction and greater ambivalence.

Developmental Perspective

The results of this investigation must be considered from a developmental perspective. In addition to previous considerations about potential influences *before* the first data collection of the study, children in the study were very young. In many respects, the aspects of the marital relationship relating specifically to how parents parent together, are likely to continue to develop children and parents mature. Children's emerging abilities across the toddler and preschool and ages will likely further challenge parents' strategies, perhaps even magnifying the importance off their differences, particularly since particularly if negative emotionality develops into a stable characteristic of the child.

Strengths and Limitations

This study makes a valuable contribution to a relatively small body of prior research on children's influences on family dynamics, by estimating the magnitude and nature of independent effects of negative emotionality in infancy on child-related conflict in toddlerhood, and by exploring the role of parental differences in child development knowledge in influencing the strength and/or direction of these links. A considerable strength of this study is its use of a large, comprehensive, longitudinal dataset collected from a nationally representative sample of infants. The large number of observations facilitates consideration of numerous important child and parental characteristics, as well as broader developmental and contextual factors, which limits the possibility, that found interaction effects are overestimated. In addition, this study combines the advantages of a large sample size with the use of in-home, developmental assessments of temperament, child cognitive ability, socioemotional functioning and the quality of parent-child relations, overcoming some of the methodological limitations of previous studies examining marital conflict in infancy. Moreover, since several studies examining the link between child-related disagreements and child problem behavior did not include fathers (Dadss & Powell, 1991; Jouriles et. al., 1991), and one that did revealed no links between parental agreement and father reports of child problems (Deal et.al, 1989), the inclusion of ratings of both mothers and fathers on child-related conflict significantly improves the validity of these findings.

It is necessary to highlight limitations of the methods and sample. While the data were collected 'longitudinally', the time difference between the two data collection periods was relatively small; while results controlled for child age and length of time between assessments, error introduced by these variables must be considered when considering developmental 'effects'. Another shortcoming of this study is its rather unsophisticted measurement of the dependent variable, child-related conflict. While it can be argued that significant findings

emerged despite the increased likelihood of a type-two error due to such lower quality measurement, the use comprehensive measures of child-related conflict and other measures of couple relationship functioning would have increased confidence in these findings. One aspect that could be included in future studies is thematic content of child-related conflict, which may be helpful to discern the underlying pathway for the found associations. In addition, since previous research showed that aspects of conflict style and resolution matter, it would have been helpful to account for the extent to which parents' communication style may have exacerbated resolving parenting disagreements. Similarly, regarding one of the primary variables of interest, negative emotionality, it is possible that mothers who frequently disagree with their spouses about child-rearing issues, report greater levels of negative emotionality in their children than mothers who frequently disagree with their spouses about non child-related topics or marital satisfaction. However, this response-bias-argument is tempered by the fact that ratings of negative emotionality included ratings of observed behavior made by highly-trained interviewers and that results were similar when these ratings were excluded and when analyses were based exclusively on mother reports of temperament. Even so, since observed ratings occurred in the context of an assessment task rather than an assessment focused entirely on child temperament, it may have given raters a better impression of state rather than trait-like characteristics. In addition, incorporating fathers' assessment of child temperament would provide another avenue for discerning how perceptions of child behavior may inform the development of child-related conflict. Similarly, while the primary independent variable i.e., differences in parents child development knowledge, was measured adequately, it would have been helpful to examine the extent to which found interaction effects were independent from parental agreement-

disagreement in childrearing values, and differences in (observed) parenting behavior of *both* parents.

Conclusion

In spite of these cautions, these findings contribute to our understanding of the circumstances under which challenging child characteristics and behaviors in infancy contribute to child-related conflict in toddlerhood. The results suggest that parental differences in child development knowledge may contribute to increased child-related conflict, particularly in families with highly negative children. To the extent that these findings can be replicated, the results may have implications for intervention; considering that family therapists and their clients are interested in the dynamic interplay between challenging child characteristics and the ways in which they may affect the whole family system, these results imply that working with both parents to synchronize their knowledge of child development, may reduce child-related conflict for parents with highly negative children.

Table 3.1

Weighted Means and Standards Deviations of Primary and Independent Variables, (N = 3758).

Variable	*M*	*SD*	*Min*	*Max*
Child Negative Emotionality Time 1				
Mother report of NE	1.46	.680	.00	3.00
Fussy or irritable	1.20	.990	.00	3.00
Goes from whimpering to crying	1.07	1.06	.00	3.00
Demands attention and company	1.86	1.08	.00	3.00
Cries for food or toys	1.57	1.05	.00	3.00
Observed positive affect	3.65	.757	1.00	5.00
Positive affect	3.60	1.07	1.00	5.00
Shows interest in materials	3.71	.947	1.00	5.00
Pays attention to task	3.86	.765	1.00	5.00
Displays social engagement	3.41	1.07	1.00	5.00
Observed Negative Affect	2.15	.866	1.00	5.00
Negative Affect	2.16	1.12	1.00	5.00
Adapts of changes in materials	2.12	1.00	1.00	5.00
Child Characteristics Time 1				
White Non-Hispanic (Reference)	.633	.482	.00	1.00
White Hispanic	.140	.347	.00	1.00
Black Hispanic	.004	.006	.00	1.00
Hispanic no race specified	.080	.271	.00	1.00
Asian	.031	.173	.00	1.00
Multiracial	.034	.181	.00	1.00
Pacific Islander	.002	.048	.00	1.00
American Indian	.008	.089	.00	1.00
Multiracial Hispanic	.004	.061	.00	1.00
Black	.063	.242	.00	1.00
Male	.515	.499	.00	1.00
Normal Birth weight	.943	.231	.00	1.00
Moderate-Low Birth weight	.045	.207	.00	1.00
Very-Low Birth weight	.010	.100	.00	1.00
Singleton	.982	.132	.00	1.00
Twin	.015	.118	.00	1.00
Higher order birth	.002	.048	.00	1.00
Age of Assessment	10.28	1.81	3.00	21.7
Time2-Time 1 (Months)	13.92	1.83	2.70	28.8
Cognitive Ability (BSF-R)	76.48	9.54	37.4	118.2
Child Health Problems	1.50	.748	1.00	5.00
Child Socioemotional Func. (NCAT)	15.52	2.53	8.00	23.0
Parental Characteristics Time 1				
Maternal Age	29.57	5.84	15.0	52.0
Paternal Age	31.95	6.46	17.0	73.0

Table 3.1 continued,

Variable	*M*	*SD*	*Min*	*Max*
Maternal Education	13.38	2.83	0.00	17.0
Paternal Education	13.24	3.08	4.50	17.0
Household Income	58.87	44.93	5.00	200.0
Married	.862	.345	.00	1.00
Number of Children under 18	2.09	1.15	1.00	16.0
Parenting Time 1				
Whether in Parental Care only	.550	.496	.00	1.00
Parental Involvement JR [48]	.00	1.00	-4.44	2.76
Cognitive Stimulation	2.75	.481	1.13	4.00
Parental Play	4.87	.548	2.17	6.00
Difference in Parental Play	.739	.624	.00	4.67
Difference in Cognitive Stimulation				
Father Involvement				
Father daily care	4.67	.858	1.00	6.00
Father crunch time	2.97	.817	1.00	5.00
Number of hours dad cares for child	8.40	10.7	.00	40.0
Whether Dad Pays Child Support	.095	.920	.00	1.00
Maternal CD Knowledge	6.47	1.76	.00	11.0
Paternal CD Knowledge	4.17	1.40	.00	8.00
Difference in CD Knowledge	2.90	1.76	.00	10.0
Maternal Authoritarianism	1.89	1.07	.00	5.00
Maternal Responsiveness	34.94	4.15	15.00	49.0
Parental Relationship Functioning Time 1 and Time 2				
Child-Related conflict Time 2 JR	2.26	.691	1.00	4.00
Child-Related conflict Time 2 MR	2.28	.846	1.00	4.00
Child-Related conflict Time 2 PR	2.23	.834	1.00	4.00
General Conflict Time 2 JR	1.87	.426	1.00	4.00
General Conflict Time 2 MR	1.85	.500	1.00	4.00
General Conflict Time 2 PR	1.89	.505	1.00	4.00
Child-Related conflict Time 1 MR	2.01	.847	1.00	4.00
Child-Related conflict Time 1 PR	2.04	.838	1.00	4.00
General Conflict Time 1 MR	1.73	.461	1.00	3.78
General Conflict Time 1 PR	1.97	.435	1.00	3.67
Difference in Conflict Perception Time 1	6.10	2.99	.00	23.0
Marital Satisfaction Time 1 MR	2.77	.432	1.00	3.00
Marital Satisfaction Time 1 PR	2.70	.480	1.00	3.00
Difference in Marital Satisfaction Time 1	.253	.450	.00	2.00
Depressive Mood Time 1 MR				
Depressive Mood Time 1PR				

[48] JR refers to joint parental report, MR refers to maternal report and PR refers to paternal report

Table 3.2

Simple Correlations among Primary Dependent and Independent Variables

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1.Negative Emotionality JR Time 1	1							
2.Differences CD Knowledge Time 1	-.012	1	.					
3.Child-Related Conflict JR Time 2	.070(**)	.033(*)	1					
4.General Conflict JR Time 2	.081(**)	.063(**)	.566(**)	1	.			
5.Child-Related Conflict MR Time1	.096(**)	-.020	.378(**)	.259(**)	1			
6.Child-Related Conflict PR Time 1	.053(**)	-.008	.391(**)	.299(**)	.360(**)	1		
7.General Conflict MR Time 1	.112(**)	.029	.298(**)	.526(**)	.500(**)	.236(**)	1	
8.General Conflict PR Time 1	.060(**)	.036(*)	.278(**)	.462(**)	.224(**)	.485(**)	.407(**)	1

** Correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed).

Table 3.3

Associations between Child Negative Emotionality at 9 months of age, Difference in Parental Knowledge of Child Development and Child-Related Conflict at 24 months of age, (N = 3758)[49]

	Model 1		Model 2		Model 3		Model 4	
Variable	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*
Constant	-0.07	0.59	0.17	0.41	0.18	0.41	0.23	0.32
Differences in Knowledge of CD	0.04	0.03	0.03	0.05	0.03	0.05	0.02	0.30
Child Negative Emotionality Time 1	0.01	0.44	0.00	0.78	0.00	0.79	-0.01	0.79
NE X CD Difference	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00
Parental Relationship Functioning								
Marital Satisfaction MR[1] Time 1	-0.01	0.68	0.00	0.96	0.00	0.81	0.00	0.95
Marital Satisfaction PR Time 1	-0.05	0.00	-0.05	0.00	-0.05	0.00	-0.05	0.01
Child-Related conflict MR Time 1	0.21	0.00	0.20	0.00	0.19	0.00	0.19	0.00
Child-Related conflict PR Time 1	0.21	0.00	0.21	0.00	0.20	0.00	0.20	0.00
General Conflict MR Time 1	0.05	0.05	0.06	0.01	0.05	0.04	0.05	0.04
General Conflict PR Time 1	0.03	0.13	0.03	0.13	0.04	0.04	0.06	0.01
Child Characteristics								
White Non-Hispanic (Reference)								
White Hispanic			0.20	0.00	0.14	0.01	0.12	0.02
Black Hispanic			0.62	0.19	0.61	0.21	0.59	0.23
Hispanic no race specified			0.25	0.00	0.19	0.03	0.17	0.04
Asian			0.26	0.00	0.24	0.00	0.24	0.00
Multiracial			0.00	0.99	-0.01	0.90	-0.02	0.85
Pacific Islander			0.21	0.44	0.04	0.88	0.06	0.83
American Indian			-0.03	0.79	-0.07	0.62	-0.03	0.83
Multiracial Hispanic			0.01	0.95	0.03	0.85	0.02	0.93
Black			-0.16	0.02	-0.22	0.00	-0.22	0.00
Male			0.08	0.03	0.07	0.06	0.07	0.06
Moderate-Low Birthweight			-0.04	0.52	-0.03	0.63	-0.03	0.59
Very-Low Birthweight			-0.04	0.56	-0.05	0.51	-0.06	0.44
Twin			-0.04	0.52	-0.08	0.17	-0.09	0.09
Higher order birth			-0.18	0.30	-0.23	0.19	-0.26	0.20
Cognitive Ability Time 1			-0.02	0.58	0.00	0.90	-0.01	0.81
Child Health Status Time 1			-0.01	0.66	-0.01	0.50	-0.01	0.48
Child Socioemotional Func. Time 1			0.00	0.89	0.01	0.57	0.01	0.56

[49] Note that all models were estimated while controlling for the child's age at assessment and length of time between assessments

Table 3.3 continued,

Variable	Model 1 *β*	Model 1 *p-value*	Model 2 *β*	Model 2 *p-value*	Model 3 *β*	Model 3 *p-value*	Model 4 *β*	Model 4 *p-value*
Parental Characteristics								
Maternal Age Time 1					0.06	0.06	0.07	0.04
Paternal Age Time 1					-0.02	0.45	-0.03	0.44
Maternal Education					-0.07	0.01	-0.08	0.00
Paternal Education					0.03	0.23	0.03	0.36
Household Income Time 1					-0.02	0.38	-0.02	0.39
Married					0.03	0.66	0.03	0.58
Number of Children under 18 Time 1					0.03	0.24	0.03	0.19
Depressive Mood MR Time 1					0.05	0.02	0.05	0.03
Depressive PR Mood					-0.03	0.21	-0.03	0.24
Parenting								
Whether in Parental Care only					0.08	0.04	0.07	0.06
Parental Involvement JR Time 1					-0.09	0.00	-0.09	0.01
Father Involvement					0.08	0.01	0.09	0.01
Whether Dad Pays Child Support Time 1					0.00	0.93	0.03	0.62
Maternal CD Knowledge Time 1					0.02	0.40	0.01	0.46
Paternal CD Knowledge Time 1					-0.04	0.27	-0.04	0.24
Maternal Authoritarianism Time 1					0.00	0.97	0.00	0.89
Maternal Responsiveness Time 1					-0.02	0.39	-0.02	0.31
Parental differences								
Difference in marital satisfaction							-0.03	0.14
Difference in Parents'Conflict Perception							-0.04	0.04
Difference in Parental Play Time1							0.01	0.78
diference in Parental Education							0.01	0.78
Difference Child-Related Conflict							-0.05	0.17
Interactions between Negative Emotionality x Parental Differences								
NE X Difference Parental Education							0.00	0.98
NE X Difference Parental Play							-0.01	0.50
NE X Difference General Conflict							-0.01	0.65
NE X Difference Child Conflict							-0.03	0.13
NE X Difference Marital Satisfaction							0.00	0.82
Interactions between Differences in Parental CD Knowledge x Child Characteristics								
CD X Cognitive Ability							0.02	0.12
CD X Socioemotional Functioning							-0.01	0.75
CD x Male							0.01	0.63

Table 3.4
Associations between Child Negative Emotionality ,Difference in Parental Knowledge of Child Development at 9 months of age and General (Non-Child-Related) Conflict at 24 months of age, (N = 3758), R = 0.432 [50].

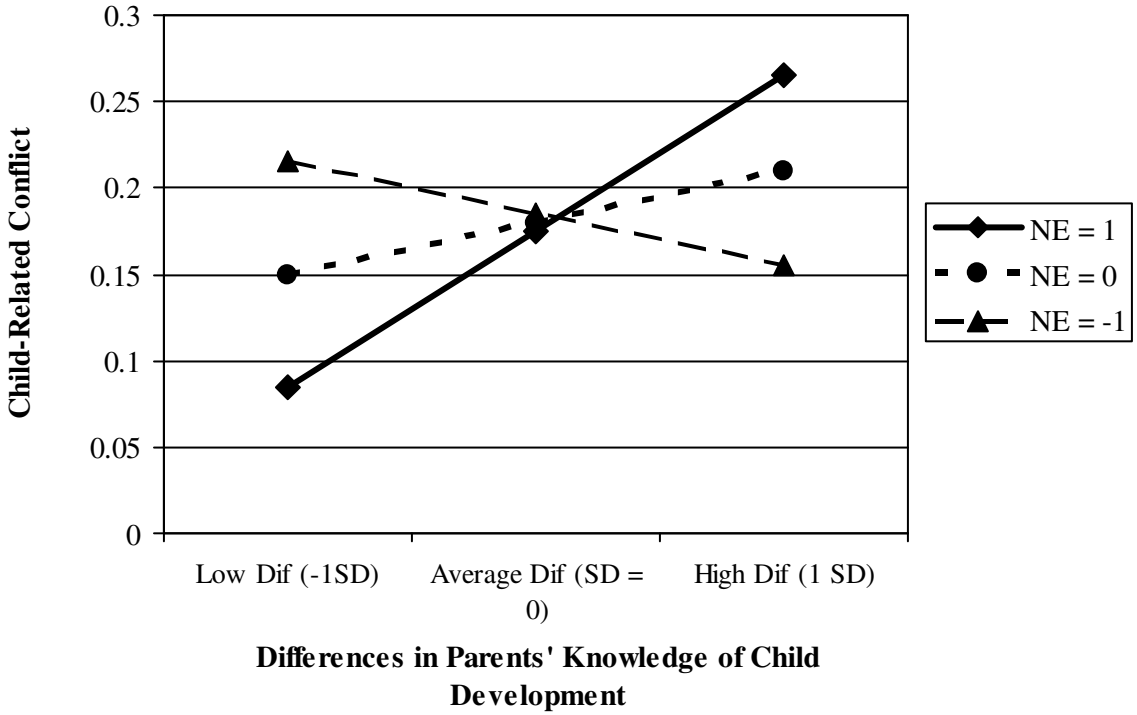
Variable	*β*	*p-value*
Constant	-0.08	0.85
Differences in Knowledge of CD	0.03	0.44
Child Negative Emotionality Time 1	0.00	0.94
NE X CD Difference	0.04	0.14
Parental Relationship Functioning		
Marital Satisfaction MR[1] Time 1	0.04	0.17
Marital Satisfaction PR Time 1	-0.11	0.00
Child-Related conflict MR Time 1	-0.06	0.05
Child-Related conflict PR Time 1	0.12	0.05
General Conflict MR Time 1	0.52	0.00
General Conflict PR Time 1	0.25	0.00
Child Characteristics		
White Non-Hispanic (Reference)		
White Hispanic	0.04	0.63
Black Hispanic	0.42	0.13
Hispanic no race specified	0.05	0.67
Asian	0.03	0.76
Multiracial	0.12	0.17
Pacific Islander	0.21	0.68
American Indian	-0.11	0.61
Multiracial Hispanic	-0.56	0.07
Black	-0.25	0.03
Male	0.02	0.63
Moderate-Low Birthweight	0.06	0.51
Very-Low Birthweight	0.05	0.66
Twin	-0.01	0.91
Higher order birth	0.12	0.53
Cognitive Ability Time 1	0.04	0.28
Child Health Status Time 1	0.02	0.44
Child Socioemotional Func. Time 1	0.01	0.72

[50] Note that all models were estimated while controlling for the child's age at assessment and length of time between assessments

Table 3.4 continued,

Variable	*β*	*p-value*
Parental Characteristics		
Maternal Age Time 1	0.04	0.34
Paternal Age Time 1	-0.10	0.02
Maternal Education	-0.09	0.04
Paternal Education	0.01	0.81
Household Income Time 1	0.02	0.56
Married	-0.01	0.35
Number of Children under 18 Time 1	-0.03	0.35
Depressive Mood MR Time 1	0.09	0.00
Depressive PR Mood	0.05	0.14
Parenting		
Whether in Parental Care only	0.06	0.24
Parental Involvement JR Time 1	-0.03	0.44
Father Involvement	0.10	0.01
Whether Dad Pays Child Support Time 1	0.11	0.27
Maternal CD Knowledge Time 1	-0.01	0.70
Paternal CD Knowledge Time 1	0.02	0.58
Maternal Authoritarianism Time 1	-0.01	0.69
Maternal Responsiveness Time 1	0.00	0.96
Parental D ifferences		
Difference in marital satisfaction	-0.03	0.27
Difference in Parents'Conflict Perception	-0.06	0.02
Difference in Parental Play Time1	0.01	0.82
diference in Parental Education	-0.01	0.93
Difference Child-Related Conflict	0.11	0.00
Interactions between Negative Emotionality x Parental Differences		
NE X Difference Parental Education	0.01	0.79
NE X Difference Parental Play	-0.01	0.68
NE X Difference General Conflict	0.00	0.99
NE X Difference Child Conflict	-0.05	0.12
NE X Difference Marital Satisfaction	-0.01	0.69
Interactions between Differences in Parental CD Knowledge x Child Characteristics		
CD X Cognitive Ability	0.04	0.15
CD X Socioemotional Functioning	0.02	0.47
CD x Male	0.05	0.32

Figure 3.1
Interaction Between Child Negative Emotionality X Difference in Child Development Knowledge at 9 Months Of Age On Child-Related Conflict at 24 Months Of Age



CHAPTER FOUR

ASSOCIATIONS BETWEEN PARENTS' MARITAL FUNCTIONING, MATERNAL PARENTING QUALITY, MATERNAL EMOTION AND CHILD CORTISOL LEVELS

ABSTRACT

Associations between family functioning and children's stress hormone levels are explored, by examining how aspects of the interparental relationship (parents' marital satisfaction and parent conflict styles), the mother-child relationship (maternal involvement and warmth) and maternal emotional functioning (depression, anxiety and self-esteem) relate to children's cortisol levels. Parents of 63 children (32 kindergarten-aged children, 31 adolescents) completed questionnaires regarding family and individual functioning, and children's salivary cortisol samples were collected on 2 consecutive weekdays at home immediately upon waking and at bedtime, such that wakeup, bedtime and average levels and the slope of their diurnal cortisol rhythms could be estimated. Higher marital functioning was significantly and independently associated with lower child cortisol levels (average levels and wakeup levels), while maternal parenting quality and emotional functioning were not significant when included in the same regression model. Associations between parents' marital functioning and children's bedtime cortisol levels and diurnal slopes were moderated by child age, with higher parent marital functioning being associated with a significantly greater lowering of bedtime levels and steeper diurnal slopes for kindergarteners as compared to adolescents. Higher maternal parenting quality was found to be significantly related to steeper diurnal cortisol rhythms.

Associations between Parents' Marital Functioning, Maternal Parenting Quality, Maternal Emotion and Child Cortisol

Research has consistently indicated strong associations between marital functioning and a wide range of child adjustment problems (Emery, 1982, 1989, 1999; Buehler et.al., 1997; Grych & Fincham, 1990, 2001), however the pathways that give rise to these associations are not clear. Several marital discord theories, including the cognitive-contextual model (Grych & Fincham; 1990, 1993; Grych, 1998; Grych, Fincham, Jouriles & McDonald, 2000; Grych, Harold & Miles, 2003), the emotional security hypothesis (Davies & Cummings, 1994, 1998; Davies et.al, 2002) and the specific emotions model (Crockenberg & Forgays, 1994, 1996; Crockenberg & Langrock, 2001a, 2001b) suggest that poor marital functioning constitutes a stressor leading to children's emotional arousal.

Although there has been considerable interest of late in integrating physiological measures into studies examining associations between parent's marital functioning and child outcomes (Gottman & Katz, 1989; El-Sheikh, Cummings, & Goetsch, 1989; Gottman & Levinson, 1992; Ballard, Cummings & Larkin, 1993; El-Sheikh, 1994; El-Sheikh, Ballard & Cummings, 1994; Katz & Gottman, 1995, 1996; Repetti, Taylor & Seeman, 2002), surprisingly, there are no published studies with children examining how parent marital quality is related to the activity of one of the body's main physiological systems for responding to stressors, the hypothalamic-pituitary-adrenal axis (HPA axis), and its major end-product, cortisol. HPA axis activity, as measured by levels of salivary cortisol, is of interest in relation to marital functioning for several reasons.

First, cortisol levels are extremely sensitive to social stressors and supports, particularly those emerging from close interpersonal relationships (Gunnar & Donzella, 2002; Repetti, Taylor & Seeman, 2002; Adam, Klimes-Dougan & Gunnar, 2006). Second, cortisol levels have effects on many physiological and behavioral processes. When secreted transiently cortisol aids survival by mobilizing energy, increasing cardiovascular tone, focusing attention and redirecting immune resources, while suppressing growth, reproduction, digestion and tissue repair processes that are less important for immediate survival (Johnson, Kamilaris, Chrousos & Gold, 1992). However, excessive amounts of cortisol can disrupt learning and memory, affect synaptic plasticity and have deleterious physical consequences such as risks of insulin-resistant diabetes mellitus and chronic immune suppression, and as such, has potential implications for children's immediate functioning as well as their long-term physical, cognitive and emotional development (Scerbo & Kolko, 1994; Repetti, Seeman & Taylor, 2002; Smider et al, 2002). Third, although there has been less human research on the topic, animal models suggest that frequent or chronic elevation of cortisol levels impairs neurogenesis, causes atrophy of dendritic processes and, at an extreme, potentiates neurotoxic effects (McEwen, 1998; Chrousos & Gold, 1992). As such, frequent or chronic elevation of cortisol levels are thought to play a role in the development of emotional and physical disorder in humans (Sapolsky, 2000).

Previous research indicates strong interrelatedness of marital relations and parenting (Erel & Burman, 1995), marital relations and parent emotional functioning (Whisman, 2001), and parent emotional functioning and parenting quality (Adam, Gunnar, Tanaka, 2004). In addition, there is ample evidence from the stress literature suggesting that multiple aspects of family functioning including conflict (Flinn & England, 1995; Flinn1999), expression of aggression and hostility (Granger et. al., 1998), parenting quality (Gunnar, Brodersen, Nachmias, Buss,

Rigatuso,1996; Gunnar, 1998; Gunnar & Donzella, 2002) and parent emotional functioning, such as withdrawal (Bugental, Martorell & Barraza, 2003), maternal depression (Ashman, Dawson, Panagiotides, Yamada,Wilkinson, 2002; Essex, Klein, Cho & Kalin; 2002; Halligan, Herbert & Goodyer & Murray, 2004) and anxiety (Warren et. al, 2003) are associated with children's stress hormone functioning. As a result, in examining associations between marital functioning and child cortisol, it is important to understand whether associations between marital functioning and children's stress hormone levels occur independently of, or are attributable to, parenting quality and parent emotional functioning. Hence, rather than merely examining the role of parents' marital functioning on children's cortisol levels, the current study examines associations of parent marital functioning, maternal parenting quality and emotional functioning on children's cortisol levels *simultaneously*.

Of particular relevance to this work is a recent review of the literature on family functioning and child outcomes by Repetti, Taylor and Seeman (2002), who concluded that two dimensions of family functioning may be especially "risky" or harmful for children's development: high levels of conflict, and unsupportive parenting (including low levels of parental involvement, support, and warmth). They proposed that the effects of these variables on children's HPA axis activity may be an important pathway by which the effects of these family factors influence children's outcomes.

The Present Study

Given prior research suggesting the potential importance of multiple family context variables, the present study examines effects of parents' marital[51] functioning, maternal parenting

[51] The term *marital functioning* is used to refer to relationship functioning between mothers and their partners regardless of their marital status and as such refers to relationships of mothers with married spouses as well as non-married cohabitating partners, two of whom are same-sex partners.

quality and maternal emotional functioning on children's cortisol levels *simultaneously,* to understand whether the effects of parent marital functioning on children's cortisol levels occur independently of, or in interaction with, maternal parenting quality and maternal emotional functioning. Children's cortisol levels are sampled immediately upon awaking and just prior to bedtime on two consecutive weekdays in the home setting in order to capture children's cortisol levels at their probable high points and nadirs, and to provide an estimate of the slope of their diurnal cortisol rhythms across the waking day. Elevated cortisol near what should be the lowest point of the diurnal rhythm of the HPA axis (in the evening) is thought to be of particular importance to dysregulation of the HPA axis (Gunnar & Vasquez, 2001 for a review), the early onset of depression (Dahl et. al, 1991), the occurrence of sleep disturbances (Gillan, Jacobs, Fram & Snyder, 1972) and impaired memory consolidation (Plihal & Born, 1999).

This study investigates aspects of family functioning and their associations with child cortisol levels in a *normal, low-risk* population, to examine whether variations in parent marital functioning, maternal parenting quality, and maternal emotional functioning in a relatively normal range are associated with child cortisol levels. In addition, we examine whether these associations vary by the age of the child, and include both kindergarten aged children and adolescents[52] in the study for that reason. We choose these particular age groups because they represent distinct developmental periods in children's lives, particularly with regards to levels of dependence on parents in regulating emotions, and abilities to make cognitive attributions about

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[52] Note that when we are referring to the kindergarten and adolescents together, we call them *children* or *child*; when we are referring only to the younger age group, we refer to them as *kindergarteners* or *kindergarten children*, and only to the older age group, we refer to them as *adolescents* or *teens*.

and derive explanations for negative interactions in the family. It is therefore of interest to examine whether family functioning variables are more salient for younger children's HPA axis functioning, or whether they are equally important for HPA axis functioning in both age groups.

Method

Participants

Participants were 63 children (32 kindergarten-aged and 31 adolescents) and their parents[53], from two-parent, primarily middle-income families. Participants were recruited as a follow-up to the Sloan Working Family Study (also called the 500 Family Study), conducted by the Alfred P. Sloan Center on Parents, Children and Work at the University of Chicago, which was designed to study how two-parent working families balance the demands of work and family life. Sloan families were originally drawn from seven communities across the United States and were recruited through schools, solicitations by phone, mail, and newspaper advertisements.

Kindergarten-aged children (23 girls and 9 boys) had a mean age of 6.1 years (ranging from 5.4 to 7.2 years) and adolescents (15 girls and 16 boys) had a mean age of 15.7 years (ranging from 13.3 to 18.1 years). Mothers of kindergarten-aged children had a mean age of 40.1 and mothers of adolescents had a mean age of 47.2 years; mothers' partners' mean ages were 40.6 and 50.21 for kindergarteners and adolescents respectively. Most children were living in married families (n = 56), while some children lived with parents who were in marriage-like, committed relationships (n = 7). Fifty-four children were living with both their biological mother and father, while 7 children lived with their biological mother and stepfather or their mother's

[53] Note that the term *parents* is used to refer to mothers and their partners, regardless of their marital or parental status. Hence partners may include biological fathers who may or may not be married to the mother, adoptive mothers or fathers, stepfathers and cohabitating partners who may be involved as social fathers or mothers.

live-in partner. One child in our sample lived with their biological father and stepmother and one child lived with two adoptive parents.

Procedures

After informed consent was obtained over the phone and in writing, parents were sent questionnaires asking about aspects of recent marital functioning (marital satisfaction, conflict tactics), parent-child functioning (parent involvement, parent warmth) and emotional functioning (anxiety, depression, self-esteem). Although we use reports of marital functioning from both mothers and their partners[54], we focus on maternal parenting and maternal emotional functioning for the current study, because although all partners were in committed relationships with the mother, partners had been involved in children's lives for substantially varying amounts of time[55].

Using materials and instructions sent to the home, parents of kindergarten-aged children assisted their child in obtaining salivary cortisol samples immediately upon wakeup and at bedtime on each of 2 consecutive weekdays, while adolescents collected saliva samples on their own at these times without assistance from their parents. Parents were also asked to sample their own saliva several times throughout the day over the same sampling period, as well as record their daily activities, emotions and cognitions according to the Experience Sampling Method

[54] While analyses predicting child cortisol using only maternal reports of marital functioning yielded slightly stronger results, we felt that combining these with partners' reports of marital functioning where available (n = 51 out of 61), provided a more accurate and less biased representation of the quality of the interparental relationship than maternal reports alone.

[55] When separate analyses were conducted predicting child cortisol levels using only paternal (i.e., partner) reports of marital functioning, paternal parenting quality and paternal emotional functioning, few significant effects were observed. However, it is impossible to know whether these null results are due to a lack of true effects, the added noise due to variations in length of amount of involvement of maternal partners in children's lives, or the smaller sample size (n = 51) due to missing data on the case level for some partners.

(Chikszentmihalyi & Larson; 1987). Findings regarding these parent data have been published elsewhere (Adam, 2005).

Parents of kindergarten-aged children also provided information about their child's health status and use of medications. For adolescents, both parents and adolescents reported on adolescent health status and medication use, while both male and female adolescents provided information on their own pubertal development, and female adolescents provided information about the phase of their menstrual cycle during saliva sampling and their use of birth control.

Cortisol Sampling And Assay Procedures

Parents of kindergarten-aged children collected small samples of saliva (approximately 1.0 mL) from their children, immediately upon waking and immediately prior to the child's normal bedtime, on two consecutive weekdays and recorded the exact time each sample was taken. Adolescents collected their own saliva independently, over a two-day period during the week agreed upon by participants, immediately upon waking and immediately prior to their normal bedtime and noted sampling times accordingly. Adolescents provided four other samples across the day in addition to their wakeup and bedtime samples; for the sake of consistency and comparison with the kindergarten data, we focus on wakeup and bedtime samples here[56]. Each family received a sampling kit including the saliva sampling materials, along with written and pictorial instructions. We also instructed parents and adolescents thoroughly by telephone on how to collect, record, store and ship saliva samples. Although electronic monitoring of compliance with sample timing was not available in the current study, substantial efforts were made to impress upon participants the importance of compliance with the study's procedures,

[56] Analyses repeated with the inclusion of these additional data points for adolescents do not alter the nature or interpretation of the reported results. An additional paper (Adam, 2006) makes use of the adolescent within-day repeated measures of cortisol to examine within-day variations in adolescent cortisol in relation to within-day changes in adolescent mood states

particularly with regards to the timing of saliva sampling immediately upon waking (Kudielka, Broderick & Kirschbaum, 2003). These efforts included having participants take a practice sample at least one day before the study began, explaining to participants *why* exact timing of the samples was essential to our study, asking participants to note any sampling issues that had occurred, and suggesting that participants conduct a third day of sampling if saliva sampling of the wakeup sample had been delayed for any reason. We also conducted (previously scheduled and agreed upon) reminder calls with each participant the evening before they were scheduled to begin saliva collection, at which time sampling procedures were reviewed and suggestions were given to help ensure compliance e.g. putting sampling materials on a bedside table.

Our experience and those of other experts in the field of salivary cortisol collection with young children has shown that young children tend to have trouble producing an adequate amount of saliva necessary for reliable analysis without controlled use of stimulants. Hence, all kindergarten-aged children were given 1/16 teaspoon of sweetened Kool-aid crystals in order to stimulate saliva, which was absorbed with sterile cotton (placed in the child's mouth for 30 seconds), and expressed through a needleless syringe into a sterile vial. While the use of stimulants such as Kool-aid can affect cortisol values (Schwartz et. al., 1998), the effects of stimulants are negligible for certain assays, and recent work by Talge, Donzella, Kryser, Gierens & Gunnar (2005) found that the correlation between stimulant - treated (Kool-aid) and untreated samples ranges from .95 to .97. Parents were instructed to use no more than 1/16 tsp of stimulant (with the help of a clear visual guide for the correct amount) and samples were visually inspected for signs of stimulant overuse. Although the High Sensitivity Salivary Cortisol Enzyme Immunoassay Kit by Salimetrics LLC used in this study is minimally affected by changes in sample pH associated with stimulant use (Schwartz et. al., 1998) the pH value of all samples

were tested to identify samples with a pH $\leq$ 3.5 or $\geq$ 9.0, which may artificially inflate or lower cortisol values. All our saliva samples were found to have pH values within the acceptable range.

Adolescents in the study were provided with one piece of Trident gum and were instructed to chew until it was soft and pliable to help stimulate saliva flow, a procedure which has been shown not to influence cortisol values (Schwartz et. al., 1998). Participants then expelled saliva through a small straw into a sterile 2 µl vial.

Only children who provided three or more of the four requested samples were included in our analyses. For those who provided only three samples (three children), we replaced the missing cortisol value with that child's own cortisol value taken at the same time on the other sampling day, rather than exclude them from the analyses. Two kindergarten-aged children were dropped from the sample due to insufficient number of samples or the use of asthma and allergy medications potentially influencing cortisol production (Kirschbaum & Hellhammer, 1989, 1994), reducing the total number of children included in our analyses to 61.

Parents and adolescents were instructed to refrigerate samples as soon as possible after they were taken. Since experimental research has shown that salivary cortisol levels are not affected by variations in temperature and motion similar to those experienced during a trip through the mail system (Clements & Parker, 1998; Kirschbaum & Hellhammer, 2000), parents were asked to return the samples to our university-based laboratory by mail. When samples reached our laboratory they were then frozen at –20 degrees Celsius until all data for the study had been collected. Samples were then sent to Salimetrics, LLC ® laboratory on dry ice, where they were assayed by enzyme immunoassay. The test used for this study (Salimetrics, LLC, High Sensitivity Radioimmune Assay) has a range of sensitivity from .007 to 1.8 µg/dl, and average intra- and inter-assay coefficients of variation less than 3% and 7% respectively**.**

Measures

Parent Marital Functioning

We assessed marital functioning as reported by both mothers and partners separately using two measures in the parent questionnaire: marital satisfaction and conflict tactics (i.e., approaches to conflict resolution).

Marital satisfaction. We assessed marital satisfaction by using the ENRICH Marital Satisfaction Scale (EMS; Fowers & Olson, 1993) on which participants reported on a scale from 0 (*strongly disagree*) to 5 (*strongly agree*) the extent to which they endorse statements such as "I am not pleased with the personality characteristics and personal habits of my partner" and "I am very happy with how we handle role responsibilities in our marriage."

Conflict resolution tactics. Using items from the adjusted Conflict Tactics Scale (CTS-2: Straus & Hamby, 1996) participants indicated how often they and their partner generally employ avoidant, constructive, verbally aggressive or physically aggressive conflict styles when disagreement arises. Participants reported on a scale from 0 (*never*) to 4 (*very often*) how often they "just keep their opinion to themselves" (*avoidant*), "discuss their disagreements calmly" (*constructive*), "argue heatedly or shout at their partner" (*verbally aggressive*) and "pushed, grabbed or hit their partner" (*physically aggressive*) during a disagreement. We later excluded the physically aggressive and avoidant items due to a limited range of responses for these items.

Maternal Parenting Quality

We assessed the quality of the mother-child relationship by using two convergent measures in the parent questionnaire: Parental involvement and parent warmth.

Parental involvement. Parental involvement with the child was measured by averaging scores on an activities checklist designed for the purposes of this study. Mothers described how

often they engaged in 28 different activities with their child, such as eating meals together, cooking together, discussing the events of the day, indicating how often they are involved in this activity with their child on a scale of 1 (*rarely or never*) to 4 (*everyday*). The parental involvement checklist varied slightly by child age to ensure that items were age-appropriate for both kindergarten-aged children and adolescents. The parental involvement checklist has a Chronbach's alpha coefficient of .82.

Warmth. Maternal warmth was measured by averaging scores of 6 items adapted from the Inventory of Parent and Peer Attachment (IPPA, Armsden & Greenberg, 1987). Mothers reported on a scale of 1 (*never true*) to 5 (*always true)* the extent to which they endorse statements such as "I make my child feel better when they talk over their worries with me" and "I cheer my children up when they are sad". The parental warmth measure has an alpha-coefficient of .85.

Emotional Functioning

To get a broad picture of mothers' emotional well-being, we assessed emotional functioning using 3 measures: Depressive symptoms, anxiety and self-esteem.

Depressive symptoms. We assessed mothers' depressive symptoms using the Center of Epidemiologic Studies Depression Scale (CED-D; Radloff, 1977), a 20-item self-administered questionnaire that assesses the frequency and duration of symptoms associated with depression in the preceding week. Participants indicated how often they experienced cognitive, behavioral, affective and somatic symptoms of depression on a scale from 0 (rarely or none of the time/ less than once a day) to 3 (most or all of the time/ 5-7 days) resulting in a total maximum score of 60 with higher scores reflecting greater distress. Participants in our sample have mean total CES-D scores of 8.51, which is comparable to average CES-D scores found in large samples of

community samples, which have found to range from 7.5 to 12.7 (Devins, Orme, Costello, Binik, Frizell, Stam et al.1988). Chronbach's coefficient alpha in our sample was .85, suggesting adequate reliability.

Anxiety and self-esteem. We assessed mother anxiety and self esteem using 11 items of the anxiety and self-esteem scales of the Taylor's Measures of Dysphoria, Anxiety, Anger and Self-esteem (Taylor, 1996). Examples for anxiety items include reports by participants about often they perceived themselves as "feeling on the edge, like something awful is going to happen", "feeling nervous for reasons I can't put my finger on," "having trouble concentrating" and "forgetting things readily." Examples of self-esteem items include participants' report on the extent to which they "feel good about themselves" or feel that they "don't have much to be proud of." Participants indicated the extent to which these statements apply to them on a scale of 0 (*never*) to 4 (*very often*). Chronbach's coefficient alpha for this scale was .79.

Puberty, Menstrual Status and Menstrual Timing

Stage of pubertal development was reported using the Pubertal Development Scale (Peterson, 1988). It consists of a series of questions about physical development that ask the adolescent to evaluate the degree to which a specific physical change such as pimply skin, growth spurt, breast development, and facial hair has occurred. A composite score of these four items was used as an overall measure of pubertal development (M = 3.21, SD = .84). We assessed adolescent girls' menstrual functioning using several questions in a health questionnaire asking them to report on 'whether they had started menstruation' (n = 12) and 'whether their menstrual cycle was regular'(n = 12) for which dummy variables were constructed (*0 = no, 1 = yes*). We also asked them to report the number of days since the beginning of the first day of their last menstrual cycle from which we constructed a series of dummy variables indicating the

phase of girls' menstrual cycle during saliva sampling resulting in the following variables: 'whether menstruating or 1 to 6 days since starting menstrual period' (*0 = no, 1 = yes*; n = 6) , 'whether follicular or 7-10 days since starting menstrual period' (*0 = no, 1 = yes*; n = 0), whether periovulatory or 11-14 days since starting menstrual period (*0 = no, 1 = yes*; n = 1), and 'whether luteal or 15 + days since starting menstrual period' (*0 = no, 1 = yes*; n = 3). An additional dummy variable was constructed indicating 'whether the adolescent reported using an oral contraceptive' (*0 = no, 1 = yes*; n = 2). Each of these variables is suspected to have an influence on cortisol levels (see Kirschbaum Hellhammer, 1989; 1994; Kirschbaum et al., 1999; Kudielka & Kirschbaum, 2002; Netherton et al., 2004) and is therefore important to measure these variables and statistically control for their effects when significant in order for the associations of interest to be properly revealed.

Data reduction

Participants' use of constructive and verbally aggressive conflict styles were significantly negatively associated with each other (r = -.64, p = .00). Constructive styles were positively (r = .43, p = .02), and verbally aggressive styles were negatively (r = -.34, p = .06) related to marital satisfaction. Hence, we standardized and aggregated scores representing constructive and verbally aggressive (reverse-scored) conflict styles with those of the EMS, to create a composite score for *marital functioning* for each participant. Mothers' and partners' scores of marital functioning were significantly associated with each other (r = .306, p = .016), hence we averaged their scores to create a jointly reported *marital functioning* score for each couple. We also standardized and aggregated the maternal involvement and warmth scores in order to create a *parenting quality* composite variable for each mother. The alpha coefficient for the composite maternal parenting scale is .75. A logarithmic transformation was applied to the

scores for anxiety and depressive symptoms to adjust for skewness of the distributions. Since correlations between depressive symptoms and anxiety (r = .64, p = .00), depressive symptoms and self esteem (r = -.60, p = .00) and anxiety and self esteem (r = -.45, p = .01) were high and significant, the scores for depressive symptoms, anxiety and self-esteem (reverse-scored) were standardized and aggregated to create an *emotional functioning* composite score for each mother. For each variable, the higher end of the scale reflects better functioning.

We used composite variables for marital functioning, maternal parenting quality and emotional functioning, rather than individual variables, in order to reduce the possibility of Type I error, decrease collinearity among the constructs included in the model, and increase the reliability of measurement of each construct. Aggregation techniques have previously been demonstrated to improve the relations between personality variables and cortisol parameters (Pruessner, Gaab, Hellhammer, Lintz, Schommer & Kirschbaum, 1997).

Data Reduction Of Cortisol Values

We performed paired samples *t*-tests and found that children's wakeup cortisol levels of sampling day 1 and sampling day 2 were similar, $t(58) = .587$, $p = .560$, as were the bedtime levels for sampling day 1 and day 2, $t(59) = .214$, $p = .831$. We also note that there were no statistically significantly differences in wakeup sampling times, $t(58) = -.013$, $p = .990$, and bedtime sampling times across the two days, $t(59) = -.303$, $p = .76$. We were more interested in typical or trait wakeup and bedtime levels, and wished to reduce the impact of day to day variation on our cortisol measure. Hence, we combined the two wakeup cortisol values to derive at an *average wakeup cortisol* value for each child, and combined the two bedtime cortisol values to derive at an *average bedtime cortisol* value for each child. To limit the influence of

extremely high or low individual cortisol values, we windsorized wakeup and bedtime cortisol values to 3 standard deviations above and below the mean before averaging.

We then estimated the child's *average cortisol* level across waking hours by calculating the area under the line fitted through children's wakeup and bedtime cortisol values (with cortisol level plotted on the y-axis, and time of day on the x-axis), and dividing by the total time awake. This was done separately for each day, then values were averaged, resulting in an estimate of the average cortisol level per waking hour, controlling for the length of the child's waking day. For analyses we used a natural logarithmic transformation for each cortisol parameter (average, wakeup, and bedtime cortisol) to reduce positive skewness of the data.

We derived the slope value of the child's diurnal cortisol curve for each sampling day, by dividing the difference between the child's natural log transformed wakeup and natural log transformed bedtime cortisol level with the difference between wakeup and bedtime sampling time. There were no statistically significant differences between the slopes across the two sampling days, $t(58) = .209$, $p = .835$. We combined the two slope values to derive at an *average slope* value for each child.

General Analytic Plan

Our analyses proceeded in several steps. We first prepared descriptive statistics for each of our independent and dependent variables and conducted t-tests comparing the means of kindergarten-aged children and adolescents on each these variables. Next, we calculated simple correlations among the constructs of interest (marital functioning, maternal parenting quality, maternal emotional functioning) and dependent variables (children's average, wakeup, and bedtime cortisol levels and the slope of the diurnal curve). Then we conducted a series of hierarchical regression analyses for each outcome by proceeding according to the following

steps. We first examined effects of marital functioning and child age on children's cortisol variables. Next we examined if the association between marital functioning and child cortisol levels was moderated by child age. When the interaction effect of marital functioning and child age was not found to be statistically significant, we did not include the interaction terms in the final model. Next we examined whether the main and/or interaction effects of parent marital functioning and child age on our cortisol variables were mediated by, or independent of, levels of maternal parenting quality and maternal emotional functioning by adding these variables to the model. In addition, when significant associations were found between sampling times and cortisol levels, or between total time awake and cortisol levels, we included those variables in the final model, to ensure that the family functioning effects were independent of these family schedule variables. Given that we used natural log transformations of our dependant variables, we used inverse natural log transformation ($100 (e^{\beta}-1)$) to obtain interpretable estimates of our β coefficients; after this transformation they represent the percentage change in the dependant variable (cortisol level) for each 1 unit change in each independent variable

To assess the extent to which collinearity among the independent variables affected the parameter estimates, we examined collinearity diagnostics (Variance Inflation Factor -VIF) for each model, to ensure that VIF values did not exceed 10, which may lead to instability of the regression model and estimates (Neter et al., 1996; Allison, 1977; 1999). We noted that VIF values for marital functioning, maternal parenting quality and maternal emotional functioning – variables at greatest risk for collinearity – did not exceed 2.4 suggesting that modeling them simultaneously is appropriate.

Results

Descriptive Statistics

The means and standard deviations of the primary independent variables included in the analyses are presented in Table 4.1. Participants' reports on variables related to the interparental relationship were similar for adolescents and kindergarten-aged children; marital satisfaction, $t(59) = -.325$, $p = .747$; use of verbally aggressive conflict style, $t(59) = .826$, $p = .412$; constructive conflict style, $t(59) = .740$, $p = .462$ and composite of marital functioning, $t(59) = -.317$, $p = .752$. Mothers' reports on emotional functioning were mostly similar across age groups; self-esteem, $t(59) = -0.709$, $p = .481$; depression, $t(59) = .185$, $p = .854$; composite of emotional functioning, $t(59) = -.668$, $p = 0.506$, but mothers of adolescents reported slightly higher levels of anxiety**,** $t(59) = 2.79$, $p = .007$. While mothers of kindergarten-aged children and adolescents reported similar levels of warmth, $t(59) = 1.39$, $p = .168$, mothers of kindergarten-aged children reported higher levels of involvement, $t(59) = 2.63$, $p = .011$; and higher scores on the maternal parenting quality composite $t(59) = .2.57$, $p = .013$ than mothers of adolescents.

Table 4.1 also presents descriptive statistics for children's cortisol measures and sampling times. Untransformed values are presented here for ease of interpretation; natural logarithmic transformed values were used in all analyses. A series of independent samples *t*-tests were performed to identify statistically significant differences between adolescents and kindergarten-aged children for wakeup and bedtime levels of cortisol as well as sampling times. As expected, kindergarten-aged children reported significantly earlier bedtime sampling times than did adolescents, $t(59) = -1.58$, $p = .000$; while wakeup sampling times were similar, $t(59) = -.334$, $p = .157$, resulting in significantly shorter hours of awake time for kindergarten-aged children, $t(59) = -1.99$, $p = .000$. While kindergartners' cortisol levels at wakeup are significantly lower than adolescents, $t(59) = -.109$, $p = .016$; bedtime cortisol levels are similar, $t(59) = .001$, $p = .964$; resulting in a trend toward flatter slopes for kindergarten-aged children, $t(59) = -.008$, $p =$

.058. We also conducted a series of independent samples *t*-tests to identify differences between boys and girls for each age group for average, wakeup and bedtime levels of cortisol as well as slope values. There were no statistically significant differences by gender within each age group. We found no differences between adolescent girls and boys in average cortisol levels, $t(29) = .0049$, $p = .940$, wakeup cortisol levels, $t(29) = .0528$, $p = .477$; bedtime cortisol levels, $t(29) = .005$, $p = .863$; or slope values, $t(29) = -.002$, $p = .776$. Average cortisol levels, $t(28) = .084$, $p = .111$, wakeup cortisol levels, $t(28) = .026$, $p = .631$; bedtime cortisol levels; $t(28) = .091$, $p = .103$ and slope values $t(28) = .007$, $p = .202$ of kindergarten-aged girls and boys were similar also similar. We also found no significant differences in cortisol levels between females who reported having started menstruating regularly for average levels of cortisol, $t(59) = -.065$, $p = .206$; wakeup cortisol, $t(59) = -.147$, $p = .081$; bedtime cortisol, $t(59) = -.003$, $p = .940$; or slope, $t(59) = .008$, $p = .274$ nor did we note statistical differences by phase of the menstrual cycle. We also did not note differences in adolescents' cortisol levels by pubertal status.

Simple Correlations Of Marital Functioning, Maternal Parenting Quality And Emotional Functioning And Children's Cortisol Levels

Intercorrelations of the composite variables for marital functioning, maternal parenting quality, maternal emotion and children's cortisol parameters (average, wakeup and bedtime cortisol, and slope of diurnal curve) are presented in Table 4.2. The marital functioning composite variable is negatively and significantly related to children's cortisol levels ($r = -.363$, $p = .004$ for average cortisol; $r = -.310$, $p = .015$ for wakeup cortisol; $r = -.356$, $p = .005$ for bedtime cortisol and $r = -.298$, $p = .020$ for slope of diurnal curve), such that children in higher marital functioning families have lower average, wakeup and bedtime cortisol levels and steeper diurnal cortisol curves. Better maternal parenting quality and better maternal emotional

functioning were associated with lower bedtime cortisol levels (r = -.252, p = .050 for maternal parenting quality; and r = -.369, p = .003 for emotional functioning) and steeper diurnal cortisol curves (r = -.265, p = .039 for maternal parenting quality and r = -.358, p = .005 for emotional functioning). Associations with average and wakeup cortisol levels were not significant for maternal parenting quality (r = -.093, p = .476; r = -.017, p = .894) or for maternal emotional functioning (r = -.184, p = .157; r = -.072, p = .584).

Multivariate Associations Among Parent Marital Functioning, Maternal Parenting Quality, Maternal Emotion, Child Age And Children's Cortisol

Given that each of marital quality, maternal parenting quality and maternal emotional functioning showed associations with cortisol, in order to examine their independent effects, we next examine them simultaneously in a regression model. We perform hierarchical linear regressions for each of our major cortisol outcome variables, including: Average cortisol levels, diurnal cortisol slopes (rate of change in cortisol from wakeup to bedtime), and wakeup and bedtime levels. Since average levels of cortisol and diurnal slopes are examined, analyses for wakeup and bedtime levels may seem redundant, but are performed in order to understand whether slope effects are driven by wakeup values, bedtime values, or both, a distinction which helps shed some light on the potential psychoneurobiological mechanism for the slope effects.

Average Cortisol Levels

In Model 1 of Table 4.3, we note a significant main effect of marital functioning on children's average cortisol levels; for every 1 SD higher marital functioning children's average levels of cortisol are lower by approximately .36 of a SD or 16.6 %, compared to children who's parents' marital functioning is at the mean level. We also note a significant main effect of child age (whether the child is a kindergartner) on children's average cortisol levels; kindergarten-aged

children have average cortisol levels across the day that are approximately .25 of a SD (17.7%) lower than those of adolescents. In Model 2, we note associations between marital functioning and child average cortisol levels are not significantly moderated by child age.

In Model 3 of Table 4.3, we find that the associations between marital functioning and children's average cortisol levels are independent of maternal parenting quality and emotional functioning. Mother's parenting quality (B = .001, p = .990) and emotional functioning (B = .010, p = .886) were not significantly associated with children's average level of cortisol across the day when marital functioning and child age are in the model, but the significant effect of marital functioning remains (B = -.188, p = .012). Even after maternal parenting quality and emotional functioning are entered in the model, 1 SD higher marital functioning is associated with .38 SD (17.2%) lower average cortisol levels for both kindergarten-aged children and adolescents. There were no significant associations between wakeup sample time (r = -.129, p =.322) or bedtime sample time (r = .148, p = .255) or the length of children's waking day (r = .233, p = .071) with average cortisol levels and these variables are therefore not included in the model. Model 3 shows that even after maternal parenting quality and emotional functioning are entered in the model, 1 SD higher marital functioning is associated with .38 SD (17.2%) lower average cortisol levels for both kindergarten-aged children and adolescents.

The associations between parent marital quality and child and adolescent average cortisol levels, controlling for maternal parenting quality and emotional functioning are represented in Figure 4.1. As is apparent from our analyses, children in both age groups living in homes where mothers and their partners report poorer marital functioning have significantly higher average cortisol levels than children in homes where parents report higher marital functioning**.** The main

effect of child age on cortisol levels is also apparent, with adolescents having higher average cortisol values than kindergarten-aged children.

Slope Of Children's Diurnal Cortisol Curve

Table 4.4 presents hierarchical regression analyses predicting the slope of children's diurnal cortisol curve. In Model 1 we note significant main effects of parent marital functioning (B = -.024, p =.016), and child age (B = -.034, p =.025), on children diurnal slope. In Model 2 however, we note that the associations between marital functioning and children's diurnal slopes are significantly moderated by child age (B = -.068, p =.000), indicating that the effect of marital functioning on the slope of children's diurnal cortisol curves depends on whether the child is a kindergartner or adolescent, with significantly steeper slopes for kindergarten-aged children whose parents report better marital functioning, compared to kindergarten-aged children whose parents report poorer marital fucnitoning. Considering the presence of a significant product term in our model, we refrain from interpreting the significance main effects of the two variables of the product term (Allison; 1977; 1999).

Model 3 of Table 4.4 shows that the interaction effect of marital functioning and child age on children's cortisol slopes remains highly significant (B = -.069, p=.000) and is independent of maternal parenting quality and emotional functioning. We also note a significant negative association between maternal parenting quality and cortisol slope, indicating that for each 1 SD increase in maternal parenting quality, children's diurnal cortisol slope are steeper by .24 SD. Maternal emotional functioning was not significantly related to the slope of children's diurnal cortisol curve (B =.010, p = .312). Because we noted significant simple correlations for the slope of the diurnal curve with the total hours of awake time (r = .369, p = .003) and wake-up time (r = -.287, p = .025) these variables were included in the final regression model to ensure

they did not account for the effects of marital functioning on cortisol slope. Neither total time awake (*B* =.002, *p* = .875) or wakeup sampling time (*B* = -.013, *p* = .163) accounted for the marital functioning or parenting effects. Examination of the *B* coefficients indicates a total effect of parents' marital functioning on kindergartners' slope of -4.3% (*B* Marital functioning + *B* (Marital Functioning x Child Age Interaction)= -.044 converted to $100(e^{-.044} - 1)$. T-tests of the simple slopes (Aiken & West, 1991) indicate that kindergartener's slopes are 4.3% steeper for each 1SD increase in marital functioning, a significant effect, whereas adolescents' slopes are 2.5% flatter, an effect which was not significant (*p* =.358).

The associations between parent marital quality, child age and child cortisol slopes, controlling for maternal parenting quality and emotional functioning, are presented in Figure 4.2. The lines illustrate differences in the steepness of the slope of the diurnal cortisol curve for kindergarten-aged children and teens whose parents report 1 SD above the mean on marital functioning, compared to the slope value of kindergarten-aged children and teens whose parents report 1 SD below the mean on marital functioning. Note that the graphed lines and the slope values they represent were derived using the regression equations resulting from our analyses. As is apparent from our analyses, kindergarten-aged children living in homes where parents report better marital functioning have significantly steeper slopes, compared to adolescents, for whom marital functioning does not have a statistically significant effect on diurnal cortisol slopes.

Wakeup And Bedtime Cortisol Levels

To understand whether slope effects are driven by wakeup values, bedtime values, or both, we conducted identical sets of hierarchical regression analyses for children's wakeup and bedtime levels of cortisol, the final models of which are presented in Table 4.5. Prior research has suggested that bedtime cortisol levels are thought to be more subject to immediate

environmental influences, whereas wakeup levels may reflect more long term influences on the HPA axis (Gunnar & Vasquez, 2001). As a result, these analyses may provide some insight into the mechanism for the overall slope effects. Table 4.5 shows that when maternal parenting quality and emotional functioning are in the model, 1 SD higher marital functioning is associated with .40 SD lower (or 15.4%) wakeup cortisol levels for *both* kindergarten-aged children and adolescents, suggesting that differential effects of parent marital functioning on children's diurnal cortisol slopes by child age are not driven by children's cortisol levels at awakening.

Instead, age differences in effects of marital functioning on children's diurnal cortisol slopes appear to be driven by elevations of kindergartners' cortisol levels at bedtime (Table 4.5). Note the significant interaction effect of marital functioning and child age on children's cortisol level at bedtime (B = -.724, p = .003), indicating lower bedtime cortisol levels for kindergarten-aged children in higher marital functioning families even after controlling for maternal parenting quality and maternal emotional functioning. Examination of the B coefficients indicates a total negative effect of marital functioning on kindergartners' cortisol levels at bedtime of 44.7 % (B Marital functioning + B (Marital functioning x Child age Interaction) = -.593 converted to 100($e^{-.593}$ -1), suggesting that bedtime cortisol levels of kindergarten-aged children are 44.7 % higher when marital functioning is lower by 1 SD. There were no significant associations between wakeup (r = -.185, p = .153) and bedtime sampling times (r = .097, p = .459) and bedtime cortisol nor did we find that the length of awake time (r = 217, p = .093) predicted children's cortisol levels at bedtime; hence these variables were not included in the final model. There is a trend for an effect of maternal parenting quality on bedtime levels of cortisol (B = -.223, p =.092), with higher quality parenting associated with lower bedtime cortisol levels.

Additional Analyses

In addition to the primary analyses presented in detail above, we examined two-way interactions between other composite variables (maternal parenting quality, maternal emotional functioning) and child age, and two-way interactions between all composite variables and child gender. We also tested whether high maternal parenting quality might buffer against the negative effects of poor marital and emotional functioning on cortisol levels by testing two-way interaction between marital functioning and maternal parenting quality, and tested whether poor emotional functioning of the mother might exacerbate the negative effects of poor marital functioning by testing the interaction between participants' marital and emotional functioning.

We tested two-way interactions between child age and child gender on each of our dependent variables to explore if the impact of age on children's cortisol level varied by child gender. Although we had limited degrees of freedom to do so, we also explored whether the impact of marital functioning varied by combinations of child age and gender by running a three-way interaction between marital functioning by child age by child gender. We also examined whether teens' pubertal development, adolescent girls' menstrual status, or the phase of girls' menstrual cycle on the days of testing modified the impact of marital functioning on cortisol. There was no sign that the impact of marital functioning on child cortisol was greater for any particular age-gender combination and no sign that its impact was modified by teens' pubertal development, adolescent girls' menstrual status or menstrual phase [57].

Discussion

Our study is the first naturalistic study to simultaneously examine associations between parent marital functioning, maternal parenting quality, maternal emotional functioning and children's cortisol levels in a low-risk sample. This investigation finds that poor marital

[57] See appendix D and E

functioning (i.e., low level of marital satisfaction, frequent use of a verbal aggression during interparental disagreements and infrequent use of calm discussion to solve disagreements), is associated with higher average and wakeup cortisol levels in both adolescent and kindergarten-aged children. It also suggests that poor marital functioning is associated with higher bedtime cortisol levels and flatter slopes of the diurnal cortisol curve, but this association is qualified by child age. While kindergarten-aged children whose parents report poor marital functioning have higher bedtime cortisol levels and flatter slopes than children whose parents report high marital functioning, adolescents' cortisol levels at bedtime and slopes of their diurnal cortisol curves are not significantly associated with marital functioning. We also find that higher maternal parenting quality by the mother, as indicated by higher involvement and warmth, is associated with increased steepness in the slope of the diurnal cortisol curve, for both kindergarten-aged children and adolescents. It is important to note that these effects are independent of one another, and of maternal emotional functioning, which does not have a significant independent effect when marital functioning and maternal parenting quality are in the model. That is, the significant simple associations between maternal emotional functioning and child cortisol, in this study, are most likely due to the fact that impaired emotional functioning (high depression and anxiety, low self-esteem) occurs in the context of poor marital functioning and poor maternal parenting.

Poor Marital Functioning And Elevated Levels Of Cortisol

Findings suggest that the nature of the conflict resolution style employed during interparental disagreements (calmly discussing disagreements versus being verbally abusive) and the level of marital satisfaction have important associations with children's stress hormone levels. As such, our work expands on work by Flinn and England (1995) who examined children's cortisol in a sample of Caribbean children and adolescents. They found that children's

average cortisol levels were related to *family composition*; children living with distant relatives, stepfathers, half- siblings or single parents without kin support, had higher average levels of cortisol than children living with both parents, single mothers with kin support, or grandparents. They also noted that stepchildren had higher average cortisol levels than their half-siblings residing in the same household who were genetic offspring of both parents. The authors suggested that traumatic family events, which appeared to be more common in families with a greater number of biologically unrelated members, may be an important mediating variable; quarreling and fighting between parents, parents and children, or parents and other family members, predicted elevations in child cortisol levels more strongly than any of the other variables measured. While those results implied that conflictual family processes mediated associations between household composition and child cortisol levels, it was not possible to ascertain to what extent conflictual processes between parents made significant contributions to child cortisol levels independent of other aspects of family dysfunction. They also did not, simultaneously consider other aspects of family functioning such as maternal emotional functioning and maternal parenting quality and their effects on children's cortisol levels. In addition, they did not examine whether the strength of associations between marital functioning and child cortisol level varied by child age.

While it is clear how acute exposure to conflict would elevate child cortisol, how might marital satisfaction and individual differences in conflict resolution strategies influence children's average cortisol levels, as was observed in the current study? Several possibilities exist. Children whose parents frequently engage in verbally aggressive conflict rather than calm discussion, might feel threatened more often and/or come to anticipate conflict more often, causing a chronic anticipatory elevation of cortisol levels. In addition, children whose parents

who report low marital satisfaction may less often witness expressions of love, cooperation and affection between their parents, leading them to appraise instances of conflict as more threatening, because they are less certain about the occurrence of resolution. This may lead the child to more frequently worry about conflict occurring, to anticipate escalation of interparental disagreements, and cause them to worry about parental separation, the loss of a parent, and/or loss of stability of family life. Any of these psychological threats, or combinations thereof, could result in more frequent or prolonged elevations of the HPA-axis, which in turn could cause changes in the underlying neurobiological regulation of cortisol levels (Carlson & Earls, 1997; Gunnar, 2000; De Bellis, et al., 1999). Clearly, additional studies are needed to examine which, if any, of these mechanisms are responsible for associations between poor marital functioning and individual differences in child basal cortisol levels.

If confirmed, these findings may provide initial evidence of physiological processes underlying what marital discord theorists have described as sensitization (Davies et al., 2002). The sensitization hypothesis suggests that the associations between exposure to high levels of conflict and child distress are a result of individual differences in child response to interparental problems, which, over time, become stable adaptational behavioral patterns. It is possible that these behavioral adaptational patterns are supported by similarly stable, adaptational patterns of physiological arousal which influence behaviors, cognitions and emotions that accompany child distress in the face of marital discord.

Maternal Parenting Quality And Children's Cortisol Levels

This study finds that decreased parenting quality by the mother (i.e., lower involvement, lower warmth), is associated with flatter slopes of children's diurnal cortisol curve independent of associations between parents' marital functioning and maternal emotional functioning. While

there is previous evidence to suggest that young children in neglectful rearing environments exhibit a lack of a normal daytime pattern of cortisol production (Gunnar & Vasquez, 2001), our study is the first to show associations between children's diurnal cortisol slope and maternal parenting quality within the normal range of parent behavior. These results seem to imply that warm, supportive and highly involved maternal parenting may constitute a coping resource for children and as such help children's regulate their physiological arousal, particularly towards the end of the day, regardless of the quality of marital functioning. Although we recognize that it is more difficult for maritally distressed parents to maintain positive parent-child interactions, high quality parenting by the mother in the context of marital discord may constitute a coping resource for children either by avoiding the erosion of children's emotional security (Davies & Cummings, 1994;1998), or may lead children to make positive cognitive appraisals (Grych, 1998) about their ability to "handle" the (anticipated or incurred) psychological threat posed by interparental discord and as such help them regulate physiological arousal. We find it interesting that effects of maternal parenting quality on the diurnal slope are similar across our full sample, suggesting that high parental involvement by the mother may still represent a coping resource to adolescents under stress, despite their quest for independence from adults.

Emotional Functioning And Child Cortisol Levels

Findings indicate that while maternal emotional functioning is associated with children's cortisol levels as a simple correlation, this association is not independent of associations between parents' marital functioning, maternal parenting quality and children's levels of cortisol levels. Results may imply that mother's emotional functioning is less likely to be detected by the child (other than through parent-child interactions or its effects on marital interactions), whereas low maternal parenting quality and poor marital functioning are more likely to pose more immediate

and salient threats to the child's well-being or goals, resulting in the activation of the HPA axis. This interpretation may be especially reasonable given that maternal emotional functioning in our sample is mostly within the normal range. It is possible that we would have found stronger independent associations between children's cortisol levels and maternal emotional functioning if the mean level of mothers' depressive symptomatology in our sample were closer to the clinical range (CES-D scores of 16 and up, Radcloff, 1977) or when preceded by exposure to clinical levels of depression during infancy (see Essex, Klein, Cho, Kalin, 2002). Although we did not have appropriate data to examine whether exposure to depression during infancy might potentiate the effects of current depression on cortisol, to further explore the impact of severity of mother depression, we conducted hierarchical regression analyses to examine the impact of "whether the mother had CES-D scores 16 or up" (n = 5) and "whether the mother had ever been diagnosed with a mental illness" (n = 7) but found no statistically significant associations or trends. Given these results, we believe that maternal emotional problems are mostly likely to influence child cortisol levels if they impact on aspects of marital functioning that are observable to the child, or are reflected in the mother's behavior towards the child.

Alternative Explanations Of Children's Cortisol Levels

Although our interpretations thus far have focused on social-environmental factors, the possibility remains that associations between marital functioning, maternal parenting quality and children's cortisol levels may be due to genetic factors. It is conceivable that children with higher cortisol levels have one or both parents who also exhibit elevated cortisol levels, which are in turn related to personality or behavioral traits that make interparental conflict or poor maternal parenting more likely. We find that associations between mother's and children's bedtime cortisol levels are indeed significant (r = .554, p = .01), but note that associations between

mother's and children's wakeup levels are not (r = .133, p = .66) suggesting that it more likely that state level variables, rather than trait level characteristics are responsible for these findings. It is however beyond the scope of this paper to conclusively rule out genetic contributions to the reported associations. In addition, although we did not find any evidence to suggest that adolescents' pubertal development, adolescent girls' menstrual status or menstrual timing were associated with differences in children's cortisol levels, it is possible that other, underlying hormonal and neurobiological changes associated with puberty may play a role in the reported associations.

Another potential explanation for young children's higher cortisol levels at bedtime in homes where mothers report poor marital functioning is that they are a result of children's direct exposure to intense conflict during the two days of the study. However, an examination and comparison of diary reports completed by parents of kindergarten-aged children and by teens suggested that this explanation is unlikely – we did not note any episodes of intense, verbally aggressive conflict occurring in the families on the specific days of study participation.

Last, prior research (Kertes & Gunnar, 2004) has shown that children's participation in evening activities, particularly sports, is associated with small increases in evening cortisol levels in 7 to 10 year-old boys. Again, however, an examination of the diaries completed by parents of kindergarten-aged children and teens on the days of testing suggested that this explanation is unlikely.

Limitations And Future Directions

We recognize that no firm causal inferences can be made due to the correlational nature of our data. Future research would benefit from taking a longitudinal approach that combines measures of marital functioning, maternal parenting quality and emotional functioning over a

longer time frame in relation to repeated measures of children's cortisol levels in maritally distressed and non-distressed homes. In addition, the use of a larger sample would allow for measurement of a greater range of parental functioning across the domains of interest, as well as provide more degrees of freedom to conduct complex analyses taking into account the history of parent psychopathology, as well as other environmental stressors and sources of support. These caveats aside, the current study suggests that a detailed examination of family functioning may help us understand individual differences in children's HPA axis functioning, not only at the extremes of parental functioning such as domestic violence, abuse or neglect, and parent psychopathology, but also for more common variations in marital, parenting and emotional functioning in the normal range. The long-term implications of these subtle variations in family functioning and cortisol levels for later HPA-axis functioning and for child and adolescent well-being remain to be examined in future research.

Table 4.1

Means and Standard Deviations for Parent Marital Functioning, Maternal Parenting Characteristics, Maternal Emotional Functioning, Child Cortisol Levels and Sampling Times

Variable	*Min*	*Max*	*M*	*SD*
Mom Marital Satisfaction (ENRICH)	13.72	95.00	52.20	14.7
Mom avoiding conflict (CTS-2)	1.00	4.00	2.52	0.81
Mom discussing calmly (CTS-2)	1.00	5.00	3.63	0.89
Mom arguing heatedly (CTS-2)	1.00	5.00	2.33	0.98
Mom hitting/throwing (CTS-2)	1.00	2.00	1.04	0.81
Partner Marital Satisfaction (ENRICH)	15.98	81.18	51.70	13.1
Partner avoiding conflict (CTS-2)	1.00	5.00	2.69	0.75
Partner discussing calmly (CTS-2)	2.00	5.00	3.73	0.76
Partner arguing heatedly (CTS-2)	1.00	4.00	2.33	0.77
Partner hitting/throwing (CTS-2)	1.00	2.00	1.02	0.77
Maternal Involvement	1.37	2.65	2.08	0.30
Maternal Warmth (IPPA)	2.67	5.00	4.17	0.49
Maternal Depression (CES-D)	0.00	26.00	8.76	6.41
Maternal Anxiety (Taylor)	.25	3.25	1.46	0.62
Maternal Selfesteem (Taylor)	1.25	4.00	2.95	0.61
Wakeup cortisol[a]	0.23	1.00	0.52	0.18
Bedtime cortisol[a]	0.01	0.54	0.08	0.11
Average cortisol[a]	0.13	0.79	0.32	0.16
Diurnal Cortisol Curve (Slope)	-.084	.007	-.032	.016
AM Sampling time[b]	5.75	10.05	7.37	0.91
PM Sampling time[b]	19.00	24.55	21.64	1.16

[a]Cortisol values are averaged over 2 days and reflect untransformed values, in ug/dl.
[b]Sampling times are expressed on a 24 hour scale with 1 hour equal to 1 unit on the scale.

Table 4.2

Intercorrelations among composites of Parent Marital Functioning, Maternal Parenting Quality, Maternal Emotional Functioning and Child Cortisol Levels and Slope of Diurnal Cortisol Curve

Variable	1	2	3	4	5	6	7
1. Marital Functioning	-						
2. Maternal Parenting	.267*	-					
3. Maternal Emotion	.547**	.261*	-				
4. Average Cortisol	-.363*	-.093	-.184	-			
5. Wakeup cortisol	-.310*	-.017	-.072	.872**	-		
6. Bedtime cortisol	-.356**	-.252*	-.369**	.611**	.238	-	
7. Slope	-.298*	-.265*	-.358**	.312*	-.089	.916**	-

Note. $^{+}$ $p < .10$, * $p < .05$, ** $p < .01$

Table 4.3

Linear Regression Analyses for Parent Marital Quality, Maternal Parenting Quality and Maternal Emotional Functioning predicting Children's Average Cortisol Levels (N = 61)

Variable	*B*	*SE*	*β*	*p-value*
Model 1, (R^2 = .194)				
Constant	-1.142	.064		
Parent Marital Functioning	-.182	.059	-.363	.003
Whether Kindergartner	-.195	.092	-.250	.038
Model 2, (R^2 = .194)				
Constant	-1.142	.065		
Parent Marital Functioning	-.156	.085	-.311	.072
Whether Kindergartner	-.195	.093	-.250	.039
MF x WK Interaction	-.051	.119	-.073	.669
Model 3, (R^2 = .195)				
Constant	-1.142	.066		
Parent Marital Functioning	-.188	.073	-.375	.012
Whether Kindergartner	-.195	.094	-.250	.042
Maternal Parenting Quality	.001	.068	.002	.990
Maternal Emotional Functioning	.010	.068	.021	.886

Note. Dependent variable is average cortisol values, natural log transformed.

Table 4.4

Linear Regression Analyses for Parent Marital Functioning, Maternal Parenting Quality and Emotional Functioning Predicting Children's Diurnal Cortisol Slopes (N=61)

Variable	*B*	*SE*	*β*	*p-value*
Model 1, (R^2 = .350)				
Constant	-.138	.010		
Parent Marital Functioning	-.024	.009	-.298	.016
Whether Kindergartner	-.034	.015	-.276	.025
Model 2, (R^2 = .350)				
Constant	-.138	.009		
Parent Marital Functioning	.011	.012	.141	.358
Whether Kindergartner	-.034	.013	-.276	.012
MF x WK Interaction	-.068	.017	-.615	.000
Model 3, (R^2 = .456)				
Constant	-.138	.073		
Parent Marital Functioning	.025	.012	.312	.052
Whether Kindergartner	-.032	.019	-.262	.103
MF x WK Interaction	-.069	.017	-.626	.000
Maternal Parenting Quality	-.021	.009	-.244	.030
Maternal Emotional Functioning	-.010	.009	-.131	.312
Wakeup Sampling Time	-.013	.009	-.193	.163
Total Time Awake (hrs)	-.002	.012	-.031	.875

Note. Dependent variable is slope of the diurnal cortisol curve, natural log transformed.

Table 4.5

Linear Regression Analyses for Parent Marital Quality, Maternal Parenting Quality and Maternal Emotional Functioning predicting Children's Wakeup and Bedtime Cortisol Levels (N = 61)

Variable	*B*	*SE*	*β*	*p-value*
Wakeup Cortisol, (R^2 = .198)				
Constant	-.613	.054		
Parent Marital Functioning	-.165	.060	-.396	.008
Whether Kindergartner	-.188	.077	-.291	.018
Maternal Parenting Quality	.024	.056	.054	.668
Maternal Emotional Functioning	.051	.056	.131	.369
Bedtime Cortisol, (R^2 = .389)				
Constant	-2.705	.124		
Parent Marital Functioning	.131	.176	.124	.462
Whether Kindergartner	-.373	.177	-.228	.040
MF x WK Interaction	-.724	.236	-.491	.003
Maternal Parenting Quality	-.223	.130	-.198	.092
Maternal Emotional Functioning	-.138	.131	-.140	.300

Note. Dependent variables are wakeup and bedtime cortisol level, natural log transformed.

Figure 4.1

Effect of parent marital functioning on children's average cortisol level while maternal parenting quality and emotional functioning are at mean levels.

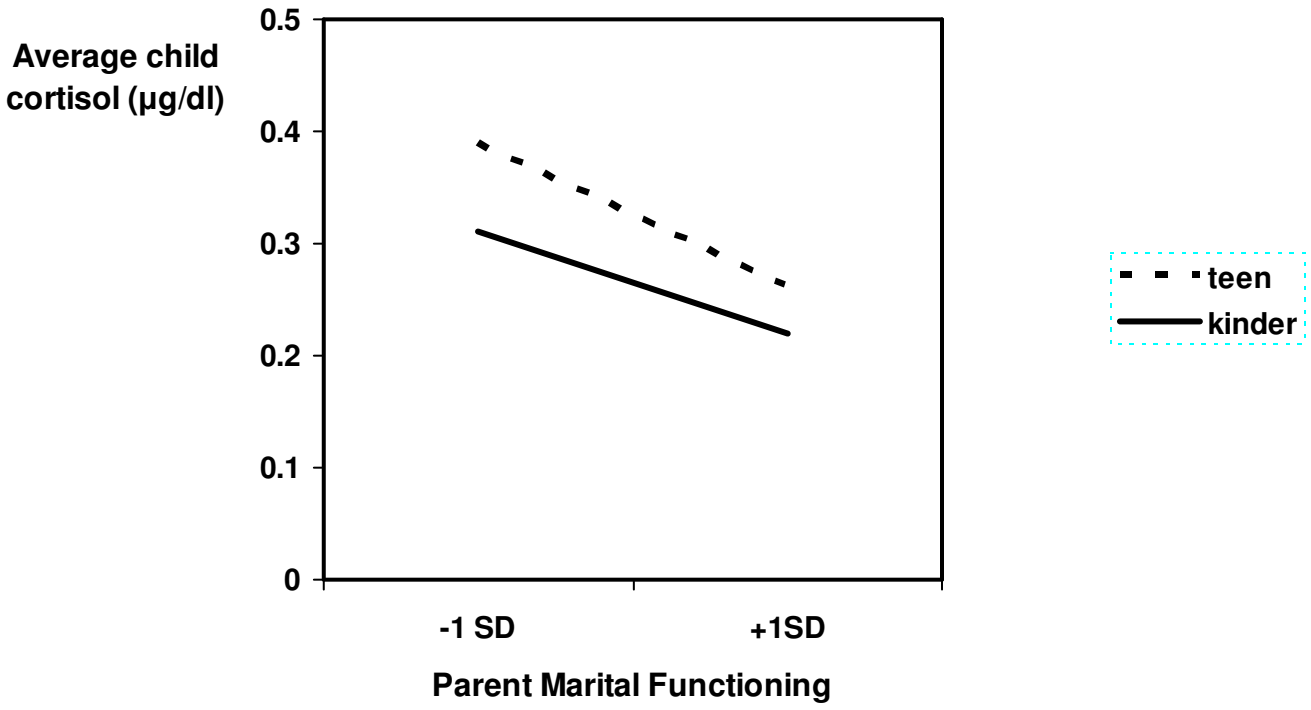
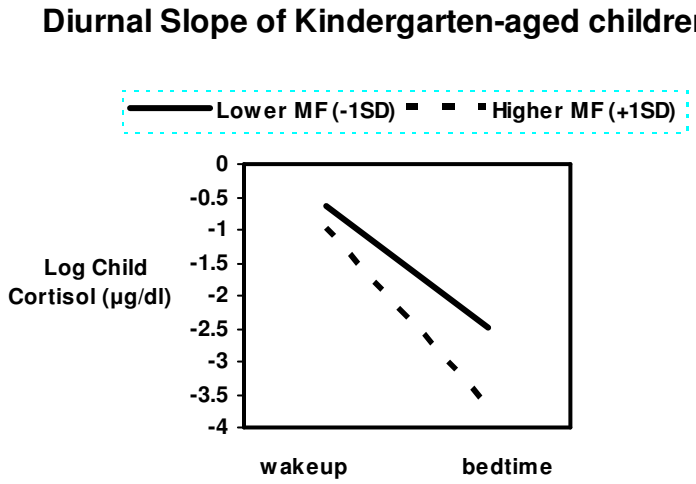
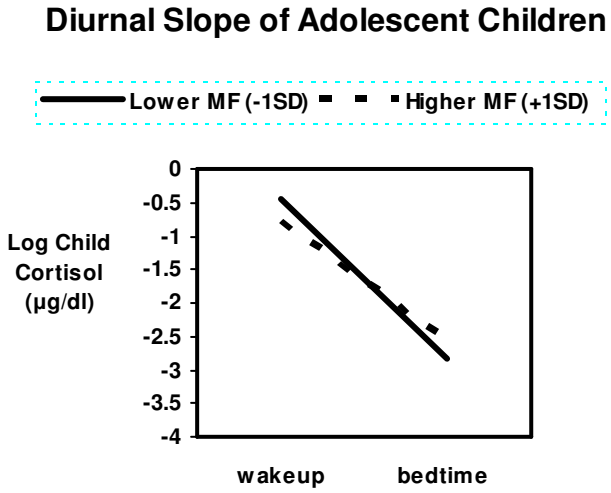


Figure 4.2

Effect of parent marital functioning on diurnal cortisol slopes while maternal parenting quality and emotional functioning are at mean levels.





CHAPTER FIVE

INTERPRETATION AND DISCUSSION OF DISSERTATION FINDINGS AND IMPLICATIONS FOR POLICY AND RESEARCH

The primary goal of this dissertation is to improve our understanding of the causes and consequences of interparental conflict for child development. In three essays, the dissertation examined 1) the consequences of interparental discord in infancy for cognitive and socioemotional functioning in toddlerhood, 2) the interplay of infant and parental characteristics in predicting child-related conflict in toddlerhood and 3) associations between marital discord and child cortisol levels in early childhood and adolescence. Although I will summarize the main findings from each study, the main focus of this chapter is an integrative discussion of the findings as a whole, and their implications for policy and future research.

Review Of Findings

In the first study, lagged dependent variable analyses of longitudinal data on a nationally representative sample of children and parents revealed a small and negative association between child-related conflict in infancy and later child cognitive ability in toddlerhood, after children's prior cognitive ability was taken into account along with important child, parent and household characteristics. These associations were not moderated by individual, familial or environmental vulnerability or protective factors, including child temperament. Associations between child-related conflict in infancy and toddler socioemotional functioning however were moderated by child gender. Greater frequency of child-related conflict during infancy was associated with lower socioemotional functioning at 24 months for girls, while boys' socioemotional functioning was not affected by varying levels of child-related conflict. Differential associations between early child-related conflict and later socioemotional functioning by child gender were not

accounted for by other individual, familial or environmental vulnerability or protective factors. As compared to findings for child-related conflict, no significant associations were found between *general* interparental conflict and child functioning in cognitive or socioemotional domains.

Results of Study 2, also based on lagged dependent variable modeling of data on a nationally representative sample of young children and their families, focused on the interplay of infant and parental characteristics in predicting child-related conflict in toddlerhood. Results showed that potentially adverse effects of child negative emotionality in infancy on later child-related conflict occurred in the face of greater parental differences in knowledge of child development. Parents of children high on negative emotionality at 9 months had higher levels of child-related conflict at 24 months when they had greater differences in knowledge of child development, compared to parent with fewer differences. In contrast, varying levels of parental differences in child development knowledge did not affect the frequency of later child-related conflict of parents whose children had average or low levels of negative emotionality at 9 months. The associations were found over and above effects of prior child-related and general conflict, marital satisfaction, and important child, parent and household characteristics.

The third study, which examined associations between marital discord and children's cortisol levels in early childhood and adolescence, found that poor marital functioning was associated with higher average cortisol levels in both adolescent and kindergarten-aged children. Poor marital functioning was also associated with higher bedtime cortisol levels and flatter slopes of the diurnal cortisol curve, but this association was moderated by child age. While kindergarten-aged children whose parents reported poor marital functioning had higher bedtime cortisol levels and flatter slopes than those children whose parents reported higher marital

functioning, adolescents' bedtime cortisol levels and slopes of their diurnal cortisol curves were not associated with marital functioning. These associations were found while controlling for maternal parenting quality and maternal emotional functioning.

Interpretation Of Dissertation Results: Small Effect Sizes

The findings of this dissertation challenge our knowledge about the size of associations between interparental discord and child maladjustment. In particular, effects sizes reported in Study 1 and 2 are considerably smaller than those reported in prior literature. For example, in a recent meta-analysis examining associations between marital discord and child adjustment, Buehler et al. (1997) found an average effect size (i.e., based on standardized units) of .32 - reporting effect sizes ranging from .19 to .35, which are considerably larger than those reported in this work. Why are effects sizes reported in this work relatively small?

First of all, it is important to remind the reader, that in Study 1 and 2, I estimated *lagged dependent* variable models to control for unmeasured, time-invariant heterogeneity captured by the dependent variable measured at 9 months of age. Conceptually, the coefficients on the predictors thus represent the effects on *changes in rates* of child cognitive development (for Study 1) or *changes in rates* of child-related conflict (in Study 2) over time. Because there is less variance associated with changes in growth in the dependent variable over time, compared to changes in absolute levels of the dependent variable at a given point in time, effects sizes for Study 1 and 2 are thus expected to be relatively small. This approach is in contrast to analytical approaches used in the majority of prior studies, which did not take into consideration prior child functioning, which contributed to upwardly biased estimates.

Second, effects sizes presented in this work are smaller than associations reported in previous work because prior studies did not adequately take into account the myriad of other,

often related factors, known to influence child development. By using a large representative dataset, I was able to take advantage of ample degrees of freedom and include a large number of covariates and controls in the model, which has resulted in smaller, but less-biased estimates of associations between child and parental characteristics, interparental discord and child development in cognitive and socioemotional domains. The question is: Does interparental discord have important implications for child development, despite the fact that effect sizes are small?

Implications Of Interparental Discord For Child Development

The findings as a whole, suggest that interparental discord does have significant implications for child development in cognitive, socioemotional and physiological domains. The following section points out the most important findings and how to interpret them. First, the take-home message of the dissertation is not that infants exposed to higher levels of child-related conflict during infancy have the lowest levels of cognitive functioning in toddlerhood. Instead, the findings suggest that infants exposed to higher levels of child-related conflict at 9 months of age experience relatively smaller rates of *growth* in cognitive ability at 24 months of age, compared to those infants experiencing lower levels of child-related conflict at 9 months. If child-related conflict exposure in *toddlerhood* (which results indicate becomes more frequent in toddlerhood), has similar negative effects on future rates of cognitive development, this work may provide an early indication that negative effects of child-related conflict throughout childhood may be additive. In other words, because significant associations emerged so early in children's lives, despite rigorously controlling for many other important influences on child development, future work should examine if and under what conditions cumulative effects of interparental discord on child cognitive development emerge as children get older.

Second, the results of this work suggest that higher levels of child-related conflict exposure affect rates of change of socioemotional development for girls, but not boys. Because it may seem counterintuitive that boys' would not be negatively affected by child-related conflict exposure, it is especially important to consider why this may be the case. In my opinion, the most likely explanation is that at 9 months of age there are subtle but important gender differences in certain aspects of socioemotional development relevant to perceiving interparental conflict, (e.g., social referencing, stress sensitivity) that may have predisposed girls - to their detriment - to better perceive interparental conflict, thus making them more vulnerable to its effects. I explored this notion by examining whether there were significant differences between boys' and girls' levels of socioemotional functioning at 9 months of age, but no such differences were found. However, despite this, I would argue that it is possible that certain aspects of social and emotional functioning relevant to perceiving, responding and coping with interparental conflict (and possibly eliciting greater conflict exposure) were not adequately measured in this study. As such, it would be hasty to conclude that conflict exposure does not pose a risk to boys' socioemotional development. While boys' socioemotional functioning may not be negatively affected by exposure child-related conflict during *infancy*, the possibility that exposure to child-related conflict in *toddlerhood* may have significant consequences for later boys' socioemotional development cannot be ruled out and must thus be examined in future work. In sum, in order to understand these processes, and to replicate these findings, future work should reexamine associations between interparental discord and child socioemotional functioning with young children of similar ages, while considering more thoughtful, comprehensive measurement of social and emotional competencies relevant to children's perception of and coping with conflict.

Implications Of Associations Between Marital Discord And Child Cortisol Levels

By revealing significant associations between marital functioning and child cortisol levels and patterns across the day, this work provides a strong rationale for further examining the role of HPA axis activity in mediating associations between interparental discord and the aforementioned domains of development across infancy, childhood and adolescence. This rationale is also informed by the notion that the developmental domains examined in the dissertation are interdependent and have important implications for several aspects of child development. For example, individual differences in physiological domains of development, such as children's sensitivity and reactivity to stress, and physiological adaptation to intense or chronic stress exposure as indexed by cortisol levels, are thought to support and contribute to individual differences in socioemotional and cognitive functioning, as well as child behavior, each of which plays a critical role in the development of cognitive skills, social competence, mental health, and overall wellbeing. Given that significant associations were found between marital discord and average child cortisol levels for kindergartners and adolescents, it seems reasonable to suggest that infant cortisol levels could play a role in mediating the found associations between child-related conflict in infancy and child cognitive and socioemotional functioning in toddlerhood. Exploring this idea further is my primary goal for future research.

In particular, findings suggest the existence of a developmentally-based vulnerability in kindergarten-aged children's ability to regulate physiological and emotional arousal in response to parental conflict. This was illustrated by higher levels of bedtime cortisol and flatter slopes of the diurnal cortisol production curve for kindergartners in high-conflict homes, not found for adolescents in high-conflict families. Assuming that the ability of infants to regulate physiological arousal to conflict, child-related or otherwise, is likely to be less developed than that of kindergarten-aged children, it is reasonable to propose that the physiological

consequences of conflict exposure during infancy may possibly underlie negative effects of conflict on toddler cognitive ability. Similarly, although speculative, it is possible that there are physiological differences by gender in sensitivity to interparental conflict exposure that may account for differential influences of interparental conflict on toddlers' socioemotional functioning noted in this dissertation. Exploring the existence of developmentally-based vulnerabilities in stress reactivity and sensitivity to conflict exposure is a secondary goal for future research. While the pathways proposed in the previous section are in part inspired by the dissertation findings, I realize that some caution is warranted to avoid overextending the results relating interparental discord to children's HPA axis activity to developmental periods not examined in this work.

Emerging Research Questions

While the dissertation as a whole provides support for the notion that interparental discord matters for various domains of child development, despite the presence of other, important influences, I recognize that longitudinal associations between interparental discord and child adjustment may reflect the operation of causal chains not explored in this work. For example, although this work conceptually considers the notion that the impact of conflict on children may be mediated by parenting practices or parent psychopathology, this work has not considered that the associations between conflict and child outcomes may be influenced by other adverse experiences with the extended family, peers and the school system, perhaps as a result of children exhibiting stress due to being exposed to conflict. For example, young children who have been exposed to interparental conflict may be most affected when it is followed by rejection by teachers, with and peers, or in the case of adolescents by romantic partners. In addition, consideration of the history of prior stress exposure, previous child cortisol levels, and their

influences on child behavior and various aspects of family functioning may reveal more complex, causal chains underlying associations between the variables of interest in this study.

The results of this dissertation force us to reevaluate the assumptions about the nature of the onset and maintenance of child-related conflict, as well as more generally, the causes and consequences of less than 'optimal' child functioning in the domains of development under study. For example, the results presented in this dissertation bring into question whether child negative emotionality causes or maintains child-related, or vice versa. Specifically, it remains unclear whether the nature and direction of causal processes vary throughout different developmental periods. For example, because it was impossible to determine the extent to which high child negative emotionality in the first month(s) of life may have contributed to a increases in interparental conflict between birth and 9 months of age, the lack of a direct effect of child negative emotionality at 9 months of age on later child-related conflict, must be carefully interpreted. Perhaps direct effects of negative emotionality occur before 9 months of age.

Also, greater differences in parents' levels of child development knowledge were found to moderate effects of high levels of child negative emotionality *at 9 months of age*, resulting into higher levels of child-related conflict *at 24 months of age*. What remains unclear is whether prior levels of high conflict *around the time of the birth and/or the first months of life birth* may contribute to the development (and maintenance) of high levels of negative emotionality in early infancy and through the first 9 months. Knowing the answers to these questions would be especially helpful to parents and policymakers particularly with regards to the nature and timing of potential interventions.

Implications For Policy And Practice

The following sections discuss implications of these finding for policy and practice. I would like to emphasize first and foremost that findings of this dissertation should first be replicated, before sound recommendations for policy and practice can be made. In fact, as stated previously, several methodological shortcomings, particularly those concerning measurements and design, as well as small effect sizes, preclude us from using this work to suppor interventions aimed at preventing, reducing and remediation of interparental conflict. If the results were to be replicated, the following policy considerations could be made.

The results show that general and child-related conflict during infancy, are significantly and positively associated with general and child-related conflict during toddlerhood. While the nature of these associations may be specific to the developmental period under study, it is not unlikely that found associations reflect an ongoing positive trend, suggesting that children who are exposed to interparental conflict as infants likely to be exposed to interparental conflict as toddlers and children. Hence, effects of exposure to ongoing interparental conflict may gradually add up over time as well and affect development across various independent domains. Given that effects of conflict begin this early and may cause continuing harm, one could argue that efforts at preventing or reducing conflict should start as early as in infancy. On the other hand, because levels of child-related conflict in infancy and toddlerhood in the US population are relatively low, further research is needed to compare the cost and benefits of early, general program efforts aimed at prevention of conflict, to more targeted remediation and treatment efforts targeted towards high-conflict families.

What do my results suggest regarding the prevention or reduction of interparental conflict? First of all, since aspects of infant temperament such negative emotionality do not significantly relate to child-related conflict in the second year of life, there is no evidence to

warrant a policy effort aimed at reducing negative emotionality in children for the purpose of reducing child-related conflict. Similarly, there is no direct effect of child development knowledge of each individual parent on child-related conflict, suggesting that attempts to increase such knowledge for the purpose of reducing later child-related conflict may not be effective. However, results do indicate that parents of infants with high levels of negative emotionality, who have greater differences in child development knowledge, argue more about their children in toddlerhood, than those with fewer differences in child development knowledge. This study suggest that approximately 16% of children (who have levels of negative emotionality in a range that would make them sensitive to parental differences in child developmental knowledge), may potentially benefit from an intervention either aimed at reducing differences in parents' child development knowledge or aimed at reducing negative emotionality.

Given the inconsistent findings and ongoing scientific debate regarding the nature of negative emotionality and its stability or lack thereof, it is unclear how one would effectively implement and evaluate an intervention to accomplishing the latter. On the other hand, it seems that it would be relatively straightforward to design programs aimed at reducing differences in parents' child development knowledge. However, in my opinion, the practical and conceptual issues of selectively targeting children based on temperament would not be feasible or desirable. Because results also indicate a trend towards a positive main effect on child-related conflict of parental differences in child developmental knowledge, and because increasing absolute levels of knowledge of child development may have other, positive implications for children (e.g., reducing child abuse, stimulating cognitive development), I would argue that the results (if replicated) may provide a rationale for supporting policy efforts aimed at increasing child development knowledge of all mothers *and* fathers of infants. By increasing child development

knowledge of both parents, mothers and fathers are more likely to have similar knowledge of child development, which may limit the development of child-related conflict in the second year of life, while other positive effects on child development are likely to occur. Before addressing which types of policy or program options may provide the structure for aforementioned goal of increasing parents' child development knowledge, the following results should also be considered.

Results also show significant associations between child-related conflict in toddlerhood and various aspects of parental functioning at 9 months, including father involvement, maternal depressive mood, use of nonparental care, father marital satisfaction and maternal education. Few of these factors however, are suitable targets for intervention. For example, reducing father involvement and increasing young children's use of non-parental care are not desirable policy solutions. While increasing women's general education may constitute a desirable macro-level solution, it is by no means clear-cut or affordable solution. On the other hand, enhancing or maintaining couple marital satisfaction and reducing women's depressive mood, particularly in the context of the transition to parenthood may be a more feasible policy solution. As such, provided the results are replicated, the dissertation may lend support to the general goal of current couples and marriage education programs, as well programs aimed at improving child development knowledge of both parents.

How would this dissertation inform current policy and program responses to interparental conflict?

As noted in the introduction, current policy responses to interparental conflict in the United States are one component of a broader American policy effort directed towards promoting 'Healthy Marriage,' which is a part of the Temporary Assistance for Needy Families

(TANF) program. The greater policy goal of improving and supporting healthy marriage relates to the well-being of children and adults, particularly in low-income families. Policy and program responses can be categorized into three broad categories 1) Domestic violence programs and policies 2) Divorce mediation, and divorce and parenting education which are alternative, nonadversarial approaches to resolving disagreements and conflict between divorced and divorcing parents over child support, custody, visitation, and so forth, and 3) Couples and marriage education, enrichment, and divorce prevention programs which aim to teach couples constructive ways of resolving their differences and conflicts.[58] Although the dissertation itself does not address the specific issues related to family dissolution, such as parental separation and divorce, within the broader policy framework of TANF framework, parent education, and couples and marriage education programs may be the most relevant type of programs categories into which to integrate some of the findings of this dissertation.

To this author's knowledge, there are no current programs focusing *exclusively* on reducing differences among parents' child development knowledge or increasing parents' objective knowledge of child development. There is however one parenting education program in particular that has been successful in leveraging gains in parenting knowledge, skills, or abilities and may thus function as an example. The MELD parent support group model has been found to help mothers develop more appropriate expectations of their children's abilities, increase their ability to be more aware of their children's needs, and strengthen their understanding that they should respond to those needs in an appropriate manner (Hoelting et al 1996). Possibly, some of the methods used in this program may be extended to couples and used to reduce differences in parents' knowledge of child development by helping them gain and

[58] Note that couples counseling and marital therapy are typically are not covered services.

share similar levels of child development knowledge. [59] Additionally, with the idea of designing cost effective ways of increasing knowledge of child development of all parents, less intense or targeted programming, such as informational campaigns directed towards mothers and fathers by healthcare providers (e.g., during immunizations) or early child care and education programs such Head Start, may be a feasible solution.

While goals of the aforementioned programs explicitly center on improving outcomes for children, couples and marriage education programs are first and foremost designed to improve couple relationship functioning. Although there are important differences, most programs place a major emphasis on teaching communication skills, problem solving, and commitment, and many include anger management and financial management (see Family Impact Seminar,1998) If replicated, findings of this dissertation may have relevance for programs directed at couples with children or expecting parents, by fostering awareness that even young children, including infants, may experience negative consequences in response to interparental conflict exposure, and that exposure to conflict should thus be minimized. Most importantly, programs could emphasize that exposure to child-related conflict, even when children are only 9 months of age, may have greater negative consequences for child development than exposure to general conflict. In addition, programs could point out the importance of parents' shared child development knowledge, especially in the context of caring for children with 'difficult' temperaments. Programs can alert parents to recognize child responses associated with stress exposure, as well as teach them how to alleviate such stress in young children. Finally, couples and marriage programs could provide resources and referrals for parents of children seeking treatment of child physical and mental health problems related to interparental conflict.

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[59] For more information about existing programs see Carter (1996) who compiled a comprehensive survey including a description of available parenting education programs and services.

Summary And Conclusion

Interparental discord, particularly child-related conflict, influences child development in cognitive, socioemotional and physiological domains in infancy, childhood and adolescence, over and above several other child, parental and household characteristics important to child development. However, the causes of interparenal conflict, and the consequences of conflict exposure on child development are complex, and often the result of the interplay between child and parent characteristics. While the pathways by which interparental conflict affects child outcomes remain unclear, this work bolsters the notion that physiological stress pathways may be an important pathway to pursue in future research.

This dissertation suggests that future research examining variations in family functioning and their associations with child cortisol levels may help us understand the immediate and long-term implications for aspects of children's HPA axis functioning, cognitive and socioemotional functioning and various other important indicators of physical and mental health and wellbeing in infancy, childhood and adolescence. In sum, this work enhances our understanding of links between interpersonal conflict and child development by improving estimates of the associations between interparental conflict and child wellbeing, and suggesting possible pathways by which it may affect child outcomes.

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APPENDIX A – COMPARING STRUCTURE OF BSF-R MENTAL SCALES TO BSID-II

Items selected from the BSID-II for the BSF-R mental scales were organized into a core set of items that was administered to all the children in the ECLS-B, analogous to the 23–25-month age set of the BSID-II. Children's performance on this core set determined whether any supplementary sets of items were administered. Children whose scores were low, were administered a supplementary set of five easier items, the basal item set, to obtain a better reading of the lower limit of their abilities. Children whose scores were high, were administered a supplementary set of nine more difficult items, the ceiling item set, to obtain a better reading of the upper limit of their abilities. The BSF-R was designed to assess the development of children 22 months 16 days to 25 months 15 days of age, which corresponds to the 23–25-month item set of the BSID-II. The mental scale core items range in age from 17 months to 37 months, the basal items reach down to 12 months, and ceiling items extend up to 42 months.

APPENDIX B – RELIABILITY OF NCAT ASSESSMENT

In addition to requiring that ECLS-B coders be initially certified to the established 90 % reliability standards (NCAST; Barnard, 1978), interlab inter-rater reliability of the ECLS-B coders was tested and maintained on a ongoing basis by conducting reliability coding on a random subset of tapes (*n*=171) for which an overall average agreement of 86 % was obtained (based on % agreement). For this subset of tapes, coefficient alphas were calculated and compared with those calculated by ECLS-B coders. Because the two individual subscales rating child behaviors have low alphas [60] (α = .38 for child's clarity of cues and α = .58 for child's responsiveness to the caregiver), the child scale, which has acceptable reliability of (α = .63) will be used to control for child socioemotional functioning at 9 months.

[60] Coefficient alphas reported in this section are based on averaging alpha values obtained from ECLS-B coders with those calculated by NCAST coders who conducted reliability coding (see Table 16 in Andreassen, & Fletcher; 2005)

APPENDIX C - INDEPENDENT SAMPLES T-TESTS COMPARING MEANS OF DEPENDENT AND INDEPENDENT VARIABLES BY CHILD, PARENTAL AND HOUSEHOLD CHARACTERISTICS

Race

Independent samples t-tests indicate that there are statistically significant differences in children's cognitive ability at 24 months by child race; compared to white children (M = 128.90, SD = 10.51), children who are not-white (M = 123.78, SD = 12.39) have significantly lower cognitive ability (t [6018) = -.12.53, p = .000); children who are Black (M = 124.75, SD = 10,90) or Hispanic (M = 123.39, SD = 10.05) or Pacific Islanders (M = 124.55, SD = 9.73) have significantly lower cognitive ability (t [6018] = -5.76, p = .000; t [6018] = -13.12, p = .000; t [6018] = 2.37, p = .020 respectively) than do children who are not Black (M = 128.20, SD = 10.60), Hispanic (M =129.37, SD = 10.45) or Pacific Islander (M = 127.92, SD = 10.66). However, difference in children's cognitive ability at 24 months by child race were not significant for all race categories; at 24 months of age, there were no significant differences in child cognitive ability for children who are Asian (t [6018] = .85, p = .398; or Native American Indian (t [6018] = 1.90, p = .060).

Independent samples t-tests also indicate statistically significant differences exist in children's socioemotional functioning[61] at 24 months by child race; compared to white children (M = .092, SD = .64), children who are not-white (M = -.103, SD = .65) have significantly lower scores on socioemotional functioning (t [5077) = - 7.01, p = .000). Children who are Black (M =

[61] Given that the dependent variable is a composite, statistics presented in this section are based on z-scores of child socioemotional functioning

-.030, *SD* = .67), Hispanic (*M* = -.107, *SD* = .65) or Asian (*M* = -.024, *SD* = .66) have significantly lower scores on socioemotional functioning (*t* [5077] = -2.321, *p* = .023 for blacks; *t* [5077] = -7.140, *p* = .000 for Hispanics and *t* [5077] = -2.302, *p* = .024 for Asians respectively) than do children who are not Black (*M* = .064, *SD* = .64), not Hispanic (*M* =1.05, *SD* = .63) and not Asian (*M* = .059, *SD* = .064). Difference in children's social emotional functioning at 24 months by child race were also not significant for all race categories; at 24 months of age, there were no significant differences in child socioemotional functioning for children who are Pacific Islanders (*t* [5077] = 1.554, *p* = .124), or Native American Indian (*t* [5077] = 1.12, *p* = .265) compared to those who are not Pacific Islander or Native American Indians.

Birthweight and Plurality

Children's scores on the BSF-R were also significantly higher (*t* [6018] = 21.183, *p* = .000) if they were born at normal (*M* = 128.25, *SD* = 10.53), versus moderately low birth weight (*M* = 123.78, *SD* = 11.04) or very low birth weight (*M* = 117.80, *SD* = 10.61). Children's scores on socioemotional functioning were also significantly lower (*t* [5077] = -6.718, *p* = .000) if they were born a twin birth (*M* = -.126, *SD* = .63) compared to if they were not (*M* = .061, *SD* = .63), and children who were born with moderately low birth weight (*M* = -.075, SD = .64) or very low birth weight (*M* = -.23, *SD* = .62) had significantly lower socioemotional functioning scores (*t* [5077] = -4.555, *p* = .000; *t* [5077] = -10.129, *p* = .000 respectively) than those that did not (*M* = .059, *SD* = .64; *M* = .059, *SD* = .62 respectively).

Income

There are also no statistically significant differences in mean levels of child-related conflict by whether the family's total household income is below the poverty threshold (*t* (6019) = .568, *p* = .571). In fact, there is no evidence to suggest that changes in total household income

levels significantly and consistently change the frequency of child-related conflict; the difference in mean levels of child-related conflict is positive and greatest (t [6019] = 3.41, p = .001) when comparing child-related conflict of respondents whose total household income falls within $30,000 and $35,000 dollars ($M$ = 2.13, SD = .88) to those with incomes between $15,000 and $20,000 dollars ($M$ = 1.86, SD = .081) but negative (t [6019] = - 2.598, p = .011) when comparing it to those with incomes of $200,000 or more ($M$ = 1.94, SD = .61).

APPENDIX D - LINEAR REGRESSION ANALYSES FOR PARENT MARITAL QUALITY, MATERNAL PARENTING QUALITY AND MATERNAL EMOTIONAL FUNCTIONING PREDICTING CHILDREN'S AVERAGE CORTISOL LEVELS, WHILE CONTROLLING FOR PUBERTAL STATUS (N = 61).

Variable	*B*	*SE*	*β*	*p-value*
(R^2 = .208)				
Constant	-1.397	.274		
Parent Marital Functioning	-.171	.075	-.341	.027
Whether Kindergartner	.059	.282	.211	.834
Maternal Parenting Quality	.008	.068	.014	.990
Maternal Emotional Functioning	-.007	.070	-.015	.920
Pubertal development	.079	.083	.348	.343

Note. Dependent variable is average cortisol values, natural log transformed.

APPENDIX E – LINEAR REGRESSION ANALYSES FOR PARENT MARITAL FUNCTIONING, MATERNAL PARENTING QUALITY AND EMOTIONAL FUNCTIONING PREDICTING CHILDREN'S DIURNAL CORTISOL SLOPES, WHILE CONTROLLING FOR PUBERTAL STATUS (N=61)

Variable	*B*	*SE*	*β*	*p-value*
(R^2 = .457)				
Constant	-.138	.079		
Parent Marital Functioning	.024	.013	.312	.076
Whether Kindergartner	-.044	.044	-.262	.321
MF x WK Interaction	-.069	.017	-.626	.000
Maternal Parenting Quality	-.021	.009	-.244	.030
Maternal Emotional Functioning	-.009	.010	-.131	.368
Wakeup Sampling Time	-.013	.009	-.193	.186
Total Time Awake (hrs)	-.002	.012	-.031	.855
Pubertal Development	-.002	.012	-.098	.764

Note. Dependent variable is slope of the diurnal cortisol curve, natural log transformed.