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**PRE-NATAL COUPLE CONFLICT AND NEGATIVE FAMILY ENVIRONMENT
ACROSS THE TRANSITION TO PARENTHOOD**

A Dissertation in

Psychology

by

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Abstract

The transition to parenthood is stressful for the majority of couples. The current project examined potential pre-natal risk and protective factors related to the quality of the post-natal family context, guided by a stress and coping framework (Lazarus & Folkman, 1984). The following three aspects of the post-natal family context were studied, given their relevance to early childhood mental health: parent depressive symptoms, parenting negativity, and co-parenting conflict. Pre-natal couple conflict was proposed to increase the level of individuals' stress while also depleting resources for coping effectively with the normative difficulties associated with first-time parenting. Therefore, it was predicted that individuals with more frequent, hostile pre-natal couple conflict would exhibit greater difficulties with post-natal depressive symptoms, parenting negativity, and co-parenting conflict. Moreover, the project examined the role of two pre-natal factors hypothesized to buffer the post-natal family context from the negative influence of pre-natal couple conflict by reducing parents' stress and increasing their coping resources. These two protective factors are the expectant parents' (1) HPA axis functioning and (2) level of social support. The moderating role of parent sex was also examined. Results of HLM analyses nesting mothers and fathers within couples revealed partial support for study hypotheses. Findings from this study contribute to the growing literature examining the effects of couple conflict on family outcomes and have implications for understanding the development of early childhood mental health difficulties.

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Pre-natal Couple Conflict and Negative Family Environment across the Transition to Parenthood

Parents play a central role in shaping the early family context that is important for children's adjustment. Examining individuals across the transition to parenthood is crucial given the demands associated with this period and the fact that early beginnings of children's families lay the foundation for their future well-being. Prior research has shown that couple conflict influences parenting quality and child functioning; some research has shown that couple conflict may also be an important influence on early family functioning. The current project used a stress and coping framework to examine whether pre-natal couple conflict increases the risk for family-level difficulties across the transition to parenthood by increasing parents' stress and reducing their capacities for effective coping. Moreover, it is likely that pre-natal couple conflict is a stronger influence on the developing family for some individuals than for others. For example, parents who have more adaptive physiological regulation profiles may experience less stress and more adaptive coping in the face of hostile couple interactions, leaving them less vulnerable to pre-natal conflict. Likewise, parents with high levels of social support may have important social resources that help to reduce their stress and facilitate adaptive coping, increasing their ability to foster a positive early family climate despite pre-natal risk. Finally, there may be important sex differences in the relation between pre-natal conflict and post-natal family difficulties. The current project was designed to test these ideas with a longitudinal, multi-method approach that resolves weaknesses in some prior research.

Links between couple conflict and child adjustment have been widely documented (e.g., Cummings & Davies, 1994; Emery, 1982). However, less is known about the *mechanisms* through which couple conflict impacts child adjustment. The current project contributes to the

literature on inter-parental conflict by examining the relation between pre-natal conflict and early negative family environments. Early negative family environments were operationalized in the current study as including elevated levels of parental depressive symptoms, parenting negativity, and co-parenting conflict. These early family environmental characteristics are important to study given that they may contribute to the risk of child maladjustment over time (e.g., Seifer, Dickstein, Sameroff, Magee, & Hayden, 2001; Spinrad et al., 2007; McHale & Rasmussen, 1998).

The transition to parenthood can be conceptualized as beginning long before the child's arrival or even pregnancy, when individuals first contemplate the possibility of having a child and the subsequent changes that this will bring (Glade, Bean, & Vira, 2005). This transition is frequently stressful, as partners navigate new parent roles and modified partner roles (Perren, von Wyl, Burgen, Simoni & von Klitzing, 2005). As a consequence, across the transition, overall levels of couple conflict increase (Cowan & Cowan, 1987), risk of mental health difficulties increases (Hopkins, Marcus, & Campbell, 1984), and relationship satisfaction and love decline (Glade et al., 2005).

Despite the difficulties associated with first time parenting, there are important individual differences across this transition (Belsky & Hsieh, 1998; Lawrence, Rothman, Cobb, Rothman, & Bradbury, 2008). To develop and refine prevention programs for new families, it is critical to identify factors that place families at risk for later difficulties and those that may protect families from risk processes. A stress and coping framework (Lazarus & Folkman, 1984), including the concepts of stress, appraisal, and coping, is useful for helping guide thinking about risk and protective processes during this time.

According to the stress and coping framework, a situation is primarily appraised as stressful when environmental demands outweigh or significantly tax an individual's resources for coping with those demands (Lazarus, 1999). After this primary appraisal of a situation as stressful, the situation is secondarily appraised as falling into one of three categories, with implications for how well an individual will navigate the situation (Folkman & Lazarus, 1985). Stressors are appraised as involving harm/loss, threat, or challenge. The first category, harm/loss, refers to damage that an individual feels has already been done. Threat, the second category, refers to damage that one fears is likely in the future. The third category, challenge, refers to stressors that one feels may be dealt with and managed effectively given the appropriate amount of effort and drive. In situations appraised as challenges, the individual feels there is something to be gained from negotiating the situation effectively (e.g., an opportunity for mastery), whereas threat situations entail only loss (Tomaka, Blascovich, Kelsey, & Leitten, 1993). Indeed, when tasks are appraised primarily as threats (as compared to challenges), individuals tend to view the situation as more stressful, to perform less well, to be less task-focused, and to experience more negative emotional responses (Tomaka et al., 1993; Folkman & Lazarus, 1985; Folkman, 1984).

The appraisal process is conceptualized as dynamic and constantly unfolding (Folkman & Lazarus, 1984) and it is likely that individuals view situations as a mix of both threat and challenge (Folkman & Lazarus, 1985). However, the relative amount of each of these appraisals will determine the degree of experienced stress and will impact the coping strategies chosen. Coping is an ongoing process including both mental and physical attempts to manage situations which are deemed stressful (Lazarus & Folkman, 1984). Folkman and Lazarus (1980) proposed two primary types of coping. Active or problem-focused coping refers to efforts to change the

relation between stressors and the person's resources to cope with those stressors. Emotion-focused coping, on the other hand, seeks to change the meaning of the stressful situation (e.g., through reappraisals). One coping response is not appropriate for all stressful situations and, as was the case with appraisals, individuals are likely to use a variety of coping strategies to deal with any given stressor. An individual's coping response should be matched to the particular set of environmental demands and available resources and should be flexible enough to adapt to changes in these demands or resources. For example, problem-focused coping may be more adaptive in situations that are considered modifiable whereas emotion-focused coping may be more appropriate when the situation is deemed non-modifiable (Folkman & Lazarus, 1985). Broadly speaking, when coping efforts are effective, stress tends to decrease. On the other hand, when coping is maladaptive (i.e., poorly matched to the demands of the situation and/or an individual's coping resources), stress remains high.

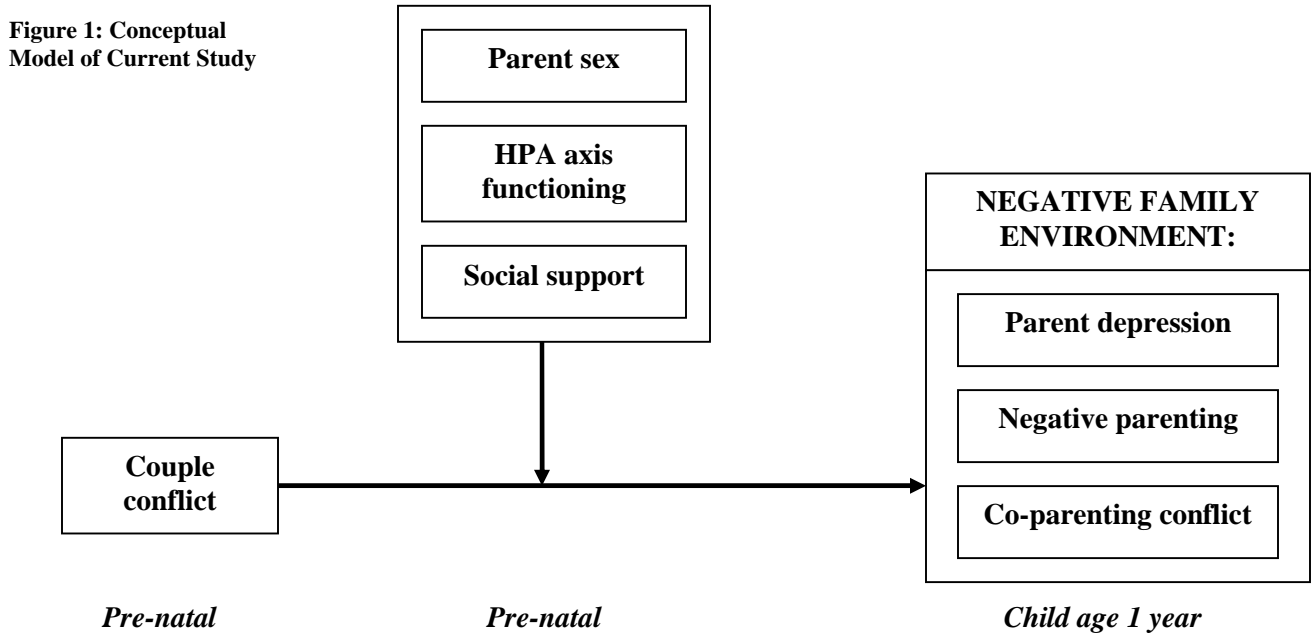
In the face of the normative difficulties associated with the transition to parenthood, it is reasonable to assume that frequent, hostile couple conflict would be experienced by new parents as increasing environmental demands and reducing resources to deal with these demands, leading to increased stress. For these parents, normative challenges associated with this time may instead be appraised as threats, increasing stress and negative affect and reducing the potential for the effective, flexible coping that is required to negotiate this transition well. As a result, difficulties may manifest themselves in several family systems (e.g., individual parent adjustment, parent-child dysfunction, and co-parenting conflict). For example, under normative conditions of stress, parents may typically view frequent night wakings as a challenge that they will overcome with assistance from their partner. However, in the face of frequent, hostile couple conflict, this same stressor of frequent night wakings may instead be viewed as a threat

(e.g., “my partner and I will fight again if the baby wakes up, further damaging our relationship” or, “my partner will not be helpful to me during night wakings and I will not be able to handle them on my own”), leading to feelings of depression, harsh, insensitive parenting behaviors, and/or difficulties working with their partner to meet their child’s needs. In fact, stress has been implicated in the development of maternal and paternal depression (Zelikovsky, Schast, & Jean-Francious, 2007), harsh parenting (Webster-Stratton, 1988), child maltreatment (Rodriguez & Richardson, 2007), and co-parenting difficulties (Belsky, Crnic, & Gable, 1995). Maladaptive appraisals have also been linked to harsh, insensitive parenting (Lorber & O’Leary, 2005) and depression (Pakenham, Smith, & Rattan, 2007).

The current project examined whether post-partum depressive symptoms, parenting negativity, and co-parenting conflict were predicted by elevated levels of pre-natal couple conflict, as well as examined moderators of this pathway (i.e., parent sex, HPA axis functioning, and social support). Given prior research linking couple relations with individual depression and the quality of parenting and co-parenting, it was predicted that pre-natal couple conflict would be positively associated with parent maladjustment, parenting negativity, and co-parenting conflict at child age 1 year. Moreover, parent sex, physiological stress-related functioning, and social support were proposed to moderate the relations between pre-natal couple conflict and post-natal family characteristics (Figure 1). This project examined these ideas by assessing families at two key points during the ongoing developmental process of the transition to parenthood: during pregnancy and at 1 year after the child’s birth. Children at this age present a variety of new demands on parents given their increased mobility, emerging speech, developing emotion regulation capacities, and accompanying bids for autonomy. These emerging capacities likely require parents to adapt their parenting and co-parenting approaches from the earlier period of

infancy, including new teaching, monitoring, and discipline practices. Thus, difficulties with parental depression, parenting negativity, and co-parenting conflict may be particularly likely during this developmental stage for children and may have long-lasting influence in setting the stage for future dyadic and triadic patterns of interaction within the family. This study builds on and extends prior work which has largely been cross-sectional, neglected the role of fathers, and/or relied solely on self-report data (e.g., Forehand et al., 1988; Conger et al., 1992) by using a longitudinal design with both self-report and observational data to examine these relations.

Data for the current study were taken from a larger study of an NIH-funded, randomized trial of Family Foundations, a prevention program targeting co-parenting for couples transitioning to parenthood (Feinberg & Kan, 2008; Feinberg, Kan, & Goslin, 2009). Self-report, observational, and salivary cortisol data were collected pre-natally and at child age 1 year. Data from 165 couples were used in hierarchical linear models testing study hypotheses.



This paper begins by highlighting the relevance and strengths of the current project, using a developmental psychopathology framework (Cummings, Davies, & Campbell, 2002). Next, it reviews prior work attempting to elucidate the mechanisms by which couple conflict influences child adjustment, highlighting how the current project expands on this work through an examination of early family environments. Then, prior conceptualizations of couple conflict and strategies for assessing conflict are reviewed, emphasizing areas for improvement. After that, arguments and evidence for the links between couple conflict and characteristics of early family environments are discussed and moderators of these links are considered. Subsequently, study design, hypotheses, and analytic approach of the project are detailed. Finally, results are described and discussed using a stress and coping framework.

Developmental Psychopathology Framework

This project was informed by a developmental psychopathology framework and incorporated this framework in several ways. First, a variety of domains of family functioning were examined, based on the literature supporting their role in early child emotional and behavioral adjustment. The examination of individual parent mental health, parenting behaviors, and co-parenting quality acknowledges the complexity of factors associated with early family functioning and the multiply-determined nature of children's adjustment difficulties. In addition, the current model includes a biological (HPA axis functioning) and a contextual factor (pre-natal social support). Complex models including individual-, couple-, family-, and contextual-level factors such as the one proposed in the current study fit within the goals of a developmental framework which encourages the consideration of multiple factors in understanding normal and abnormal development. It should be acknowledged that all potential factors contributing to early child mental health are not considered here (e.g., individual factors such as child gender and

temperament, other family-level factors such as discipline strategies or parental attachment security, contextual factors such as stressful life experiences, neighborhood quality). Indeed, it is unlikely that any one study could encompass all relevant risk and protective variables. However, the current project was an attempt to examine several core aspects of early family functioning in a complex way.

The current project also reflects a developmental psychopathology approach in its use of a longitudinal design and appropriate analytic techniques for such data. A series of hierarchical linear models was used to examine whether pre-natal conflict *prospectively* predicts family functioning. The foundation for most of the hypotheses in the current study comes from prior cross-sectional work. For example, concurrent links between couple-level difficulties and parenting difficulties have been shown (e.g., Osborne & Fincham, 1996). Longitudinal data can strengthen claims for causality by showing that higher levels of a risk factor at one time point predict higher levels of the dependent variable at a subsequent time point.

A third way in which this project was informed by a developmental psychopathology framework is in the examination of potential protective factors for individuals transitioning to parenthood, as compared to an exclusive focus on risk. These protective factors include a contextual factor, social support, and a biological factor, HPA axis functioning. The HPA axis is a multi-faceted system that allows the body to respond to stressors. Research on how HPA axis functioning is implicated in individual and family functioning is in an early phase and this project contributes to this growing literature.

The final aspect of the project which incorporates a developmental psychopathology perspective is its relevance for translational work. The results of this study will inform applied work with couples transitioning to parenthood by identifying the degree to which selected pre-

natal risk and protective factors impact later family functioning. Thus, these results will help to alleviate the high cost to society of the consequences of poor individual, couple, and family adjustment to parenthood and will expand our knowledge of the family environments which may contribute to early childhood mental health difficulties. Basic research that can be applied to work with families is a central component of a developmental psychopathology framework.

Unpacking the Influence of Inter-parental Conflict on Child and Family Functioning

There is ample research documenting a relation between inter-parental conflict and child maladjustment (Cummings & Davies, 2002; Emery, 1982; Grych & Fincham, 1990). In addition to individual studies, meta-analyses (e.g., Buehler et al., 1997) and reviews of this literature consistently support the existence of this relation (e.g., Cummings & Davies, 1994; 2002). For example, Buehler and colleagues (1997) conducted a meta-analysis of 68 studies examining the link between inter-parental conflict and child adjustment for children between the ages of 5-18. Results indicated an average effect size of .32 between inter-parental conflict and child adjustment difficulties, representing an effect that is between small and medium (Cohen, 1977).

Early research emphasized the influence of modeling to explain the link between inter-parental conflict and child maladjustment (Bandura, 1977). From this perspective, children's exposure to conflict was thought to lead directly to child adjustment difficulties because children learned inappropriate conflict resolution strategies through the negative models displayed by their parents. This was proposed to occur particularly when children observed inter-parental conflict behaviors that led to the attainment of a goal and therefore came to think of conflict as an effective means of achieving one's goals. Although modeling likely plays a role in the link between inter-parental conflict and child adjustment, current research has emphasized the need to identify other factors associated with inter-parental conflict which may further explain its impact

on child adjustment. In fact, empirical work has shown support for indirect effects of conflict on child adjustment in addition to direct effects (see review in Buehler, Krishnakuman, Anthony, Tittsworth, & Stone, 1994).

Currently, researchers seek to go beyond the documentation of links between conflict and child adjustment and the demonstration of direct effects to investigate the mediators of this link. The current study focuses on the relation between pre-natal couple conflict and early negative family environments characterized by parental depressive symptoms, parenting negativity, and co-parenting conflict. Prior work attempting to elucidate the mechanisms through which inter-parental conflict impacts child behavior has primarily focused on factors within the child. These studies are briefly discussed here.

Children's cognitive processes, coping strategies, and emotional security have been proposed as mediators in the link between inter-parental conflict and child adjustment. For example, Grych, Fincham, and their colleagues have proposed a "cognitive-contextual framework" for understanding the link between children's exposure to inter-parental conflict and their subsequent adjustment difficulties (Grych & Fincham, 1990; Grych, 1998; Grych, Fincham, Jouriles, & McDonald, 2000). The cognitive-contextual framework posits that children exposed to inter-parental conflict attempt to understand it by making appraisals regarding who is to blame, how threatening the conflict is, and their ability to cope with the conflict. The cognitive-contextual framework further suggests that aspects of the conflict (e.g., frequency, intensity, subject) and contextual variables surrounding the conflict (e.g., quality of the parent-child relationship; overall emotional climate within the family) also impact conflict appraisals. These appraisals are then proposed to influence children's adjustment (e.g., appraisals of high threat,

self-blame, and low perceived ability to cope with the conflict are suggested to be associated with worse child adjustment).

This theory has received some support in empirical studies. For example, Grych (1998) examined whether elements of the conflict situation and contextual factors were associated with children's threat, blame, and coping efficacy appraisals when faced with inter-parental conflict. Results of that study indicated that elements of the conflict (e.g., content, intensity) as well as background factors (e.g., father-child relationship quality, exposure to inter-parental physical aggression) were related to children's endorsement of these different types of appraisals. Further, longitudinal work has documented relations between inter-parental conflict, threat and blame appraisals, and child adjustment in the expected directions (Grych, Harold, & Miles, 2003). Thus, there is evidence that inter-parental conflict and family contextual factors are linked to children's appraisals, which are associated with children's adjustment.

However, contrary to predictions posited by the cognitive-contextual framework, at least one study has found more support for a *moderating* role of appraisals in the relation between child exposure to inter-parental conflict and child adjustment as compared to a *mediating* role (e.g., Kerig, 1998). For example, children's appraisals of the degree of threat, self-blame, and aspects of the conflict (e.g., frequency, intensity, resolution) were found to moderate the relation between their exposure to inter-parental conflict and their internalizing and externalizing problems (Kerig, 1998). No support was found for a mediating role, leaving the question of the mechanism by which conflict exposure leads to child difficulties unanswered.

Coping strategies have also been proposed to explain the link between child exposure to inter-parental conflict and child maladjustment, with maladaptive coping efforts proposed to lead to adjustment problems. In one test of this idea, Nicolotti, El-Sheikh, and Whitson (2003)

exposed children to a recorded argument between an unfamiliar male and female and asked them to imagine that the couple fighting was their parents. Children then reported on the types of coping strategies that they use when their own parents fight. Results did not support a mediating role for coping strategies, but coping strategies did moderate the relation between exposure to marital conflict and child maladjustment, with active coping (e.g., problem-solving) or support seeking being protective against the development of adjustment difficulties. Again, the lack of support for a mediational pathway has encouraged researchers to continue searching for the mechanisms to explain the link between inter-parental conflict and child maladjustment.

Crockenberg and Forgays (1996) have proposed the specific emotions model to explain the link between inter-parental conflict exposure and child maladjustment. In this model, conflict that is interpreted by children as interfering with their goals leads to negative emotional responses and their subsequent negative behaviors. The specific negative emotions elicited by conflict are proposed to depend on the meanings that children make of the conflict. For example, the thought that conflict might interfere with a child's plans might lead to anger whereas the thought that a child's father might take his anger out on the child might lead to fear (Crockenberg & Langrock, 2001). In this model, children are thought to make appraisals of conflict with regard to its blocking of any number of goals, and these appraisals then determine the child's specific emotional response and subsequent adjustment.

The emotional security hypothesis has also been put forth to explain the link between inter-parental conflict and child adjustment (e.g., Davies & Cummings, 1994; 1998; Davies, Myers, Cummings, & Heindel, 1999; Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006). Emotional security refers to a child's sense that relationships within the family are strong and that family members can be counted on to meet the child's needs even

under conditions of stress (Goeke-Morey & Cummings, 2006). Emotional security is conceptualized as a construct that is related to yet distinct from attachment security (Ainsworth, Blehar, Waters, & Wall, 1978) because it is influenced by family relationships beyond just the parent-child attachment (Goeke-Morey & Cummings, 2006) and because it is seen as a goal in and of itself (and not just a means to achieve survival as in attachment) (Cummings & Davies, 1996).

A lack of emotional security has been proposed to manifest itself in one of several ways (Davies & Cummings, 1994; 1998). For example, excessive child emotional reactivity (e.g., extreme fear, distress, and/or anger) in response to conflict is thought to reflect a lack of emotional security. Related to this point, children exposed to conflict are posited to be sensitized to future experiences of conflict exposure (Cummings & Davies, 1994). In fact, prior research has documented that children with frequent inter-parental conflict exposure show higher levels of negative affect in response to conflict compared to other children (Cummings & Davies, 1998; Davies, Myers, Cummings, & Heindel, 1999). Children may also make attempts to regulate their exposure to negative parent emotions through enmeshment in the conflict or complete avoidance of the conflict, further reflecting difficulties with emotional security. Finally, children who have low levels of emotional security may develop insecure internal representations (i.e., appraisals) of inter-parental relations (Cummings & Davies, 1998).

These responses to conflict are proposed to be adaptive for children in the short-term yet are expected to lead to interpersonal difficulties and child maladjustment over time (Cummings & Davies, 1998). For example, heightened sensitivity to conflict may be adaptive in highly conflictual families because children are more quickly able to detect threat and to respond accordingly (e.g., leave the situation, prepare themselves for a conflict). Yet, the constant

detection of threat and accompanying negative affect might be expected to interfere with adaptive social functioning and well-being over time.

Support has been found for the role of emotional security in child adjustment in the face of inter-parental conflict. For example, a longitudinal study showed that emotional security mediated the relation between child exposure to conflict and later internalizing and externalizing problems as assessed by multiple informants (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006). In addition, using an experimental design, children were exposed to a simulated conflict between their mothers and a confederate and an audiotaped conflict between an unfamiliar man and woman in a laboratory setting (Davies & Cummings, 1998). Results of this study supported a partial mediating role of emotional insecurity (in terms of emotional reactivity and biased appraisals) in the relation between child exposure to conflict and their adjustment difficulties, especially with regard to internalizing problems (Davies & Cummings, 1998). Despite these results, 50% of the relation between conflict and child adjustment was left unexplained, suggesting that other factors, such as the ones examined in the current study, may also be important mediators. In summary, emotional security has gained some initial empirical support as playing a mediating role in the link between child exposure to conflict and the development of child maladjustment.

Finally, attempts to integrate emotional and cognitive frameworks to understanding links between child exposure to inter-parental conflict and adjustment have been made. For example, Mann and Gilliom (2004) examined the relations between retrospective reports of inter-parental conflict, cognitive appraisals (e.g., threat, blame, coping efficacy), emotional security in inter-personal relationships, and psychological adjustment in a late-adolescent sample. Support was found for a mediating role of both appraisals and emotional security in the relation between past

exposure to conflict and current adjustment. In another study examining potential mediators in the relation between inter-parental conflict and child maladjustment in a sample of 4th and 5th graders, support was also found for a mediating role of both children's cognitions (appraisals of conflict) and emotional responses (distress in response to conflict) (Fosco & Grych, 2008).

In summary, it is likely that children's cognitions, coping strategies, emotional security, and other child factors play a role in their adjustment in the face of inter-parental conflict, though empirical support for a mediating role of some of these factors has not been shown. In addition, most of the theorizing concerns pathways involved when children are directly exposed to inter-parental conflict. However, it is likely that couple conflict is damaging to children even when children are not directly exposed. Moreover, most prior research in this area has focused on children who are able to report on their emotions, attributions, and/or adjustment. To inform prevention efforts, it would be helpful to identify factors *earlier* in development that may be associated with negative child outcomes. In addition, some initial support for family-level processes playing a mediating role in the relation between inter-parental conflict and child maladjustment has been shown in cross-sectional work (e.g., triangulation; Fosco & Grych, 2008). Consistent with recommendations for the second generation of studies on the consequences of inter-parental conflict (Cummings & Davies, 2002), the current study investigated the prospective relations between pre-natal conflict behaviors and three other characteristics of early family environments (parental depressive symptoms, parenting negativity, and co-parenting conflict). These factors have been shown in prior work to be associated with child adjustment and may therefore represent more proximal explanations for the impact of couple conflict on child adjustment than the conflict itself and at the same time may

reflect more appropriate targets for *early* intervention than the child-level factors discussed above (e.g., appraisals of conflict).

The three characteristics of early family environments examined in this study, parental depressive symptoms, parenting negativity, and co-parenting conflict, were chosen because of links between these factors and child adjustment demonstrated in prior work. Evidence for these links is briefly described here.

Parental depressive symptoms. Young children of depressed mothers have been shown to have higher rates of insecure attachment compared to those of non-depressed mothers (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985). Further, toddlers of depressed mothers were observed to be more aggressive and less compliant with maternal requests in a clean-up task compared to those of non-depressed mothers (Pelaez, Field, Pickens, & Hart, 2008). Finally, in longitudinal work, the course and symptoms of maternal depression were found to be related to later observed and parent-rated child adjustment difficulties (Seifer, et al., 2001).

Negative parenting. A number of studies has established a relation between parenting quality and child adjustment. Specifically, there is evidence that harsh and negative parenting behaviors are linked with child maladjustment (e.g., Eisenberg et al., 2001; Eamon, 2001). For example, Keren, Feldman, and Tyano (2001) compared clinic referred infant-mother pairs with non-referred infant-mother dyads and found that clinic referred mothers provided less support, structure, and sensitivity, and were less positive and more negative during free-play interactions as compared to mothers of non-referred children. In longitudinal work, observed maternal sensitivity and warmth at child age 1.5 years were found to be negatively related to maternal report of child externalizing problems at age 2.5 years (Spinrad et al., 2007). In addition,

mothers' report of non-supportive strategies for dealing with toddler distress at age 1.5 years was positively related with maternal report of later child externalizing problems in that study.

Co-parenting conflict. Co-parenting refers to parents' ability to work together as a team in the interests of the child and elements of co-parenting quality have been shown to be associated with child adjustment (McHale, 1995). For example, children who are consistently provided with conflicting/competing parental messages may feel "caught in the middle", leading to frustration and inhibiting the normative development of emotion regulation skills (Cox, Paley, & Harter, 2001, pp 256). Further, co-parental undermining was found to be positively related to behavioral inhibition in young children (Belsky, Putnam, & Crnic, 1996) and observed competitive co-parenting during infancy has been prospectively linked with teacher-reported externalizing problems (McHale & Rasmussen, 1998).

The current study expands on this prior work by examining pre-natal risk (couple conflict) and protective (HPA axis functioning, social support) factors in the development of these characteristics of the early negative family environment and by examining whether risk and protective processes function differently for mothers and fathers.

Assessing Couple Conflict

The current study attempted to improve on three types of limitations found in prior work on inter-parental conflict and family outcomes. Prior studies have often conceptualized inter-parental relationship functioning through the use of global, self-report assessments of marital satisfaction or more narrow areas of child-rearing disagreement (see reviews in Davies & Cummings, 1994; Emery, 1982). However, other dimensions of couple conflict are likely relevant for child and family functioning. Emery (1982) and others have highlighted the relevance of the hostile quality of conflict for predicting its impact on child and family

functioning. For example, conflict characterized by intense anger, hostility, and physical violence was shown to be more stressful for children and families and associated with greater child problems as compared to conflict which involves lower levels of negative affect, hostility, and aggression (Fantuzzo et al., 1991; Grych & Fincham, 1993). In addition, the frequency of conflict has been posited as a relevant dimension for determining its impact (Grych & Fincham, 1993). In fact, frequent, intense, physical, unresolved, child-related conflicts are considered most detrimental for children (Cummings and Davies 1994; Fincham & Osborne, 1993; Grych, 2005). In the current study, both the frequency of conflict and the level of hostility of the conflict were proposed to predict later family functioning.

A second limitation of prior work on inter-parental conflict is that much of this work relied primarily on self-report measures for the assessment of couple conflict, and this information was often obtained only from one partner (usually mothers) (e.g., Davies & Cummings, 1998). Although self-report measures are subject to reporting bias, when used to assess couple conflict they are useful because they provide insight into behaviors that may not be observable in a laboratory setting or during a home visit and may offer an insider's view of family functioning (Weiss & Margolin, 1977). However, when measuring some aspects of family functioning (e.g., parenting), observational measures of marital conflict have been found to be better predictors than self-report measures (Erel & Burman, 1995; Krishnakumar & Buehler, 2000). The current project assessed couple conflict using both a self-report measure of the frequency of conflict (assessed by both partners) as well as an observational measure of specific couple conflict behaviors (e.g., hostility, demandingness, and contempt) within a problem-solving discussion.

Finally, a third limitation in prior work examining couple conflict and family outcomes is that the bulk of this work has been cross-sectional in design (though notable exceptions exist: e.g., Grych, Harold, & Miles, 2003). Authors have tended to note this difficulty yet discuss their findings as if couple conflict had a causal role in the development of family difficulties (Davies & Cummings, 1998). In the current study, the longitudinal design strengthens claims for a causal role of couple conflict in negative family outcomes.

The transition to parenthood provides a good opportunity for investigating the impact of couple conflict on family functioning because conflict is particularly likely during this potentially stressful transition.

Risky Context of Transition to Parenthood

The transition to parenthood is a time of excitement for many couples, but is also associated with an elevated risk for individual and couple difficulties. For example, clinical levels of adjustment difficulties have been linked with this period for both males and females (e.g., Belsky & Kelly, 1994). In fact, 15% of mothers suffer from post-partum depression (Segre, O'Hara, Arndt, & Stuart, 2007). Less work has examined the depressive difficulties of new fathers. However, there is some evidence that fathers also experience elevated rates of post-natal depressive problems (Matthey, Barnett, Kavanagh, & Howie, 2001; Areias, Kumar, Barros, & Figueiredo, 1996; Madsen & Juhl, 2007). Given the increased rates of depression for new parents, it is perhaps not surprising that the couple relationship also suffers during this transition. For example, declines in relationship satisfaction and love have been demonstrated following the arrival of a baby (Glade, Bean, & Vira, 2005), accompanied by an increase in couple conflict (Cowan & Cowan, 1987) and couple interactions that are tense and/or withdrawn (Boath, Pryce, & Cox, 1998; Mauthner, 1998). Overt conflict is relatively common for married couples,

occurring about once or twice a month on average (McGonagle, Kessler, & Schilling, 1992), and increasing during the transition to parenthood (Boath et al., 1998). In the context of these conflicts, couples who exhibit higher levels of certain behaviors, such as demandingness, hostility, and contempt, and/or those who have frequent conflict may be at risk for later family difficulties. Indeed, negative affect expressed during couple discussions has been linked to declines in marital adjustment across the transition to parenthood (Heinicke & Guthrie, 1996).

In summary, new parent couples are at risk for individual adjustment difficulties, such as depression, and couple difficulties, such as decreased satisfaction and increased conflict. Prior to the arrival of a child, frequent conflict and couple interactions characterized by demandingness, hostility, and contempt likely put individuals and couples at risk for later difficulties by increasing the environmental demands at the same time as reducing available resources (e.g., a partner's support), resulting in an increase in parents' stress. In addition, demands which may have otherwise been appraised as challenges requiring the mobilization of resources may instead be appraised as threats, resulting in increased negative affect, increased stress, and less adaptive coping strategies to deal with the many strains of new parenting. Systems theory posits that couple conflict has multiple negative effects on the family which then serve to reinforce the already dysfunctional system (Cox, Paley, & Harter, 2001). In the current project, focus is placed on depressive symptoms, parenting negativity, and co-parenting conflict and how these variables may be predicted by pre-natal couple conflict. In the next section, evidence for links between couple conflict and these aspects of early family environments is reviewed.

Couple Conflict Behaviors and Parental Depressive Symptoms

From a stress and coping perspective, it is reasonable to assume that couples experiencing frequent, hostile pre-natal conflict are at increased risk for post-partum depressive symptoms.

As discussed above, couple conflict likely increases environmental demands while also reducing available supports and resources, resulting in an increase in stress. Specifically within the literature on couple conflict and depression, it has been argued that problems in the couple dyad contribute to depressive problems because they lead to an increase in the amount of stress that individuals must deal with at the same time that the level of support available decreases (Beach, Sandeen, & O'Leary, 1990). This imbalance in environmental demands and available resources may lead to more maladaptive appraisals of parenting situations as threatening, while also leaving individuals with fewer coping resources for dealing with the many normative difficulties associated with new parenting. Indeed, maladaptive cognitions have been posited to develop as a result of frequent, hostile couple conflict (Sayers, Kohn, Fresco, Bellack, & Sarwer, 2001). Cognitions such as thoughts of hopelessness, helplessness, and self-blame are, in turn, thought to contribute to the risk for depressive symptoms. For example, Sayers and colleagues (2001) found that married women who reported discordant marriages had higher levels of blaming and hopeless cognitions than wives from non-d discordant marriages and these cognitions were associated with diagnoses of Major Depression. In addition, marital conflict may lead to feelings of isolation. New parents who feel isolated may be less likely to take the perspective that the stressors associated with this transition are normative, increasing feelings of low self-efficacy and self-worth, helplessness and hopelessness.

Frequent or hostile conflict experienced *during pregnancy* may be particularly linked to the development of depressive symptoms given the increased importance placed on family goals for both men and women across this transition (Salmela-Aro, Nurmi, Saisto, & Hlmesmaki, 2000). All new parents must cope with the disruptions caused by the birth of a child and the associated demands (Hopkins, Marcus, & Campbell, 1984). However, experiencing the

additional stressor of couple conflict may put parents at increased risk for depressive symptoms because of a cumulative effect of these risk factors. Indeed, couple difficulties have been shown to have a greater impact on individual depressive symptoms for those who are already facing stress in other ways (Liu & Chen, 2006), which is consistent with Lazarus's (1999) contention that stressors adversely affect already vulnerable individuals. In sum, couples experiencing pre-natal conflict may be more vulnerable to the normative stressors that a new child brings.

I will now review studies documenting an association between couple conflict and depressive symptoms, beginning with earlier work that relied on cross-sectional or retrospective designs, followed by treatment outcome studies and longitudinal studies which strengthen claims for causality.

There is cross-sectional and retrospective evidence supporting an association between couple conflict and depressive difficulties. For example, early epidemiological work using retrospective reports suggested that increased marital conflict was a common precursor to the onset of depression (Paykel et al., 1969). Another retrospective study found that individuals suffering from depression were more likely to report marital difficulties in the past year as compared to non-depressed individuals (Roy, 1987). Also, partner criticism and negative interactions have been shown to be more common in couples with one depressed person than with two healthy partners (see review in Beach, Fincham, & Katz, 1998). These studies provide initial support for a link between couple functioning and depression, though the cross-sectional and retrospective designs leave questions of causality unanswered.

Treatment outcome research has also been suggestive of a link between marital conflict and depressive symptoms. Several treatment outcome studies have found equivalent benefits of behavioral marital therapy and individual cognitive-behavioral therapy for the reduction of

depressive symptoms in conflictual couples with at least one depressed partner (e.g., O’Leary & Beach, 1990; Foley, Rounsaville, Weissman, Sholomaskas, & Chevron, 1989; Jacobson, Dobson, Fruzzetti, Schmaling, & Salusky, 1991; Beach & O’Leary, 1992). Further, using mediational analyses, two of these studies found that improvements in the couple relationship mediated the relation between marital therapy and reductions in depressive symptoms (Beach & O’Leary, 1992; Jacobson et al., 1991). These findings are suggestive of a causal role of marital functioning in the development and maintenance of depressive symptoms.

Evidence for a causal role of couple functioning in the development of depression has also been shown in prospective work. Reviews of the literature support a link between marital satisfaction and individual depression, with evidence that marital functioning contributes to the onset and maintenance of depressive symptoms (e.g., Beach, Fincham, & Katz, 1998). For example, one study examined the impact of marital stressors (e.g., divorce/separation, marital affairs, physical aggression, husband’s drug abuse) on depressive symptoms among women who had no prior depression history (Christian-Herman, O’Leary, & Avery-Leaf, 2001). Results indicated a higher than average prevalence of Major Depression among wives who had experienced a significant marital stressor within the last month (38% as compared 2% in prior epidemiological work; Eaton et al., 1989). In addition, marital stressors were found to predict future depressive symptoms whereas depressive symptoms were not associated with future marital problems. Unfortunately, these studies did not include men.

There is also longitudinal evidence that marital conflict *per se* contributes to the onset and maintenance of individual depression (Downey & Coyne, 1990). For example, in a longitudinal study of mothers and their adolescent daughters, Forehand and colleagues (1988) found that adolescents’ exposure to inter-parental conflict was positively associated with

concurrent and subsequent maternal depressive symptoms. Next, in a large, longitudinal study of marital conflict (frequency of arguing) and mothers' self-reported depressive symptoms, Liu and Chen (2006) found that frequency of marital conflict at baseline was positively related to maternal depressive symptoms 2 years later, even after controlling for initial level of depressive symptoms. In addition, another longitudinal study with a large, community sample of married people showed that individuals (both men and women) who reported relationship difficulties at baseline were almost three times more likely than those who did not report such difficulties to have a Major Depressive Episode within the next year (Whisman & Bruce, 1999). The inclusion of males in this study is a strength. However, the measure of relationship discord was limited to a single item asking "In general, how would you say you and your (husband/wife) got along in the past 2 weeks?", highlighting the need for future work to use more complex assessments of couple functioning and marital conflict.

Most prior studies examining factors associated with depression, the transition to parenthood, and post-natal depressive symptoms have neglected male partners (Perren, von Wyl, Burgen, Simoni, & von Klitzing, 2005). However, there is some reason to believe that couple conflict may have a greater impact on the post-partum adjustment of mothers than fathers. Females tend to think about relationships more frequently and in more complex ways than males (Acitelli & Young, 1996). They value social goals and interdependence, whereas males tend to be more independent (Dedovic, Wadiwalla, Engert, & Pruessner, 2009). In addition, females are believed to invest more in relationships, to value relationships more, and to rely on close interpersonal relationships for emotional help in times of difficulty more than males (Nolen-Hoeksema, 1990). When the couple relationship is not a good source of such help, females may experience greater personal distress than males do. For example, in a large-scale study of adult

di-zygotic opposite sex twins, Kendler, Myers, and Prescott (2005) found that support from a spouse was more important in predicting depression for women than men, where the relationship was non-significant (Kendler et al., 2005). Given the greater value that females place on emotional support and listening than males (Pines & Zaidman, 2003), it is reasonable to assume that couple relationships characterized by frequent, hostile conflict would be more distressing for mothers than fathers. In addition, females may tend to worry more about the damage done to their relationships and the hurt they caused their partner following couple conflict (Dedovic et al., 2009). For these reasons, difficulties in the couple relationship were expected to lead to greater difficulties in individual adjustment for mothers as compared to fathers in the current study.

In summary, there is ample evidence supporting a link between couple functioning generally, and couple conflict more specifically, and depressive symptoms. The current study builds on prior work on couple conflict and depressive symptoms with its use of a prospective design within a sample of both mothers and fathers transitioning to parenthood. Parent sex was also examined as a moderator of the relation between pre-natal couple conflict and post-natal depressive difficulties. Next, the link between couple conflict and parenting negativity will be discussed.

Couple Conflict and Parenting Negativity

Couple conflict has also been implicated in the development of parenting negativity. The increased environmental demands and the reduced resources for dealing with these demands which are associated with couple conflict may result in increased overall stress, maladaptive appraisals of normative parenting situations, and maladaptive coping strategies for dealing with these demands (e.g., harsh, rejecting, insensitive parenting behaviors).

The marital relationship has been posited to be an important or even primary influence in the development of parenting (Belsky, 1981; 1984). Katz and Gottman (1996) theorized that marital conflict impacts parenting because it distracts parents from attending to their children's needs, leading to insensitive and non-contingent parenting behaviors. From a stress and coping perspective, it is possible that parents burdened by frequent, hostile couple conflict misinterpret children's emerging efforts towards autonomy as threatening and respond with insensitivity, displays of negative affect, and/or criticism. Similarly, Engfer (1988) describes how couple conflict has negative effects on other family processes in what is referred to as "the spillover effect". Spillover occurs when the consequences of negative experiences within the couple relationship have a negative influence on other relationships within the family, especially with regard to negative affect (Erel & Burman, 1995). Spillover can be understood within a stress and coping perspective because increased environmental demands on the couple can lead to parents' increased stress, maladaptive appraisals, and ineffective coping which have consequences for transferring negative affect to children. Thus, couples who experience frequent or hostile conflict may also be expected to experience and exhibit high levels of negativity in their interactions with children.

Across the transition to parenthood in particular, individuals who experience frequent or hostile conflict with their partners may be at particular risk for the development of parenting negativity. First, parents facing high levels of pre-natal couple conflict have more negativity available to spill over into the parent-child relationship. Given their increased stress levels, they may also have greater difficulties with the changes in routine, disrupted sleep patterns, and increased responsibilities associated with new parenthood. All parents are likely taxed by these adjustments, but those experiencing high levels of hostile conflict with their partner may feel

especially overwhelmed, leading to difficulties in meeting their various role demands, including the new parent role (Jennings, Stagg, & Conners, 1991). These parents may be less likely to appraise parenting situations as challenges which offer the opportunity for mastery and may instead perceive the demands as threatening. In addition, parents experiencing high levels of relationship conflict may also feel that their emotional needs are left unmet, leaving them less able to demonstrate sensitive and affectionate behaviors with their child. Further, individuals experiencing frequent and hostile pre-natal conflict may have developed expectations that interpersonal relationships are stressful and marked by difficulty, contributing to later problems in managing parent-child interactions. For these parents, difficult child behavior may provide confirmation of their negative expectations, leading to increased levels of anger in the moment and subsequent irritation, anger, and harshness directed towards the child. Finally, parents who have experienced frequent or hostile pre-natal couple conflict likely have fewer coping resources available to them to help with regulating emotions in parent-child interactions, increasing the potential for spillover into negative parenting behaviors. Indeed, the resources required to regulate emotions and deal with stressors have been posited to come from a central psychological store which can be depleted (Muraven & Baumeister, 2000). Parents who regularly rely on these resources to cope with couple conflict may have few left over for emotion regulation in response to difficult child behavior. In summary, parents experiencing frequent and hostile couple conflict may not have the necessary emotional and cognitive resources available to them to approach parent-child interactions effectively.

Studies documenting an association between couple conflict and negative parenting will now be reviewed. First, evidence for a relation between couple conflict and dysfunctional discipline will be discussed. Next, the results of individual and meta-analytic work documenting

cross-sectional links between couple conflict and parenting negativity in older and younger samples will be considered. Finally, extant studies using experimental and longitudinal designs will be reviewed.

There is evidence that couple conflict is related to parenting difficulties around discipline (e.g., overly harsh or overly permissive) and ineffective discipline strategies have been proposed to explain the link between couple conflict and child maladjustment (see review in Emery, 1982). For example, Dielman, Barton, and Cattell (1977) found that couple hostility was positively associated with physical punishment and negatively associated with the use of reasoning in a cross-sectional study during middle childhood. In addition, positive links between the frequency of marital conflict and physical punishment were found in a large sample of children between 4-9 years old (Eamon, 2001). In summary, concurrent associations between marital conflict and ineffective discipline strategies have been shown.

Cross-sectional links between marital conflict and other negative parenting behaviors have been demonstrated in samples of older children. For example, in a study of ethnically diverse, low-income 4th graders, couple conflict was negatively related to parental support (e.g., parents' ability to comfort the child) and positively related to parental inconsistent discipline (e.g., frequently changing rules) and hostile control (e.g., coercion and negativity in the parent-child relationship) (Gonzales, Pitts, Hill, & Roosa, 2000). In another study of middle-schoolers, couple conflict was positively related to observed parenting difficulties, including dimensions of rejection (e.g., criticizing, insulting, blaming), coercion (e.g., threatening, manipulation), and lack of emotional support (e.g., an inability to recognize and meet the child's needs) (Kaczynski, Lindahl, Malik, & Laurenceau, 2006).

Using a combination of questionnaire and observational assessment strategies in an adolescent sample, Fauber, Forehand, Thomas, and Wierson (1990) found that inter-parental conflict was positively associated with maternal use of guilt as a discipline strategy and maternal rejection (indications of not wanting to be close to the child) in both divorced and maritally intact families. The lack of inclusion of fathers in this study was a noted limitation. Conger and colleagues (1992) studied both mothering and fathering during adolescence and found that observed couple conflict hostility was negatively related to parenting quality (defined by high levels of warmth, high levels of appropriate discipline, and low levels of hostility) in financially stressed families. Taken together, these results provide strong cross-sectional support for a link between marital conflict and negative parenting within middle childhood and adolescent samples.

Of particular relevance to the current study, links between marital conflict and parenting quality have also been documented in samples with younger children. Goldberg and Easterbrooks (1984) examined the link between observed marital harmony (a variable ranging from high harmony to high conflict) and self-reported parenting quality in couples with toddlers. Marital harmony was negatively related to fathers' strict parenting and positively related to fathers' supportive parenting. For mothers, marital harmony was positively linked to facilitation of the child's independence.

In addition to these individual studies, meta-analyses of studies across childhood and adolescence have also supported links between marital functioning and parent-child relations (Erel & Burman, 1995; Krishnakumar & Buehler, 2000). Specifically, Erel and Burman (1995) examined the link between various dimensions of the marital relationship and the parent-child relationship in 68 studies. The average effect size was .46, indicating a statistically significant

and positive relation between marital quality and parent-child relationship quality of small to medium magnitude (Cohen, 1977). Thus, this meta-analysis provides strong evidence that marital quality and parent-child relationships are related, though it does not speak to the question of causality given the cross-sectional nature of the majority of studies included in analyses. Further, the constructs assessed were broad (marital quality and parent-child relationship quality), as opposed to the more specific links posited in the current study (marital conflict and negative parenting behaviors).

Another meta-analysis examined the more specific links between inter-parental conflict (including inter-parental disagreements and overt conflict), and parenting behaviors (harsh discipline, lax control, emotionally unsupportive parenting, and global parenting quality) (Krishnakumar & Buehler, 2000). Results suggested that inter-parental conflict and parenting quality were significantly, negatively related such that at higher levels of couple conflict individuals showed higher levels of harsh discipline, lax control, emotionally unsupportive parenting, and worse overall parent quality. The average effect size was $-.62$, representing a moderate effect (Cohen, 1977). Again, the lack of longitudinal research was highlighted and a call for future longitudinal research on the link between couple conflict and parenting was made. The current study was an attempt to address this need.

Experimental and longitudinal designs used in a few studies have provided more convincing evidence for a causal role of marital conflict in negative parenting. For example, using an experimental design, Jouriles and Farris (1992) provided some evidence for spillover of negativity from marital conflict to parenting. Parent couples of boys between the ages of 3 and 6 years old were randomly assigned to non-conflictual or conflictual marital interactions. First, parents discussed either the most positive (in the non-conflictual condition) or the most negative

(in the conflictual condition) topic they had generated for discussion without their child present. Following this discussion, parents participated in a videotaped clean-up interaction with their son. Parents assigned to the conflictual condition were less positively engaged with their child (had less general conversation) during the clean-up task as compared to those in the non-conflictual condition, suggesting that the negative affect experienced in the couple interaction may have spilled over into their interactions with their child.

Finally, some longitudinal work has examined pre-natal couple conflict and parenting quality across the transition to parenthood. For example, Cox, Owen, Lewis, and Henderson (1989) assessed parent couples during pregnancy and at child age 3 and 12 months. Results showed that observed pre-natal marital conflict was negatively associated with self-reported and observed parenting quality at child age 3 months. Lindahl, Clements, and Markman (1997) followed couples from the time they were planning to have their first child to child age 5 years. Results from this longitudinal study indicated that mothers' pre-natal and concurrent conflictual couple communication (consisting of conflict, dominance, denial, and negative affect during a marital interaction) were positively associated with parenting insensitivity, withdrawal from parenting, and negative affect expressed to the child when the child was approximately age 5 years old. However, after taking current levels of conflictual marital communication into account, pre-natal conflict no longer contributed unique variance to the prediction of maternal parenting at child age 5 years. On the other hand, fathers' observed pre-natal conflict and negative affect were positively related to their rejection of the child (e.g., making critical, dismissive, invalidating, or insulting comments) at age 5 years, even after controlling for current levels of marital conflict. Thus, this study provides support for a prospective link between couple conflict and later parenting difficulties, though the evidence was stronger for fathers.

In summary, there is ample cross-sectional evidence for a link between couple conflict and parenting negativity. This link has been found across developmental periods (e.g., within early childhood, middle childhood, and adolescent samples) and using diverse assessment strategies (e.g., parent report, child report, observations). Further, meta-analyses have supported the association between couple conflict and parenting quality. In addition, some experimental work has strengthened claims for a causal role of couple conflict in displays of negative parenting. Finally, extant longitudinal work provides mixed support for a prospective link between marital conflict and negative parenting, (i.e., pre-natal conflict contributed unique variance to the prediction of parenting difficulties for fathers but not mothers in one study).

The argument has been made that fathers' parenting is more strongly affected by marital conflict than is mothers'. Fathers' parenting has been hypothesized as being more susceptible to the impact of couple relationship difficulties for several reasons. First, the father role is traditionally considered to be less clearly defined than the mother role, leaving fathering quality open to greater impact by a variety of factors including couple conflict (Erel & Burman, 1995). Second, mothers may be relied on by fathers as "gatekeepers" to their children (Belsky, 1979). In couples with higher levels of conflict, mothers may not provide fathers with as many parenting opportunities and fathers unhappy in the couple relationship may not insist on being involved. Finally, there is some theorizing that women tend to have more clearly delineated roles of "mother" and "partner", whereas men may tend to have a particular style of relating to others (Coiro & Emery, 1998). As a result, men who experience negativity in the couple relationship may be more likely to perceive negativity in interactions with their children, and/or may elicit negative behaviors in both inter-personal contexts. Some support has been found for this idea in studies examining family violence. For example, Dixon, Hamilton-Giachritsis,

Browne, and Ostapuik (2007) examined the domestic violence perpetration histories of mothers and fathers who were reported for suspected child maltreatment. They found that fathers were significantly more likely to be abusive in both the couple and parent-child relationship than mothers (57% vs. 26%), supporting the idea that males may have less clearly defined role definitions of father vs. partner than females and that negativity in the couple relationship may be more likely to spillover into parenting negativity for fathers.

In studies examining the association between couple relationship and parenting quality, there is mixed evidence for a moderating role of parent sex. Two qualitative reviews of the literature concluded that marital quality was more relevant to father-child interactions than mother-child interactions (Parke & Tinsley, 1987; Crockenberg & Covey, 1991). On the other hand, in their meta-analysis examining links between global marital quality and parent-child relationship quality, Erel and Burman (1995) concluded that difficulties in the marital relationship were not more strongly related to parenting for fathers as compared to mothers. In a meta-analysis which more specifically examined the link between marital conflict and parenting behaviors, Coiro and Emery (1998) concluded that there is some evidence that fathers' parenting is more impacted by conflict than mothers', but that both parents are affected by difficulties in the couple relationship. Taken together, prior work provides some evidence that fathers' parenting may more negatively impacted by couple conflict than mothers' in the current study, though the findings have been mixed.

In summary, this study contributes to the literature through its examination of whether observed hostile and self-reported frequent pre-natal couple conflict predict observed parenting negativity for mothers and fathers using longitudinal data. Parent sex was also examined as a moderator of these relations. In addition, this study expands on prior work by examining

observed parenting quality within a triadic context (mother, father, and child), whereas the bulk of past work has assessed parenting quality using self-report data or observations of parenting behaviors in dyadic contexts. Observations of parenting behavior within triadic interactions have been suggested to be particularly useful for elucidating the impact of marital conflict on parenting quality (Cox & Paley, 1997). Next, the association between couple conflict and co-parenting difficulties is considered.

Couple Conflict Behaviors and Co-parenting Conflict

A third family factor which may be related to pre-natal couple conflict is co-parenting quality. Co-parenting, or the ability of parents to work together, is an important marker of family functioning with relevance for child adjustment, though less is known about how difficulties and strengths in co-parenting teams develop. Aspects of co-parenting include the level of support between partners, the level of conflict within the relationship, division of labor (primarily around childcare issues), and the level of active participation in parenting by both partners (McHale, 1995). Similarly, Feinberg (2002) posits four primary components of co-parenting quality including: support vs. undermining of the other's parenting, childrearing disagreement, division of labor, and parents' management of interactional patterns in the family, including child exposure to inter-parental conflict, unified parental coalition vs. triangulation, and interactional balance (relative amounts of time that each parent engages with the child). Co-parenting quality is related to yet distinct from couple relationship quality and parenting quality (McHale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000).

From a stress and coping perspective, it is reasonable to assume that couples who experience frequent and/or hostile pre-natal conflict may have difficulty in developing effective co-parenting teams. Individuals experiencing frequent and hostile couple conflict in addition to

the normative strains associated with having a first child will likely experience elevated levels of stress. This stress may interfere with cooperative and synchronous interactions in the triadic context because stressed parents are more likely to make maladaptive appraisals of normative triadic struggles (e.g., disagreements over the best teaching strategy; a child's perceived preference for or comfort with mother vs. father) and/or to cope more poorly with them.

Stressed parents making maladaptive appraisals of the demands associated with triadic family functioning and having fewer coping resources for managing triadic tasks will likely develop more conflictual co-parenting teams because effective co-parenting requires the use of problem-solving and negotiation strategies in order to work together in child-rearing. Highly stressed parents may be expected to have difficulty with the problem-solving, compromising, and regulation of emotions necessary to resolve triadic family difficulties effectively. In addition, individuals with high levels of pre-natal couple conflict may have had fewer opportunities to discuss and work out their differing expectations for parenting and/or have negotiated these discussions less well, leading to conflicts in co-parenting after the child arrives. Finally, McHale (1995) has argued that couples experiencing high levels of conflict are more likely to demonstrate co-parenting conflict in the context of the child because this may be a way to gain the control that they are unable to achieve in the couple relationship (e.g., they cannot "win" versus their spouse in the dyadic context but they can attempt to "win" in a competition over affection and/or attention from their child).

Next, evidence for a link between couple conflict and co-parenting conflict will be reviewed. Specifically, child-rearing disagreements and intimate partner violence (both of which may be related to couple conflict), have been linked to co-parenting difficulties in prior studies. In addition, longitudinal work with divorced families has documented an association between

couple conflict and co-parenting quality. Finally, cross-sectional and limited longitudinal studies documenting this association will be discussed.

A construct which may be related to pre-natal couple conflict is holding disparate beliefs or expectations for parenting. Indeed, disagreements about child-rearing have been linked to co-parenting quality in longitudinal work. For example, Van Egeren (2003) examined the pre-natal predictors of co-parenting quality at child age 1, 3, and 6 months, and whether co-parenting improved or worsened over time. Pre-natal disagreement about parenting style (e.g., permissive vs. authoritative), was associated with steadily worsening, more fluctuating, and less stable co-parenting quality, according to mothers. These results were supported in another longitudinal study of primiparous, co-habiting couples (McHale & Rotman, 2007). Couples with greater pre-natal disagreements about parenting showed worse co-parenting quality (lower levels of co-parenting support and cohesion and higher levels of conflict) at child age 3 and 12 months. Thus, individuals who felt more at odds with their partner regarding child-rearing beliefs during pregnancy had more difficulties with the development of co-parenting teams than those who agreed more with their partner during that time. Taken together, these results link pre-natal disagreements about parenting approaches to later co-parenting quality.

The links between couple violence, an extreme form of marital conflict, and co-parenting quality have also been examined. For example, in a study of married couples with a young child, parent report of domestic violence was positively related to observations of concurrent hostile-withdrawn co-parenting (characterized by interactions in which couples appeared primarily withdrawn and non-communicative but attempts to engage were overtly negative, tense, irritated, and/or frustrated) and negatively related to positive co-parenting (cooperative and affectively positive interactions) (Katz & Low, 2004). These results were also supported in a longitudinal

study with data that was used for the current project. Feinberg, Kan and Goslin (2008) documented an association between self-reported pre-natal domestic violence perpetration and later observed and self-reported co-parenting quality. Taken together, these findings support a link between domestic violence and co-parenting difficulties. These results are relevant to the current study because they reveal that extreme, self-reported couple conflict behaviors are prospectively related to co-parenting difficulties. The current project examined whether less severe, negative couple behaviors are also linked to later co-parenting quality.

Longitudinal work with divorcing couples has documented the prospective link between couple conflict and co-parenting quality. For example, observed pre-divorce couple hostility predicted the quality of co-parenting 18 months later (Maccoby, Depner, & Mnookin, 1990). Specifically, couples who were more hostile at baseline were more likely to display subsequent conflicted co-parenting (characterized by little parenting coordination, active conflict, and undermining of the ex-partner) as opposed to cooperative co-parenting (characterized by coordinated parenting across households and support of the other's parenting). Within intact families, little prospective work has examined the relation between couple conflict and co-parenting quality.

There is some cross-sectional evidence that couple conflict is linked to co-parenting quality within intact families. Triadic competitive interactions are elevated in families marked by higher levels of couple conflict (see review in Cox, Paley, & Harter, 2001) whereas couples with higher levels of marital satisfaction have been shown to display more warmth, less conflict, and better co-parenting cooperation in triadic interactions (Cowan & Cowan, 1987). In a study of parent couples of infants between 8 and 11 months, observed couple conflict was positively related to observed hostile-competitive co-parenting (characterized by high levels of parental

competing, verbal disagreements, and a parent-centered dynamic of the interaction) (McHale, 1995). In another study of couples with 30-month olds, maternal report of child exposure to inter-parental conflict was positively related to observed co-parenting competition and verbal conflict and negatively related to co-parenting cooperation and warmth (McHale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000). Finally, self-reported couple conflict was negatively associated with self-reported co-parenting cooperation (characterized by partners asking each other's opinion on parenting) and was positively associated with co-parenting conflict (characterized by partners undermining the other's parenting) and triangulation (using the child in the parents' conflict) (Margolin, Gordis, & John, 2001). Thus, these studies provide initial cross-sectional evidence for a link between marital conflict and co-parenting difficulties.

Finally, there is extant support for a prospective link between pre-natal couple conflict and post-natal co-parenting difficulties. Lindahl, Clements, and Markman (1997) found that fathers' (but not mothers') observed pre-natal conflict and negative affect in a problem-solving discussion were positively associated with their levels of triangulation, negative affect, and hostility toward their partner in a triadic context at child age 5 years. These effects remained even after controlling for concurrent levels of marital conflict. It should be noted that the behavioral observations at child age 5 years in that study consisted of a marital discussion in the presence of the child, which is significantly different than the triadic free-play and teaching interactions used to assess co-parenting quality in the current study. Nonetheless, these results suggest that pre-natal couple conflict may place couples at risk for the development of co-parenting difficulties across the transition to parenthood.

Little is known about differential effects of couple conflict on co-parenting for mothers and fathers. Similar arguments for the contention that couple relationship quality has a greater

impact on fathers' parenting quality than mothers' could be applied to the co-parenting context. For example, fathers may perceive their co-parenting roles as less rigid and socially defined than mothers do, leaving their co-parenting quality more susceptible to external influences such as marital conflict. In addition, because of the potentially more well-defined "parent" vs. "partner" roles of females, mothers may be better able to separate couple relationship difficulties from the triadic context. On the other hand, fathers may relate to mothers in the co-parenting context in much the same way that they relate to them in the dyadic context, leading to a higher correlation between couple conflict and co-parenting for fathers than for mothers. One study provided empirical support for this idea. In the study reviewed above, Lindahl, Clements, and Markman (1997) found that pre-natal couple negativity predicted fathers' co-parenting difficulties (e.g., triangulation of the child into marital problems) but not mothers'. In summary, there is limited evidence suggesting that fathers' co-parenting may be more greatly affected by couple conflict than mothers'.

Evidence for links between couple conflict and co-parenting difficulties has been reviewed. Longitudinal evidence suggests that child-rearing disagreements, one type of couple conflict, are linked to later co-parenting quality. In addition, prospective work has shown that couples exhibiting marital violence, an extreme form of couple conflict, are at risk for subsequent co-parenting problems. Within divorced samples, couple conflict has been shown to predict later co-parenting quality and prior work with intact families has demonstrated that more conflictual couples also show poorer co-parenting quality using cross-sectional designs. Finally, limited longitudinal work has demonstrated a link between pre-natal couple conflict and co-parenting difficulties in the context of a marital discussion in the child's presence. The current study expands on these results by using a longitudinal design to examine the relation between

both self-reported and observed pre-natal couple conflict and observed co-parenting conflict assessed in triadic free-play and teaching interactions across the transition to both mother- and father-hood within intact families. Parent sex was also examined as a moderator of the relation between pre-natal couple conflict and post-natal co-parenting conflict.

In summary, prior work, much of which has relied on cross-sectional, self-report data and has neglected fathers, provides preliminary evidence that pre-natal couple conflict is positively associated with post-partum depressive symptoms, parenting negativity, and co-parenting conflict. Next, potential moderators of the relations between pre-natal couple conflict and early characteristics of family environments are considered.

Moderators of the Relation Between Pre-natal Couple Conflict and Post-natal Family Environments

Difficulties that may be associated with the transition to parenthood were described above; however, couples are expected to adapt to the difficulties associated with the adjustment to parenthood in different ways, depending on a complex interaction of risk factors and protective resources. Indeed, not all individuals experience difficulties with depression following childbirth, many develop sensitive and competent parenting, and many learn to work effectively in co-parent teams. It is important to understand factors which may protect individuals from the negative influence of pre-natal couple conflict across this period. The current project focuses on physiological stress functioning and social support as potential buffers of the impact of couple conflict on later parent depressive symptoms, parenting negativity, and co-parenting conflict. These factors may be protective because they provide parents with resources for coping with the normative demands of new parenting and the increased demands

associated with couple conflict, thereby reducing parents' stress and reducing the likelihood that challenges will be appraised as threats.

HPA axis functioning. Within a stress and coping framework, individual differences in the body's physiological response to stress are likely to moderate the impact of frequent, hostile couple conflict on individual adjustment, parenting, and co-parenting quality. Adaptive physiological stress regulation likely serves to reduce the experienced stressfulness of external demands and/or to encourage adaptive appraisals and effective coping with these demands. The hypothalamic-pituitary-adrenocortical (HPA) axis is an important component of this physiological self-regulation and consists of a multi-faceted system that allows the body to respond to physical and psychological stressors blocking an individual's goals (e.g., for survival, maintenance of social status/acceptance; Dickerson & Kemeny, 2004). This system includes the hypothalamus, the pituitary gland, and the adrenal gland. In response to a stressor, the hypothalamus releases a hormone, corticotrophin (CRH), which in turn causes the release of adreno-corticotrophin releasing hormone (ACTH) by the pituitary. This prompts the release of cortisol into the blood stream by the adrenal glands. Elevated levels of cortisol in the blood provide negative feedback to the HPA axis system, leading to suppression of the release of CRH and ACTH and a subsequent reduction in cortisol secretion.

Consistent with the approach taken here, McEwen (1998) described how social relationship stressors such as couple conflict could have consequences for individual adjustment depending on individual HPA axis functioning. For example, he suggested that couple conflict can be conceptualized as entailing "repeated hits" to the system, given that the content of disagreements are likely to vary. Difficulties are more likely to arise in the face of these repeated hits of conflict for those who manifest elevated levels of baseline cortisol and elevated cortisol

reactivity because these individuals would be less likely to adapt to and cope effectively with these conflicts over time. Further, McEwen stated that the ability of individuals to recover physiologically following a conflict affects the physiological toll of that stressor on the individual, with prolonged recovery associated with greater stress and risk for maladjustment. In sum, McEwen proposed that difficult inter-personal interactions which are accompanied by elevated baseline cortisol levels, elevated cortisol reactivity, and/or prolonged or delayed recovery are likely to lead to negative health consequences. The current study examined these ideas for psychological and family outcomes, whereas McEwen primarily made claims regarding physical health. Specifically, the current project focused on the potential of three indicators of HPA axis functioning to buffer individuals from the development of depressive symptoms, parenting negativity, and co-parenting conflict: baseline cortisol level, cortisol reactivity to couple conflict, and cortisol recovery following conflict.

HPA axis activity has been associated with social threats perceived to be out of one's control (Dickerson & Kemeny, 2004). Thus, HPA axis functioning related to couple conflict (often threatening to the social self and perceived as uncontrollable) may be especially relevant for understanding the impact that conflict will have on the individual, couple, and developing family. Several studies have examined HPA axis responses during couple interactions (e.g., Heffner et al., 2006). Typically, blood or saliva samples are collected and assayed for stress hormones such as cortisol. There is now ample evidence documenting a relation between couple behaviors during these discussion tasks and HPA axis functioning, with greater reactivity and slower recovery associated with negative couple behaviors on average (Kiecolt-Glaser & Newton, 2001).

Despite the group level associations between couple behavior and HPA axis functioning,

individual differences in the physiological stress response to couple conflict have been documented. For example, there is evidence that attachment style, temperament, relative power within the couple relationship, stage of relationship (i.e., newlyweds compared to older married couples), and sex impact HPA axis functioning during couple discussions (Powers, Pietromonaco, Gunlicks, & Sayer, 2006; Laurent & Powers, 2007; Loving, Heffner, Kiecolt-Glaser, Glaser, & Malarkey, 2004; Feinberg, Bontempo, & Granger, in submission).

In the current study, the level of baseline cortisol levels was proposed to moderate the relations between pre-natal couple conflict and characteristics of the post-natal family environment. Specifically, lower baseline cortisol levels were predicted to be protective against depressive symptoms, parenting negativity, and co-parenting conflict for individuals dealing with pre-natal couple conflict. In low quantities, cortisol is adaptive and is implicated in the normative regulation of other bodily systems, increased neuronal plasticity, and heightened metabolic activity. However, glucocorticoids such as cortisol affect the brain in a biphasic manner, having a different impact at low versus high levels (Diamond, Bennet, Fleschner, & Rose, 1992). McEwen (2003) further elucidated the multi-faceted role of cortisol in adaptive and maladaptive functioning with the concepts of allostasis and allostatic load. Cortisol is implicated in individuals' normal adaptation to the rhythms and demands of daily life and in striving to maintain homeostasis in a process referred to as *allostasis* (McEwen, 2003). However, for some individuals, cortisol is not turned off when no longer needed, perhaps due to dysregulation in the negative feedback loop that allows the normally functioning HPA axis to discontinue cortisol secretion, or because the environmental demands are so taxing that they require constant activation. Over many months or years, this condition of elevated baseline cortisol levels, or hypercortisolism, leads to “wear and tear” at the body and brain level and contributes to what

McEwen refers to as *allostatic load*, or the long-term “cost” of short-term adaptation for individuals with dysregulated HPA axis functioning. For example, the brain’s receptors for glucocorticoids such as cortisol can be damaged under constant activation, resulting from and further exacerbating the problem of hypercortisolism (Sapulsky, 1990; Diamond et al, 1992).

Such chronically high cortisol may in turn lead individuals to appraise more situations as stressful and threatening and may leave them with fewer coping resources. There is mixed evidence on this topic. For example, a recent study found that active coping strategies were associated with lower cortisol levels throughout the day (O’Donnell, Badrick, Kumari, & Steptoe, 2008). On the other hand, an older study linked higher levels of morning cortisol to active coping strategies for men (Brandtstadter, Baltes-Gotz, Kirschbaum, & Hellhammer, 1991).

It should be noted that hypocortisolism, or the presence of baseline cortisol levels which are very low, may also be maladaptive for individuals transitioning to parenthood. Meta-analytic results suggest that exposure to chronic or severe stressors can lead to extreme levels (either excessively high or excessively low) of baseline cortisol (Miller, Chen, & Zhou, 2007). It has been proposed that when some individuals are exposed to chronic, severe stressors, the brain creates more receptors for glucocorticoids such as cortisol so that cortisol does not remain in the body to cause the damage associated with prolonged exposure (Heim & Nemeroff, 2001). This up-regulation of receptors leads to lower levels of baseline cortisol. For example, baseline cortisol has been found to be negatively associated with severity of trauma exposure and severity of PTSD symptoms (Schechter et al., 2004). Factors such as the timing and nature of stressful events, emotions aroused by the stressor, and appraisals of the stressor have been put forth to predict whether hyper- or hypocortisolism will follow high levels of stress (Miller, et al., 2007).

In the current study, it was considered unlikely that the working- to middle-class, volunteer sample of committed couples includes a significant number of individuals with significant trauma histories or individuals who are experiencing the chronic, severe levels of stress associated with hypocortisolism. Therefore, in the current study, lower levels of baseline cortisol were predicted to protect individuals from the development of depressive symptoms, parenting negativity, and co-parenting conflict in the face of pre-natal couple conflict. However, exploratory analyses examining a curvilinear relation of baseline cortisol to pre-natal couple conflict and post-natal family outcomes were also conducted.

Cortisol reactivity, the second indicator of the HPA axis system examined in this project, reflects the mobilizing of physiological resources to deal with environmental demands. Some degree of reactivity is necessary for an individual to respond to environmental demands and moderate cortisol responses promote learning and adaptation to the environment. However, extremely high levels of reactivity may contribute to greater appraised stressfulness of a particular demand and a greater likelihood of threat appraisals. Prior work has shown that greater cortisol reactivity is associated with internalizing difficulties such as social phobia and depression (Condren, O'Neill, Ryan, Barrett, & Thakore, 2001; Meyer, Chrousos, & Gold, 2001). Thus, individuals who exhibit lower levels of cortisol reactivity to conflict may appraise the conflict as less stressful and/or as a challenge that can be overcome and may enact quick, effective coping strategies to deal with the conflict.

Cortisol recovery is the third indicator of HPA axis functioning to be examined here. Under prolonged exposure to cortisol, neuronal damage and/or permanent loss can occur (Diamond, Bennet, Fleschner, & Rose, 1992). Individuals whose cortisol levels remain elevated even long after an environmental demand has been removed likely experience heightened stress,

negative emotions, and threat. Indeed, it has been noted that an individual's capacity to relax following difficult interpersonal interactions impacts the stressfulness of that encounter (Frankenhaeser, 1986). Individuals with delayed cortisol recovery could be said to be physiologically "stuck" in threat mode. The next time couple conflict occurs, these individuals will likely experience more stress and will be more likely to appraise the conflict as threatening (e.g., they may think "Last time we had a discussion like this I felt terrible for hours. Nothing good will come of this discussion either"). Delayed cortisol recovery following couple conflict has been associated with extreme levels of inter-personal difficulties such as the perpetration of intimate partner violence (Feinberg, Jones, Granger, & Bontempo, submitted). In summary, it is possible that delayed cortisol recovery following couple conflict increases individuals' risk for the development of individual and family difficulties.

It should be noted that the HPA axis is likely both regulated and regulating. Indeed, HPA axis functioning has been described as the means by which interpersonal difficulties impact a variety of individual (e.g., depression) and couple outcomes (e.g., divorce and marital satisfaction) (Laurent & Powers, 2007; Kiecolt-Glaser, Bane, Glaser, & Malarkey, 2003; Levenson & Gottman, 1985). Individuals' appraisals of conflict and their coping efforts likely influence their physiological reactivity and recovery to stressors, which in turn likely influence individual (e.g., depression) and family outcomes (e.g., marital satisfaction). In this way, HPA axis functioning can be said to *mediate* the relation between environmental demands and individual and family outcomes. On the other hand, less intense physiological reactivity and greater physiological recovery also likely allow an individual to appraise conflict as less threatening and to enact better coping strategies. In that case, HPA axis functioning could be

conceptualized as playing a *moderating* role in the relation between conflict and individual and family outcomes. The latter role of the HPA axis was the focus of the current study.

In the current study, indicators of HPA axis functioning (i.e., lower baseline cortisol levels, lower cortisol reactivity, and greater cortisol recovery) were predicted to protect individuals from the potentially deleterious effects of couple conflict on later individual and family functioning. Specifically, the relations between pre-natal couple conflict and parental depressive symptoms, parenting, and co-parenting quality were predicted to be moderated by the level of baseline cortisol, cortisol reactivity, and cortisol recovery following couple conflict.

HPA Axis functioning and depressive symptoms. Conflict behaviors have been proposed in prior work to be linked to depression due partially to the associated increased/prolonged activation of the HPA axis (Kiecolt-Glaser and Newton, 2001). As highlighted above, cortisol is adaptive in low qualities and for short duration, but can be damaging at elevated levels which persist over time (Meyer, Chrousos, & Gold, 2001). In the current study, lower levels of baseline cortisol, less cortisol reactivity, and greater cortisol recovery were predicted to be protective against the development of depressive symptoms in the face of pre-natal conflict. Adaptive physiological regulation when dealing with couple conflict can help individuals to appraise conflict as a challenge that can be successfully coped with and allow individuals to recover and unwind following the stressful couple interaction, protecting new parents from the development of individual adjustment difficulties.

Maladaptive HPA axis functioning has been proposed to be part of a physiological reaction to stress that leaves an individual vulnerable to the development and/or maintenance of depressive difficulties (e.g., Heim, Owens, Plotsky, & Nemeroff, 1997). For example, HPA axis dysfunction has been posited to explain the link between early life stressors (e.g., child

maltreatment) and the subsequent development of depression (Shea, Walsh, MacMillan, & Steiner, 2004). In addition, treatment outcome research has documented that individuals receiving outpatient treatment for depression show positive changes in HPA axis regulation prior to positive changes in behavioral and mood symptoms (Appelhof et al., 2005). Adaptive HPA axis functioning may also protect individuals from the development or worsening of depressive symptoms across the transition to parenthood.

Each of the three indicators of HPA axis functioning which are of interest to the current study have been implicated in depression. For example, elevated cortisol levels for depressed individuals compared to controls have been documented (e.g., Young, Abelson, & Cameron, 2004; Meyer, Chrousos, & Gold, 2001; Shea, Walsh, MacMillan, & Steiner, 2004; Gold, Goodwin, & Chrousos, 1988). Frequency and chronicity of depressive symptoms and prior history of depressive episodes have all been linked to baseline cortisol levels, with more severe, chronic, and frequent depressive problems associated with higher levels of cortisol (reviewed in Shea et al., 2004). Further, prior to a laboratory stressor, individuals with Major Depression had significantly higher baseline cortisol levels than matched controls (Young, Lopez, Murphy-Weinberg, Watson, & Akil, 2000). In addition, cross-sectional research has revealed that individuals who suffer from Cushing's syndrome, characterized by excessive levels of glucocorticoids such as cortisol, are more prone to depression than matched controls (Krystal et al., 1990; Haskett, 1985). Of note, when the hypercortisolism of Cushing's patients is corrected through surgery, the depressive symptoms of these individuals have been shown to decrease (McEwen, 2003). Of particular relevance to the current study, Handley, Dunn, Waldron, and Baker (1980) found that higher baseline cortisol levels at the end of pregnancy (i.e., 38 weeks) were associated with more severe post-partum depressive problems for mothers. Fathers were

not examined. Nonetheless, these results support the current hypothesis that pre-natal elevations in cortisol may be a risk factor for post-natal depressive problems.

Greater cortisol reactivity to demands has also been shown to be associated with depressive problems, though not all studies have documented this association (e.g., Burke, Davis, Otte, & Mohr, 2005). Individuals with Major Depression have been shown to have greater cortisol reactivity to ovine CRH, which mimics the body's stress response, than nondepressed comparison participants (Gold, Goodwin, Chrousos, 1988). Further, in a study of individuals treated with outpatient therapy and currently in remission from depression, elevated cortisol reactivity was associated with relapse (Appelhof et al., 2005). Across the transition to parenthood, mothers who showed greater cortisol reactivity to a social stress test during pregnancy were more likely to report difficulties with post-partum depression as compared to those with low cortisol reactivity to stress, even after controlling for pre-natal depressive problems (Nierop, Bratsikas, Zimmermann, & Elhert, 2006). Fathers were not included in that study. In summary, there is evidence that heightened cortisol reactivity to stress places individuals at risk for the development or maintenance of depressive symptoms, particularly during pregnancy.

Finally, prolonged cortisol recovery may be associated with internalizing difficulties such as depression. A failure in the HPA axis negative feedback loop, in which cortisol that has reached a certain level in the blood stream causes the system to shut itself off, has been put forth as a causal and maintaining factor in depressive symptoms (Johnson, Kamilaris, Chrousos, & Gold, 1992; Barden, Reul, & Holsboer, 1995) and impaired functioning of this negative feedback has been demonstrated in patients with Major Depression as compared to matched controls (Young, Haskett, Murphy-Weinberg, Watson, & Akil, 1991). A meta-analysis of studies

comparing HPA axis functioning in depressed and non-depressed individuals concluded that individuals with Major Depression had significantly higher cortisol levels following a stressor (at what would normatively be a point of recovery) than non-depressed controls (Burke, Davis, Otte, & Mohr, 2005). This effect remained even after controlling for baseline levels of cortisol.

The dexamethasone suppression test (DST) has been widely studied in relation to the incidence, severity, course, and response to treatment for individuals with Major Depression. The DST entails giving individuals 1.0 mg of dexamethasone late at night (during a low point in the circadian rhythm of cortisol) and measuring their cortisol levels at various points (i.e., morning, afternoon, evening) during the next day (APA Task Force on Laboratory Tests in Psychiatry, 1987). Dexamethasone is a synthetic steroid which consistently results in cortisol suppression over the next 24 hours for healthy, non-depressed individuals by blocking the release of CRF and ACTH. Because of this blocking of CRF and ACTH, the DST test is thought to mimic the normal functioning of the HPA's negative feedback loop. Elevated levels of cortisol (between 4 and 10 ug/dl) within 24 hours of the administration of dexamethasone indicate that the normative suppression of cortisol production did not occur, often referred to as "escape from cortisol suppression", and dysregulation in the negative feedback loop of the HPA axis is inferred. A significant percentage of individuals hospitalized for Major Depression show this abnormal cortisol escape from dexamethasone suppression (APA Task Force, 1987), potentially highlighting dysregulation in the negative feedback loop of the HPA axis. DST non-suppression has been shown to be associated with more severe pre-treatment depressive symptoms (Georgotas et al., 1986) and with relapse after complete clinical recovery (Charles, Schittecatte, Rush, Panzer, & Wilimotte, 1989; Appelhof et al., 2005). Among depressed, older adult out-patients with Major Depression, those whose DST response had not normalized by the third

week of psychiatric treatment showed no clinical improvement by week 7 (Georgotas et al., 1986). Further, hospitalized individuals who continue to demonstrate this abnormal non-suppression at the end of treatment were more likely to relapse than those whose DST reactions normalize with treatment (reviewed in Coryell, 1990). Non-suppressors were also found to be more likely to make serious suicide attempts during follow-up than suppressors (Coryell, 1990). The samples sizes of these studies individually are small. However, taken together, these results suggest that dysregulation in the cortisol recovery phase of HPA axis functioning (as assessed by the DST test) is linked with depressive problems (i.e., the incidence of Major Depression, severity of symptoms, response to treatment, and course of depressive problems).

In summary, there is evidence for links between the three indicators of HPA axis functioning and depressive symptoms. The development and maintenance of depressive symptoms are likely multiply determined (Cicchetti & Toth, 1995). However, the results described above suggest that maladaptive HPA axis functioning is one factor that may contribute to the development and/or maintenance of depressive symptoms. The current study will expand on the results of prior work on HPA axis functioning and depressive problems by examining the ability of adaptive HPA axis functioning to *protect* individuals from post-natal depressive symptoms in the context of frequent and hostile couple conflict.

HPA axis functioning and parenting negativity. Parental HPA axis functioning may also be related to the quality of parenting, although there is little research in this area. Activation of the stress response system can lead individuals to rely on defensive behavioral responses associated with fear (Meyer, Chrousos, & Gold, 2001). Working memory and problem-solving capacities are less accessible when this system is activated. Thus, when the HPA axis is engaged, individuals tend to rely on more automatic behaviors. In addition, functions such as

sleep, growth, and sexual behaviors are suppressed when the HPA axis is active (Chrousos & Gold, 1992). Thus, individuals with chronic, elevated, or prolonged physiological stress responses to couple conflict may be more tired and have fewer cognitive resources to deal effectively with parenting demands. They may also be more likely to appraise parenting difficulties as threats. More specifically, in interactions with their children, parents with maladaptive HPA axis functioning may mis-perceive ambiguous child cues as threatening, may be less able to problem-solve effectively and/or to generate alternative strategies for dealing with their child, and may rely on automatic responses which are typically reserved for dealing with feared or threatening stimuli, resulting in negative and insensitive parent-child interactions.

For these reasons, in the current study, individuals who experience high levels of couple conflict accompanied by high levels of baseline cortisol, heightened cortisol reactivity, and/or prolonged cortisol recovery were predicted to be at higher risk for the development of parenting negativity. On the other hand, it was predicted that conflictual individuals who nonetheless exhibit adaptive HPA functioning would be less likely to display parenting negativity.

Cross-sectional work has documented an association between HPA axis functioning (including baseline cortisol levels and cortisol reactivity) and negative parenting among parents at high risk. To this author's knowledge, HPA axis recovery has not been examined. One study examined the relation between maternal cortisol reactivity and harsh parenting among highly stressed, low-income, ethnically diverse, clinic-referred mothers of toddlers (Martorell & Bugental, 2006). Maternal salivary cortisol reactivity to the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978) was found to be positively related to self-reported harsh parenting for mothers with low perceived power and temperamentally difficult children. Martorell and Bugental (2006) explained these results by suggesting that mothers with low perceived power

experience heightened cortisol reactivity to threatening stimuli (e.g., difficult child behavior) and therefore are more likely to exhibit behaviors associated with fear responses (i.e., harsh maternal behaviors). Although the cross-sectional nature of this study does not allow for causal conclusions, the findings support a link between HPA axis functioning in response to threatening interpersonal situations and harsh parenting, especially for mothers under stress.

Another study also examined the relations between HPA axis functioning, parenting, and child outcomes in a high-risk sample of diverse, low-income mothers with significant trauma histories and their young children (from infancy to approximately age 4 years) with externalizing behavior problems (Schechter et al., 2004). Similar to the results presented above, results from this study showed that maternal cortisol reactivity to a separation/reunion task was positively associated with observed maladaptive parenting (e.g., displays of inappropriate affect and disorganized behavior) during the reunion, at a trend level. In addition, baseline maternal cortisol levels were negatively associated with observed maladaptive parenting during the reunion at a trend level such that mothers with lower baseline cortisol levels displayed more maladaptive parenting. These results make sense when considered within the context of the sample: highly stressed individuals with trauma histories and PTSD symptoms. As discussed above, hypocortisolism may occur for these individuals and reflects a form of HPA dysregulation. Thus, these two studies provide initial evidence that HPA axis dysregulation is associated with self-reported and observed parenting difficulties within highly stressed samples. Unfortunately, these studies did not assess cortisol *recovery* to stress, leaving questions as to this component of HPA axis functioning unanswered. Further, HPA axis functioning and the parenting behaviors of fathers has not yet been examined.

In the current study, the relation between pre-natal conflict and parenting negativity was predicted to be exacerbated by dysregulated HPA axis functioning. The current project expands on extant prior research on HPA axis functioning and parenting behaviors through its use of longitudinal data, its inclusion of fathers, its examination of HPA axis *recovery* (in addition to baseline cortisol levels and cortisol reactivity), and its conceptualization of HPA axis functioning as a moderator of the relation between pre-natal risk and parenting quality.

HPA axis functioning and co-parenting conflict. It was predicted above that couples experiencing higher levels of pre-natal conflict would have greater difficulty with the development of effective co-parenting across the transition to parenthood. This may be less true for those parents who experience adaptive HPA axis functioning in response to couple conflict. Currently, there is no empirical evidence on this topic of which the author is aware. However, it is reasonable to assume that dysregulated HPA axis functioning could leave individuals with fewer resources for regulating their emotions and managing the negotiation required to create synchronous triadic interactions. As stated above, physiologically less-well regulated parents may have more difficulties with working memory, problem-solving, and generation of alternative strategies, all of which could interfere with effective coping and lead to co-parenting difficulties. Parents whose physiological responses are more drastic and whose recovery is delayed following interpersonal difficulties likely perceive these experiences as more stressful and appraise them as threats where there is little to be gained and much to lose. Thus, these individuals will likely show greater difficulties with cooperation and less synchronous, more conflictual triadic interactions with their partner and child. For these reasons, in the current study, it was predicted that individuals showing lower baseline cortisol levels, less cortisol reactivity to conflict, and greater physiological recovery following conflict would be better

equipped to engage in the negotiation and compromise required for successful co-parenting in the face of frequent and hostile pre-natal conflict.

A note about the assessment of HPA axis functioning in pregnant women is warranted. Baseline cortisol levels are elevated on average during pregnancy (Susman, Schmeelk, Ponirakis, & Garipey, 2001). As a result, the range of baseline cortisol levels within a sample of pregnant women may be restricted. In addition, HPA axis responses to stress have been shown to be dampened during pregnancy (Weerth & Buitelaar, 2005). Little is known about HPA axis *recovery* to stress during pregnancy specifically (Weerth & Buitelaar, 2005). Despite the elevated basal cortisol levels and dampened cortisol reactivity associated with pregnancy, it is clear that HPA functioning in response to stress remains intact during this period and individual differences in HPA axis functioning have been found to meaningfully predict relevant individual, family, and child variables (e.g., Susman et al., 2001; Monk et al., 2000). Thus, in the current study, HPA axis recovery during pregnancy was thought to have potential as a protective factor for women dealing with conflict despite the more limited range of HPA axis functioning that was expected in this sample.

In summary, evidence supporting a link between HPA axis functioning in response to interpersonal stress and individual and family functioning has been reviewed, relying primarily on cross-sectional data. The current study expands the literature in this area by using longitudinal data and by conceptualizing indicators of HPA axis functioning as *moderators* of the relation between conflict and negative family outcomes. This conceptualization represents a new and potentially fruitful direction of study. In addition, HPA axis functioning was assessed *in the home* in the current study, which may be more ecologically valid compared to laboratory settings typically used in prior work. Further, no prior studies of which the author is aware have

examined the prospective links between pre-natal cortisol recovery and parenting or co-parenting. Finally, this is one of few studies to examine HPA axis functioning within a sample of couples transitioning to parenthood.

Social support. An ecological systems perspective emphasizes the impact that factors at various levels have on child and family functioning (Bronfenbrenner, 1986). Contextual factors in particular have been argued to influence parents' abilities to create environments that support or thwart the adaptive development of their children (Azar, Reitz, & Goslin, 2008). Indeed, contextual demands and resources are likely relevant for understanding the development of parental depressive symptoms, parenting behaviors, and co-parenting quality across the transition to parenthood. From a stress and coping perspective, social support can be thought to reduce the stressfulness of couple conflict by increasing the resources available to an individual to manage this and other normative parenting difficulties. Social support refers to emotional, instrumental, or informational help (Crockenberg, 1988), and could help alleviate the stress that first-time parents experience across the transition to parenthood. Instrumental (e.g., helping complete tasks) emotional (e.g., provision of sympathy, validation, love, acceptance), and informational (e.g., giving knowledge and advice) support may be especially helpful for first-time parents who experience high levels of conflict with their partner and who as a result may feel hopeless, worthless, un-loved, and/or ineffective. With adequate support resources, new parents may be more likely to appraise couple conflict and parenting difficulties as challenges as opposed to threats and to demonstrate more effective coping with these difficulties.

Power and Parke (1984) proposed a model of social support specifically for women making the transition to parenthood. They suggest that the type and availability of social support from a variety of sources within and beyond the family influence new mothers' adjustment and

parenting. Specifically, four types of support are posited including relational, ideological, physical, and informational. Relational support across the transition to parenting refers to the presence of intimate relationships which provide emotional support (e.g., becoming excited with the woman about the arrival of a baby; comforting the woman in times of distress) and fun (e.g., spending time in leisure activities). Ideological support refers to support surrounding the woman's decisions about her role. For example, members of a woman's network may support her decision to continue or discontinue working after birth, thus providing ideological support. Physical support is similar to instrumental support and refers to the provision of help and goods (e.g., financial assistance, helping with house cleaning). Finally, informational support is provided when members of a woman's network give advice and suggestions regarding the transition to parenthood (e.g., about pre-natal diet and exercise, parenting strategies, day care). These types of support can be provided by partners, friends, relatives, neighbors, and institutions. This model is similar to more general models delineating types of support that are relevant for adjustment, but is helpful in conceptualizing the particular aspects of support which may have most relevance across the transition to parenthood. Although Power and Parke (1984) focus on mothers, many of their ideas may also be relevant to new fathers.

Using cross-sectional designs, social support has been demonstrated to be linked with lower levels of stress and adaptive functioning for adults facing both normative and extreme environmental demands. For example, satisfaction with social support was associated with lower levels of life stress for a sample of stepmothers (Johnson et al., 2008). Social support has also been shown to differentiate abusive and non-abusive mothers (Coohey & Braun, 1997) and mentally ill adults from ones from the general population (Caron, Tempier, Mercier, & Leouffe, 1998; Froland, Brodsky, Olson, & Stewart, 2000). Using longitudinal designs, the buffering

effects of social support in the face of stress have been demonstrated with parents across a wide range of outcomes (e.g., Crnic, Greenberg, Ragozin, Robinson, & Bashman, 1983; Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998; Dunst, Trivette, & Cross, 1986). These studies highlight the importance of social support for parents facing normative and more severe life stress. In addition, there is some initial evidence linking social support and depressive symptoms, parenting negativity, and co-parenting conflict in new parents.

Social support and parent depressive symptoms. Social support may protect parents experiencing frequent and/or hostile pre-natal couple conflict from the development of depressive symptoms by decreasing stress, facilitating adaptive appraisals of challenges, and providing resources for adaptive coping. Emotional support, advice, and instrumental assistance in the face of couple conflict can allow parents to avoid feeling helpless and isolated, buffering them from the development of depressive symptoms. Parents whose romantic relationships are marked by conflict but who receive love and affection from others (e.g., extended family) may be protected from the development of depression because this support helps them to maintain a feeling of self-worth and to reduce self-criticism. Thus, in the face of pre-natal couple conflict, it is possible that individuals with higher levels of social support avoid the types of maladaptive cognitions that contribute to depressive symptoms, such as self-blame and hopelessness regarding the couple relationship (Sayers, Kohn, Fresco, Bellack, & Sarwer, 2001).

On the other hand, recent work on female relationships has highlighted the tendency within some of these relationships to focus excessively on negative thoughts and feelings in a process called co-rumination (Rose, 2002). Co-rumination has been linked with elevated levels of depression (Rose, 2002). However, if friends and family *normalize* the difficulties associated with first-time parenting, including increased couple conflict, this could lead parents to focus less

on the negative and to expect things to improve, leaving them less vulnerable to depressive symptoms.

To better understand the development of post-partum depression in women, Mauthner (1998) conducted a qualitative study with mothers who had experienced what they considered to be “post-natal depression” (though no data on depressive symptoms were collected). Of relevance to the current study, mothers’ interview responses highlighted the influence of supportive others on their post-natal adjustment. Specifically, support from other mothers of young children was emphasized as extremely important to the participants’ experiences with depressive difficulties because these other mothers were seen as understanding motherhood and the accompanying changes in individual adjustment to a greater degree than male partners. In addition, study participants highlighted the ability of other mothers to openly disagree with societal expectations that mothers should not feel distressed or ambivalent following the birth of a child, allowing study participants to feel validated and supported. This type of support is similar to the ideological support highlighted in Power and Parke’s (1984) model of social support across the transition to motherhood, discussed above. Similar results were found in another qualitative study of divorced mothers (McLanahan, Wedemeyer, & Adelberg, 1981). In that study, qualitative interview responses suggested that aspects of mothers’ social support networks were associated with their psychological well-being (e.g., positive self-image, feelings of security). Thus, these studies suggest that social support from a variety of sources outside of the family may be helpful for women transitioning to parenthood, though these findings do not speak to the impact of social support on male adjustment to fathering.

Quantitative research using cross-sectional and longitudinal designs has also documented associations between social support and individual adjustment. For example, in a sample of

stressed, adolescent mothers, maternal social support was negatively related to the level of self-reported depressive symptoms (Colletta, 1983). In addition, a study of parents of disabled children found that parents' satisfaction with support predicted parent physical and emotional well-being (Dunst, Trivette, & Cross, 1986). Further, Levy-Shiff, Dimitrovsky, Shulman, and Har-Even (1998) found that maternal social support during infancy was negatively associated with self-reported burn-out (e.g., feelings of physical, emotional, and/or mental exhaustion) 11 months later. Finally, meta-analyses have documented that a lack of social support during pregnancy is a risk factor for the development of post-partum depression in women (O'Hara & Swain, 1996; Beck, 2001).

In summary, there is cross-sectional and longitudinal work examining social support and individual adjustment in parents. Most of this work has focused on mothers whereas less is known about social support and male adjustment following the arrival of a child. The current study builds on this prior work by examining the moderating role of social support in the link between pre-natal couple conflict and post-natal maternal and paternal depressive symptoms.

Social support and parenting negativity. Social support may also protect individuals from the development of parenting negativity. Adjusting to changes in routine and increased responsibilities associated with new parenthood likely strains the resources of new parents, especially those who experience high levels of couple conflict, leading to heightened experiences of stress. Grandparents and extended family members providing support to new parents in the form of advice, financial assistance, caretaking help, and emotional support may help new parents to feel less overwhelmed and better able to meet their various role demands, including their new role as parent (Jennings, Stagg, & Conners, 1991). In this way, social support for new parents may decrease the level of stress they experience, freeing up resources for better emotion

regulation and cognitive flexibility in interactions with their child, leading to parenting behaviors which are more patient, warmer, and less harsh. In addition, new parents who experience high levels of couple conflict yet who receive high levels of social support from their networks may be less likely than those without such benefits to allow couple conflict to spill over into negative parenting because social networks encourage parents to interpret the demands of parenting as challenges which they may overcome with hard work and perseverance.

Links between parental social support and better parenting have been proposed. For example, Belsky's (1984) model of the determinants of parenting highlights the potential impact of parents' contextual supports on their parenting behaviors. Belsky (1984) posits that social support is helpful to parents because it provides emotional and instrumental help, similar to more generalized models of social support. In addition, Belsky adds that social support impacts parenting by providing social expectations which guide parenting behaviors. Thus, it is possible that social support moderates the link between couple conflict and parenting because it provides parents with expectations that they should not display inappropriate negative affect to children or reject children's requests for assistance or affection, even in cases where parents are burdened and stressed by couple conflict. Further, supportive others may provide advice regarding specific coping strategies for effectively dealing with the difficulties of new parenthood.

Several empirical studies have documented associations between social support and parenting quality in cross-sectional work, though this work has focused primarily on mothers. For example, mothers of infants who were more verbally and emotionally responsive were more likely to have frequent contact (e.g., weekly or more) with their social networks (Powell, 1980). In addition, Cotterell (1986) found that mothers with higher levels of support reported better parenting behaviors (e.g., warmth, higher tolerance for frustration by their child) of their pre-

schoolers than those with lower levels of support. In another study of mothers and pre-school children, Jennings, Stagg, and Conners (1991) showed that mothers' satisfaction with support networks was associated with their observed parenting behaviors in the expected directions. Specifically, maternal satisfaction with support was linked to higher levels of warmth and lower levels of controlling and intrusive parenting behavior.

Prospective work also indicates that social support influences parenting quality. For example, Crnic, Greenberg, Ragozin, Robinson, and Basham (1983) examined the life stress, social support, and attitudes towards parenting of mothers of infants, half of whom were born pre-mature. Results indicated that maternal social support was related to mothers' later self-reported happiness in the parenting role and to their observed parenting sensitivity.

A few studies have found that the relation between social support and parenting is present only for parents at elevated levels of risk. For example, in a longitudinal study of mothers and infants, mothers who reported more social support in comparison to their level of stress (a variable created by subtracting level of reported stress from reported social support) at child age 3 months showed more sensitive behaviors with children during a Strange Situation reunion at child age 1 year, but only when children were rated as more irritable by interviewers (Crockenberg & McCluskey, 1986). Thus, this study demonstrated that social support was helpful for mothers who were faced with more difficult children. In addition, in the study discussed above assessing the adjustment and parenting quality of first-time mothers, Levy-Shiff, Dimitrovsky, Shulman, and Har-Even (1998) found that maternal social support moderated the impact of parenting stress and negative parenting appraisals (e.g., the belief that parenting is challenging and a threat) on mothers' observed warmth and caregiving behaviors in interactions with their child at age 1 year. Specifically, mothers who viewed parenting as stressful and/or

threatening during infancy showed less warmth and caretaking behaviors at child age 1 year, but only among those with lower levels of social support. Taken together, these results suggest that social support can moderate the association between stressors (e.g., difficult child temperament, parenting stress, maladaptive beliefs about parenting) and negative parenting. No prior studies of which the author is aware have examined the moderating role of social support on the link between couple conflict and parenting quality.

In summary, there is cross-sectional support and some longitudinal evidence that parents with higher levels of social support exhibit better parenting behavior. Again, the majority of studies reviewed have focused on mothers, and only a few have examined moderating effects. The current study expands on prior work by examining the role of social support as a moderator in the relation between pre-natal couple conflict and early parenting negativity for mothers and fathers.

Social support and co-parenting conflict. Finally, I proposed that social support protects individuals with elevated couple conflict from the development of co-parenting conflict. It is reasonable to assume that adults with higher levels of social support as they make the transition to parenthood would be better able to work together as a team to promote their children's adjustment, though there is little empirical evidence on this matter to date. From a stress and coping perspective, social support may reduce the perceived stressfulness of co-parenting interactions, promote the appraisals of these difficult situations as manageable challenges, and provide resources for adaptive coping to deal with in-the-moment co-parenting difficulties more effectively. Social support could also serve to normalize the strains that are associated with difficulties across the transition to parenthood, attenuating the perceived threat associated with couple conflict during this period. In much the same way that advice and caretaking help

provided by one's network could promote adaptive coping with the goal of positive parenting practices, these supportive behaviors might also encourage teamwork and effective partnerships for new parents. Supportive others could also provide tips on effective ways of negotiating conflict, and stress the importance of providing a "united front" in the child's presence. Overall, it is likely that parents receiving higher levels of support in the context of couple conflict will be more likely than those without this resource to demonstrate helpful and cooperative behaviors with their partner towards the goal of child-rearing, even when they are unable to do so within the couple relationship. At this point, there is limited evidence on this issue. However, one study examining social support and co-parenting quality for mothers provides evidence for an association between social support and co-parenting quality (Lindsey, Caldera, & Colwell, 2005).

Lindsey, Caldera, and Colwell (2005) found that mothers' report of social support provided to their family over the past 6 months by various sources (e.g., spouse, relatives, co-workers, etc.) was related to observed maternal co-parenting quality during triadic free-play interactions with infants. Specifically, higher levels of received support were associated with more cooperative maternal co-parenting (e.g., statements endorsing father's parenting, following the father's lead during the interaction). That study did not assess paternal social support, leaving this relation for fathers an unanswered empirical question. However, these results do support a main effects role of social support in co-parenting quality for mothers. The current study expands on these results by testing the moderating role of both maternal and paternal pre-natal social support in buffering parents from the impact of couple conflict on negative co-parenting.

In sum, the current study expands on prior work that has demonstrated a buffering role of social support for individuals experiencing stress by examining the relations between pre-natal couple conflict behaviors, maternal and paternal social support, and individual and family adjustment across the transition to parenthood.

The Current Study

Design Overview

Data for this project came from Dr. Feinberg's NIMH- and NICHD-funded randomized, clinical-trial of the Family Foundations Project (NIMH: R21 MH064125-02; NICHD: K23 HD042575-01A1). Couples were initially assessed in a pre-natal home visit, during which they completed questionnaires, participated in videotaped interactions, and provided saliva samples. Random assignment to intervention ($n = 89$ couples) or no-treatment control condition ($n = 80$ couples) was completed following this assessment. Control group couples received a brochure about selecting quality childcare; intervention couples received the Family Foundations program (consisting of 4 pre-natal and 4 post-natal interactive, psycho-educational, skills-based classes targeting the co-parenting relationship). Follow-up data collection was completed through mail-in surveys at child age 6 months and home visits at child age 1 and 3 years. Data collected in the pre-natal home visit and the home visit from child age 1 year were used in the current study.

Participants

One-hundred and sixty-nine adult heterosexual, cohabitating (82% married) couples expecting their first child participated in the study. The majority of couples (81%) were recruited through childbirth education programs at hospitals in Harrisburg, PA and Altoona, PA. Mean age in years was 28.33 ($SD = 4.93$) for mothers and 29.76 ($SD = 5.58$) for fathers. Participants lived in rural areas, towns, and small cities. Most participants were White (91%),

with the remaining participants identifying as African American, Asian, Hispanic, or other. A wide range of incomes was represented (\$2,500 to \$162,500) with a median of \$65,000 ($SD = \$34,372$). Average years of education were 15.06 for mothers ($SD = 1.82$) and 14.51 for fathers ($SD = 2.19$). Analyses for the current project did not include data from four couples due to developmental difficulties, death, or congenital medical problems. Random assignment of subjects to intervention condition led to statistically equivalent groups on demographic (e.g., age, education), adjustment (e.g., depression), and couple variables (e.g., relationship quality).

Procedure

Pre-natal Home Visit ($M = 22.9$ weeks of gestation, $SD = 5.3$). Couples participated in a home visit during pregnancy and prior to randomization to intervention status. During this visit, partners completed questionnaires separately and engaged in a videotaped interaction in which they were asked to discuss and attempt to resolve problems. For the first 12 minutes, partners were asked to take turns providing support to each other regarding problems not related to the couple relationship. For the last 12 minutes, couples were asked to discuss and resolve problems that they had rated as areas in which they would like to see change within their relationship (for a total of 24 minutes). The interviewer was not present during these discussions. These videotaped interactions provided observational data of couple conflict behaviors (described below). Using a passive drool collection strategy, saliva samples for cortisol assays were gathered at three time points during the home visit. *Baseline* cortisol levels were collected near the beginning of the home visit and prior to videotaped couple discussions. Because cortisol is detectable in saliva approximately 15-20 minutes after its secretion by the adrenal glands, “baseline” cortisol levels in the current study reflect individuals’ stress response to the home visit (e.g., having a stranger enter their home, anticipating participation in the visit).

Cortisol levels reflecting physiological *reactivity* specifically to the discussion interaction task were collected approximately 15 minutes after the videotaped discussions. Finally, cortisol levels reflecting physiological *recovery* from the discussion task were collected approximately 20 minutes later (~35 minutes after the discussion was over). Couples were asked to refrain from activities that could potentially impact cortisol (e.g., eating, brushing teeth, smoking) for 30 minutes before the visit.

Follow-up home visit (Child age M = 13.7 months, SD = 1.3). Couples participated in a second home visit with their child approximately one year after the child's birth. Similar to the pre-natal home visit, parents again completed questionnaires independently, providing data on parental depressive symptoms and other information not used in the current study. Families participated in triadic interactions (with both parents and the child) including a 12-minute free-play session and a 6-minute teaching session. Observational codes of parenting and co-parenting quality were obtained from these triadic interactions. Parents also participated in videotaped couple discussions similar to the pre-natal visit, though data from these interactions were not used in the current study.

Observational data. Separate coding teams blind to intervention status rated observational data on several dimensions. Specifically, pre-natal couple problem-solving discussions were rated as to their level of conflict behaviors (demandingness, hostility, and contempt) by one team. Triadic interactions at child age 1 year were rated for each parent's parenting negativity (displays of negative affect, rejection, and insensitivity) by a separate team, and co-parenting conflict (undermining behaviors or statements that show a lack of endorsement of partner's parenting) was rated by yet another team. Manualized codes were developed for the Family Foundations project and/or were adapted from those used in prior work. Coders were

extensively trained and met weekly with an experienced criterion coder for reliability meetings. Ratings were averaged across coders. If a “key” score existed (i.e., for cases that were used in reliability meetings) this score was utilized as the consensus rating. Coder reliability was acceptable: percent close agreement (i.e., the percentage of score pairs ≤ 1 point different) across all codes and rater combinations was 88% at the pre-natal time point and 94% at child age 1 year.

Measures

Pre-natal couple conflict. Observed couple conflict behaviors (Appendix A): During the pre-natal home visit, parents completed a videotaped interaction in which they were asked to discuss and resolve problems in their personal lives (12 minutes) and in their relationship (12 minutes). Parents were individually coded on the dimensions of demandingness (e.g., harsh expression of views), hostility (e.g., irritation, anger), and contempt (e.g., sarcasm, eye rolling). Scores on these three dimensions were standardized and a composite score was created based on exploratory factor analysis and confirmed through an examination of internal validity, which was adequate (Cronbach’s alpha = .83 for mothers and .87 for fathers). This composite reflects parents’ observed pre-natal conflict behaviors.

Prior work has established that observations lasting between 10-15 minutes are sufficient for reaching reliable behavioral ratings of couple functioning for the majority of dimensions of interest, including dimensions similar to those in the current study (e.g., hostility, negative affect; Heyman et al., 2001). This was found for both maritally distressed and non-distressed couples. Thus, observations of couples for 24 minutes in the current study are thought to provide an adequate picture of stable aspects of couple functioning.

Self-reported couple conflict behaviors (Appendix B): To assess the frequency of pre-natal couple conflict, parents completed items from the Revised Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996; CTS-2). Individuals were asked to rate 40 items on a 7-point scale as to the frequency of different strategies for dealing with conflict within the relationship that they and their partner used over the past year, ranging from “0 times” to “More than 20 times”. Twenty items assessed self-to-partner behaviors and 20 assessed partner-to-self behaviors. An additional response option “Not in the past year, but it did happen before” was also provided but will not be used in current analyses. Subscales can be generated reflecting an individual’s and partner’s use of negotiation, psychological aggression, physical assault, and injury in dealing with conflict. For the current study, the total annual frequency of self-to-partner psychological aggression (4 items) was used as a measure of the frequency of pre-natal couple conflict. Sample items from this scale include “I swore at my partner” and “I shouted or yelled at my partner.”

Adequate internal consistency for this subscale has been documented in prior studies (Cronbach’s alpha = .79; Straus, Hamby, Boney-McCoy, & Sugarman, 1996), and was also obtained in the current study (Cronbach’s alpha = .73 for mothers and .68 for fathers). Further, evidence for construct validity has been demonstrated in that items from the psychological aggression scale discriminated between intimately violent individuals and non-violent individuals in prior work (Straus et al., 1996).

As discussed above, self-report and observational measures of conflict are each thought to provide relevant information to an understanding of couple conflict. In the current study, exploratory analyses were conducted to determine whether the self-report and observational measures of conflict could be combined (e.g., by standardizing both measures and taking an

average; by multiplying the observational rating by the self-reported frequency) and used as the independent variable in analyses, or whether these two measures were best examined as separate independent variables.

Post-natal family factors (Child age ~1 year). Depressive symptoms (Appendix C): Parental depressive symptoms were assessed using items from the widely used Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Parents rated 7 items on a 4-point scale as to the frequency of sad/depressive feelings experienced in the past week. Adequate 4-week test-retest reliability and internal consistency of the CES-D have been reported (Radloff, 1977). Further, construct validity has been demonstrated through significant correlations between scores on the CES-D and other self-report measures and clinical ratings of depression in the expected directions (Radloff, 1977; Shean & Baldwin, 2008). In the current study, adequate internal consistency was achieved for both mothers and fathers (Cronbach's alpha = .84 for mothers and .66 for fathers). Prior work has established that individuals scoring below a certain cut-off on the original measure (16/60) are likely to be truly non-depressed and those scoring 16 or above are likely experiencing mild or moderate depression (Radloff, 1977). Because an abbreviated version of the scale was used in the current study, it was not possible to use this same cut-off to estimate the percentage of individuals experiencing clinical levels of depressive difficulties. Instead, the same proportion (~27%) was used to extrapolate an estimation of a "clinical cut-off" in the current study such that individuals scoring 6 points or more out of a possible 21 were likely to be experiencing clinically significant levels of depressive symptoms.

Observed Parenting (Appendix D): Parents were individually coded on the dimensions of sensitivity (awareness of and appropriate response to child's needs, interests, and abilities),

negative affect (irritability, anger, hostility) towards the child, and rejecting the child (ignoring, openly rejecting). These variables were moderately correlated and a composite score was used as a measure of negative parenting in the current study (Cronbach's alpha = .79 for mothers and .80 for fathers; parenting sensitivity was reverse coded prior to creating the composite).

Observed Co-parenting (Appendix E): Parents were individually coded on co-parenting conflict. Co-parenting conflict was defined as showing disapproval of a partner's parenting (e.g., offering unsolicited advice or direction, showing overt disapproval or criticism of the other's parenting). For ease of interpretation, scores were reverse coded such that higher scores reflected greater co-parenting conflict.

Moderator variables (Pre-natal). HPA axis functioning: *Baseline* cortisol levels were assessed using saliva samples collected at the beginning of the home visit and prior to videotaped couple discussions (Time A). Cortisol *reactivity* to the couple discussion was assessed by subtracting baseline cortisol levels from cortisol levels 15 minutes after the discussion (Time B). Cortisol *recovery* was assessed by subtracting salivary cortisol levels at 35 minutes after the couple problem-solving discussion (Time C) from samples taken approximately those at reactivity (15 minutes after the discussion) (Time B). Because of the considerable influence of time of collection and the number of weeks of gestation (for mothers) on cortisol variables, regression models were used to remove the impact of these factors. Resulting "residualized" cortisol values were used in analyses examining study hypotheses.

Social support (Appendix F): Social support was assessed using a modified version of Sarason, Sarason, Shearin, and Pierce's (1987) Social Support Questionnaire, Short Form-Revised. Individuals rated 17 items as to how helpful various sources of support (e.g., parents, friends, church) were to their family in the past 3-6 months using a 5-point scale from "Not at all

helpful” to “Extremely helpful”. In the current study, the perceived helpfulness of 9 sources of support were summed to create the pre-natal social support variable. These sources are: Parents, partner’s parents, relatives, partner’s relatives, friends, partner’s friends, church, and co-workers. The original measure has been shown to have adequate internal and construct validity in past work (Sarason et al., 1987). For example, construct validity was demonstrated when scores on this scale increased as a result of participation in a support group (Chien, Thompson, & Norman, 2008) and when scores on this measure were positively related to life satisfaction among a sample of people caring for a individuals diagnosed with dementia (Clay, Roth, Wadley, & Haley, 2008). In the current study, Cronbach’s alpha for the modified scale was .67 for mothers and .66 for fathers.

Control variables. Parent age and education were used as control variables given previously established links to parenting and couple relationships (Van Egeren, 2003). In addition, prior work has shown that individuals’ history of depression (including number of major depressive episodes, severity of depressive episodes) is an important predictor of their post-natal experiences of depression (reviewed in Hopkins, Marcus, & Campbell, 1984), and this relation was also found in the current study ($r = .48, p < .01$). For these reasons, the current study controlled for the level of pre-natal depressive symptoms in analyses with post-natal depressive symptoms as the dependent variable. Finally, because participation in Family Foundations may be expected to moderate family processes, dummy coded intervention status (0 = control group; 1 = intervention group) was controlled for in all analyses.

Hypotheses

Hypothesis 1: Pre-natal couple conflict will predict characteristics of early family environments. Pre-natal couple conflict was posited to place parents at risk for mental health

difficulties, parenting negativity, and co-parenting conflict following the birth of their child. Therefore, pre-natal couple conflict was predicted to be significantly, positively associated with depressive symptoms, parenting negativity, and co-parenting conflict approximately one year after the birth of a child.

Hypothesis 2: Parent sex will moderate the relations between pre-natal couple conflict and characteristics of early family environments. Pre-natal couple conflict likely affects mothers and fathers differently, though there is limited work in this area. Most work examining post-partum depression has focused on mothers (Perren, von Wyl, Burgen, Simoni & von Klitzing, 2005). Based on the idea that social relationships hold greater importance for women than for men, couple conflict was predicted to have a greater influence on adjustment for mothers than for fathers. On the other hand, it was predicted that fathers' parenting and co-parenting behaviors would be more adversely affected by difficulties in the marital relationship, based on extant evidence on this issue (Coiro & Emery, 1998; Lindahl, Clements, & Markman 1997).

Hypothesis 3: Pre-natal HPA axis functioning will moderate the relations between pre-natal couple conflict and characteristics of early family environments. Not all individuals who experience pre-natal conflict were expected to demonstrate poor mental health, parenting negativity, or co-parenting conflict. In the current study, pre-natal baseline cortisol levels, cortisol reactivity to conflict, and cortisol recovery from conflict were predicted to moderate the impact of pre-natal conflict on post-partum parent depressive symptoms, negative parenting, and co-parenting conflict. Specifically, individuals with lower levels of baseline cortisol, lower levels of cortisol reactivity, and higher levels of cortisol recovery were predicted to have lower levels of post-natal difficulties.

Hypothesis 4: Pre-natal social support will moderate the relations between pre-natal couple conflict and characteristics of early family environments. Contextual factors may also provide resources for individuals dealing with difficulties. In the current study, pre-natal social support was predicted to moderate the impact of pre-natal conflict on post-partum parent depressive symptoms, parenting negativity, and co-parenting conflict. Specifically, individuals with higher levels of social support were predicted to have lower levels of post-natal difficulties.

Analytic Strategy

Preliminary analyses were conducted to provide descriptive information and to ensure normal distributions in study variables. With regard to missing data, attrition from the pre-natal home visit to the home visit at child 1 year has been minimal (91% of parents participated in the home visit at child age 1 year) and logistic regression analyses revealed no differential attrition by condition. Further, exploratory analyses were conducted to determine the appropriateness of combining self-reported and observe pre-natal couple conflict into one variable reflecting individuals' frequency and hostile quality of pre-natal couple conflict.

To test study hypotheses, a series of hierarchical linear models (HLM) nesting mothers and fathers within couples and using appropriate covariates was conducted. The use of HLM was appropriate given that data from mothers and fathers within the same couple were correlated (Table 4), thus violating the assumption of independence of ordinary least squares regression. HLM can take into account and adjust for the nested nature of these data.

Hypothesis 1 (Direct effect of pre-natal couple conflict on characteristics of early family environments). To examine hypothesis 1, the three family factors at child age 1 year (i.e., parental depressive symptoms, parenting negativity, and co-parenting conflict) were regressed on self-reported or observed pre-natal couple conflict in 6 separate hierarchical linear

models, controlling for parent age, education, and intervention status.

Hypothesis 2 (Moderating role of parent sex in the link between pre-natal couple conflict and characteristics of early family environments). Moderation analyses were conducted to determine if the relations between pre-natal couple conflict and post-natal family factors differed by parent sex. Specifically, as recommended by Baron and Kenny (1986), moderation was tested by examining the significance of the interaction term formed by either self-reported or observed pre-natal couple conflict and parent sex in predicting the three post-natal family factors (i.e., parental depressive symptoms, negative parenting, and co-parenting conflict) in six separate hierarchical linear models, controlling for parent age, education, and intervention status.

Hypothesis 3 (Moderating role of HPA axis functioning in the link between pre-natal couple conflict and characteristics of early family environments). Moderation analyses were conducted to determine if the relations between pre-natal couple conflict and post-natal family factors differ as a result of the pre-natal physiological stress system. Specifically, moderation was tested by examining the significance of the interaction term formed by either self-reported or observed pre-natal couple conflict and either baseline cortisol, cortisol reactivity, or cortisol recovery in predicting the three post-natal family factors (i.e., parental depressive symptoms, negative parenting, and co-parenting conflict) in eighteen separate hierarchical linear models, controlling for parent age, education, and intervention status.

Exploratory analyses were also conducted to determine whether the absolute value of the baseline cortisol term significantly moderated the relations between pre-natal couple conflict and post-natal family outcomes. The significance of the interaction term formed by either self-reported or observed pre-natal couple conflict and the absolute value of baseline cortisol in

predicting the three post-natal family factors (i.e., parental depressive symptoms, negative parenting, and co-parenting conflict) was examined in six separate hierarchical linear models, controlling for parent age, education, intervention status, and the linear baseline cortisol term.

Hypothesis 4 (Moderating role of social support in the link between pre-natal couple conflict and characteristics of early family environments). Finally, moderation analyses were conducted to determine if the relations between pre-natal couple conflict and aspects of post-natal family environments differ as a result of pre-natal social support. Specifically, the significance of the interaction term formed by either self-reported or observed pre-natal couple conflict and social support in predicting the three aspects of post-natal family environments (i.e., parental depressive symptoms, negative parenting, and co-parenting conflict) were tested in six separate hierarchical linear models, controlling for parent age, education, and intervention status.

Power Analyses

The Optimal Design for Longitudinal and Multilevel Research software was used to determine study power (Raudenbush, Spybrook, Liu, & Congdon, 2004). Four factors determine power in hierarchical linear models: the number of groups, the number of observations per group, intra-class correlations within groups, and the proportion of variance explained by covariates. In the current study, there were 165 groups (parent couples) consisting of 2 individuals each. The relations between mothers' and fathers' scores on the measures in the current study range from .36 (parenting negativity) to a non-significant .05 (depressive symptoms), and the covariates typically account for 10% of the variance in post-natal family outcomes. Within these constraints, there was a power of .80 to detect effect sizes of .31 - .37 or higher at the .05 probability level. In other words, as long as couples who differ by one standard deviation on pre-natal conflict have levels of post-natal depressive symptoms, parenting

negativity, and co-parenting conflict that differ by about one-third of a standard deviation, this study would be able to detect that relation as significantly different than zero. Effect sizes in this range are considered small to moderate (Cohen, 1977), and are consistent with the magnitude of effect sizes found in prior work examining relations among couple conflict and family processes.

Results

Descriptive analyses

Table 1 provides demographic information about the sample. ANOVA and Chi Square analyses were conducted to examine whether mothers and fathers differed significantly on any demographic factors. Mothers and fathers did not differ significantly with regard to race or ethnic background ($\chi^2(5, 333) = 3.56, ns$). Significant differences were found between mothers and fathers for age and years of education, with mothers having significantly more education (15 years compared to 14.5 years) ($t(1, 331) = -3.86, p < .01$) and fathers being significantly older (30 years compared to 28 years) ($t(1, 331) = 3.82, p < .01$).

Table 2 presents means and standard deviations for independent, dependent, and moderator variables. Mothers and fathers demonstrated similar levels of self-reported ($t(1, 179) = -1.20, ns$) and observed pre-natal couple conflict ($t(1, 179) = .23, ns$). Mothers had significantly higher levels of depressive symptoms than fathers during pregnancy ($t(1, 179) = -2.56, p < .05$) but not at child age 1 year ($t(1, 179) = 1.12, ns$). During pregnancy, about 10% of mothers scored above the clinical cut-off for depression whereas only 2% of fathers scored above this cut-off. Across the transition to parenthood from pregnancy to child age 1 year, levels of depression decreased for the overall sample ($t(1, 299) = 2.79, p < .01$). However, this decrease was statistically significant for mothers ($t(1, 153) = 3.71, p < .01$; 6% above the clinical cut-off

at child age 1 year) but not for fathers ($t(1, 145) = -.15$, ns; 2% above the clinical cut-off at child age 1 year).

Mothers and fathers demonstrated similar levels of parenting negativity ($t(1, 179) = 1.42$, ns) and co-parenting conflict ($t(1, 179) = -1.04$, ns). With regards to pre-natal HPA axis functioning, after controlling for time of saliva sampling, mothers' weeks of gestation, and medications which may alter cortisol levels, mothers and fathers were not significantly different on measures of baseline cortisol ($t(1, 179) = -1.02$, ns) or cortisol recovery ($t(1, 179) = -.46$, ns), but mothers showed marginally higher levels of cortisol reactivity than fathers ($t(1, 179) = -1.73$, $p < .10$). Finally, mothers reported marginally higher levels of pre-natal social support than fathers ($t(179) = -1.92$, $p < .10$).

In summary, parent sex differences were found for the demographic variables of parent age and education. No sex differences were found for the independent or dependent variables. In addition, no sex differences were found with regard to pre-natal cortisol baseline levels or cortisol recovery. Mothers reported significantly higher levels of pre-natal depressive symptoms and showed a trend towards having higher levels of pre-natal social support and cortisol reactivity.

Exploratory analyses: Combining self-reported and observed pre-natal couple conflict

Before conducting analyses to test study hypotheses, exploratory analyses were conducted to determine whether the two measures of pre-natal conflict (i.e., self-reported and observed) could be combined and/or whether the two measures provide different explanatory information that would be important to consider simultaneously for predicting post-natal family outcomes.

First, for data reduction purposes, exploratory analyses were conducted to determine the validity of creating one variable comprised of a linear combination of observed and self-reported pre-natal couple conflict. Pearson product correlations revealed that, for the whole sample, self-reported pre-natal couple conflict and observed pre-natal couple conflict were significantly, positively related, though the magnitude of this relation was small ($r = .29, p < .01$) (Table 3). This analysis was repeated separately for mothers and fathers, revealing that for mothers, self-reported and observed pre-natal couple conflict were significantly, positively related ($r = .40, p < .01$), but this relation was weaker for fathers ($r = .18, p < .05$) (Table 4). Because self-reported and observed pre-natal conflict were only weakly associated, especially for fathers, it was determined that combining these variables into one composite variable of pre-natal couple conflict was not valid. Instead, analyses testing study hypotheses were conducted with each of the two measures of pre-natal couple conflict serving as independent variables in separate analyses.

Second, because the correlations between self-reported and observed conflict were not strong, it seemed important to explore the possibility that a non-linear combination of these measures of couple conflict might predict post-natal family outcomes. To explore this possibility, four groups were created, based on individuals' scores on both measures of conflict. Group 1 (fighters) included individuals who scored higher than the median score on both the self-reported and observed conflict measures ($n = 136$). Group 2 (deniers) included individuals who reported lower than average pre-natal conflict (i.e., below the median score) but who were observed to be more conflictual than average (i.e., above the median score) ($n = 70$). Group 3 (suppressors) included individuals who reported higher than average pre-natal conflict (i.e., above the median score) but who were observed to be less conflictual than average (i.e., below

the median score) ($n = 58$). Finally, individuals in Group 4 (non-fighters) scored below the median score on both measures of pre-natal conflict ($n = 54$). A MANOVA revealed that these groups differed significantly in terms of their post-natal family outcomes ($F(3, 250) = 2.91, p < .05$). Specifically, conflict groups differed significantly in terms of the level of post-natal co-parenting conflict ($t(1, 250) = -.44, p < .01$). Conflict groups did not differ significantly with regard to post-natal depressive symptoms ($t(1, 250) = -.64, ns$) or parenting negativity ($t(1, 250) = -.52, ns$). Tukey *post-hoc* analyses revealed that Group 1 (fighters) and Group 4 (non-fighters) were significantly different (at the $p < .05$ level) with regard to co-parenting difficulties, with pre-natal “fighters” having significantly more co-parenting conflict than “non-fighters.” Co-parenting conflict scores for Group 2 (deniers) and Group 3 (suppressors) were not significantly different and were in between the scores for fighters and non-fighters. No other pairwise comparisons reached significance. These results do not support a view that the self-reported and observed conflict variables represent different types of information that should be combined to create a two-dimensional profile. Rather, it appears that the overall level of conflict utilizing information from both dimensions is linked to later co-parenting difficulties (although not to other variables). Thus, the use of the two independent variables in a linear manner (rather than in a non-linear combination) seemed justified.

In summary, results of exploratory analyses indicated that observed and self-reported pre-natal couple conflict could not be combined in a valid way and were instead used as independent variables in separate analyses testing study hypotheses.

Hypothesis 1: Pre-natal couple conflict will predict characteristics of children's early family environments

Six hierarchical linear models nesting mothers and fathers within couples were conducted to examine whether the two measures of pre-natal couple conflict (i.e., self-reported and observed) were related to depressive symptoms, parenting negativity, and/or co-parenting conflict at child age 1 year. All analyses examining main effects and moderation controlled for parent age, education, and intervention status. Analyses predicting post-natal parental depressive symptoms also controlled for pre-natal depressive symptoms. Two significant relations and one trend emerged. Specifically, in line with predictions, observed couple conflict was significantly, positively associated with parenting negativity ($B = .30, p < .05$) (Table 5) and self-reported couple conflict was significantly, positively associated with co-parenting conflict ($B = .06, p < .01$) (Table 6). In addition, after controlling for pre-natal depressive symptoms, self-reported couple conflict positively predicted parental depressive symptoms at child age 1 year at a trend level ($B = .01, p < .10$) (Table 7). (This relation was significant at the $p < .05$ level when pre-natal depressive symptoms was not used as a covariate).

Self-reported pre-natal couple conflict did not significantly predict parenting negativity at child age 1 year and observed pre-natal couple conflict did not significantly predict depressive symptoms or co-parenting conflict at child age 1 year.

Hypothesis 2: Parent sex will moderate the relations between pre-natal couple conflict and characteristics of early family environments

The six original hierarchical linear models nesting mothers and fathers within couples predicting depressive symptoms, parenting negativity, and co-parenting conflict at child age 1 year were conducted again, with the addition of interaction terms created from parent sex

(dummy-coded, female = 0, male = 1) and either observed or self-reported couple conflict. Two significant interactions and one trend emerged.

First, after controlling for pre-natal depressive symptoms, parent sex moderated the relation between observed pre-natal conflict and depressive symptoms at child age 1 year ($B = .15, p < .05$; Table 7; Figure 2). For fathers, the relation between pre-natal conflict and post-natal depressive symptoms was positive though non-significant ($B = .06, ns$), and for mothers the relation was negative though non-significant ($B = -.09, ns$).

Second, parent sex also moderated the relation between observed conflict and parenting negativity at child age 1 year ($B = -.51, p < .05$; Table 5; Figure 3). For mothers, the relation was positive and significant ($B = .56, p < .01$) and for fathers the relation was positive but small and non-significant ($B = .06, ns$). Finally, parent sex moderated the relation between observed conflict and post-natal co-parenting conflict at a trend level ($B = -.29, p < .10$; Table 6; Figure 4). For mothers, the relation was positive and significant ($B = .26, p < .05$), whereas the relation was negative and non-significant for fathers ($B = -.03, ns$).

In sum, pre-natal couple conflict positively predicted mothers' but not fathers' parenting and co-parenting difficulties at child age 1 year. Pre-natal couple conflict predicted higher levels of depressive symptoms for fathers and lower levels of depressive symptoms for mothers, but neither prediction was significant.

Hypothesis 3: Pre-natal HPA axis functioning will moderate the relations between pre-natal couple conflict and characteristics of early family environments

Baseline cortisol. The six hierarchical linear models nesting mothers and fathers within couples predicting depressive symptoms, parenting negativity, and co-parenting conflict at child age 1 year were conducted again, this time including the interaction terms created from the

baseline cortisol variable and either observed or self-reported pre-natal couple conflict. One significant interaction emerged. Baseline cortisol moderated the relation between self-reported pre-natal couple conflict and post-natal parenting negativity ($B = .14, p < .05$; Table 5; Figure 5). For parents with higher levels of baseline cortisol, self-reported pre-natal couple conflict was significantly, positively associated with parenting negativity ($B = .08, p < .05$). For parents with lower levels of baseline cortisol, self-reported pre-natal couple conflict was associated with lower levels of parenting negativity but this relation was not significant ($B = -.05, ns$).

To explore whether the impact of baseline cortisol on the relation of couple conflict and family outcomes was non-linear, the hierarchical linear models nesting mothers and fathers within couples were conducted again, with the addition of an interaction term created from the absolute value of the residualized baseline cortisol variable and either observed or self-reported couple conflict. One significant interaction emerged. After controlling for pre-natal depressive symptoms and the linear baseline cortisol term, the relation between self-reported pre-natal couple conflict and depressive symptoms at child age 1 year was significantly moderated by the absolute value of the residualized baseline cortisol variable (Figure 6). For individuals with higher absolute values of baseline cortisol (i.e., large negative or large positive values of baseline cortisol), the relation between self-reported pre-natal couple conflict and post-natal depressive symptoms was positive and significant ($B = .01, p < .01$). For individuals with lower absolute values of baseline cortisol (reflecting moderate levels of baseline cortisol), the relation between pre-natal couple conflict and post-natal depressive symptoms was negative but non-significant ($B = -.002, ns$).

Cortisol reactivity. Next, the hierarchical linear models with pre-natal couple conflict predicting depressive symptoms, parenting negativity, and co-parenting conflict at child age 1

year were conducted again, with the addition of interaction terms created from the cortisol reactivity variable and either observed or self-reported couple conflict. No significant or trend-level interactions emerged.

Cortisol recovery. The hierarchical linear models nesting mothers and fathers within couples predicting depressive symptoms, parenting negativity, and co-parenting conflict at child age 1 year were conducted again, with the addition of interaction terms created from the cortisol recovery variable and either observed or self-reported pre-natal couple conflict. One significant interaction and two trends emerged. Cortisol recovery significantly moderated the relation between observed pre-natal couple conflict and co-parenting conflict ($B = 8.73, p < .05$; Table 6; Figure 7). Contrary to predictions, for parents with higher cortisol recovery, observed pre-natal couple conflict was associated with higher levels of co-parenting conflict ($B = .29, p < .05$). For parents with lower levels of cortisol recovery, the relation between observed pre-natal couple conflict and co-parenting conflict was negative and non-significant ($B = -.04, ns$).

In models that controlled for pre-natal depressive symptoms, cortisol recovery moderated the relation between observed pre-natal couple conflict and post-natal depressive symptoms at a trend level ($B = -3.05, p < .10$; Table 7; Figure 8). For parents with higher levels of cortisol recovery, observed pre-natal couple conflict was associated with lower levels of post-natal depressive symptoms at a trend level ($B = -.11, p < .10$). For parents with lower levels of cortisol recovery, observed pre-natal couple conflict was associated with higher levels of post-natal depressive symptoms, but this relation did not reach significance ($B = .01, ns$).

Cortisol recovery also moderated the relation between observed pre-natal couple conflict and parenting negativity at a trend level ($B = 8.74, p < .10$; Table 5; Figure 9). Contrary to predictions, for parents with higher cortisol recovery, observed pre-natal couple conflict was

associated with higher levels of parenting negativity ($B = .50, p < .01$). For parents with lower levels of cortisol recovery, the relation between observed pre-natal couple conflict and parenting negativity was also positive, though smaller and not significant ($B = .16, ns$).

In summary, two out of the three indicators of HPA axis functioning assessed were found to moderate the relations between pre-natal couple conflict and post-natal characteristics of the family environment. Specifically, baseline cortisol moderated the relation between self-reported pre-natal couple conflict and post-natal parenting negativity. The direction of moderation was in-line with predictions such that the relation between conflict and parenting negativity was positive and significant for parents with higher levels of baseline cortisol but was negative and non-significant for parents with lower levels of baseline cortisol. Evidence that the non-linear (absolute value) baseline cortisol term moderated the relation between self-reported pre-natal couple conflict and post-natal depressive symptoms was also found. In addition, cortisol recovery significantly moderated the relation between observed pre-natal couple conflict and co-parenting conflict. Cortisol recovery also moderated the relations between observed pre-natal couple conflict and post-natal depressive symptoms as well as the relation between observed pre-natal couple conflict and parenting negativity, both at trend levels. Consistent with predictions, the relation between pre-natal conflict and post-natal depressive symptoms was greater for those who exhibited lower levels of cortisol recovery. Contrary to predictions, the relation between pre-natal conflict and co-parenting conflict as well as parenting negativity was greater for those who exhibited *higher* levels of cortisol recovery. Finally, cortisol reactivity did not significantly moderate the relations between pre-natal couple conflict and post-natal family outcomes.

Hypothesis 4: Pre-natal social support will moderate the relations between pre-natal couple conflict and characteristics of early family environments

The hierarchical linear models nesting mothers and fathers within couples predicting depressive symptoms, parenting negativity, and co-parenting conflict at child age 1 year were conducted again, with the addition of interaction terms created from social support and either observed or self-reported couple conflict. No significant or trend-level interactions emerged.

Discussion

The primary goal of the current study was to examine whether pre-natal couple conflict would be positively associated with three family factors that impact children's early mental health: Parent depressive symptoms, parenting negativity, and co-parenting conflict. Results from hierarchical linear models provided some evidence for each of these predictions. Findings are discussed within a stress and coping framework applied to "spillover" of negativity from the couple relationship to parent-child relationship quality, co-parenting relationship quality, and individual parent adjustment.

There was mixed evidence for the main effect of pre-natal couple conflict on later parent and family functioning. In line with hypotheses, observed pre-natal couple conflict was significantly associated with parenting negativity at child age 1 year. Also in line with hypotheses, self-reported couple conflict was significantly associated with co-parenting conflict and depressive symptoms at child age 1 year. The significant relation between pre-natal couple conflict and post-natal depressive problems was reduced to trend level significance when pre-natal depressive problems were controlled, highlighting the importance of parents' earlier adjustment in understanding their post-natal adjustment. There were expected associations that were not supported by the data for the sample as a whole: Self-reported pre-natal couple conflict

was not significantly associated with post-natal parenting negativity and observed couple conflict was not significantly associated with post-natal co-parenting conflict or with post-partum depressive symptoms.

Taken together, the current results provide some support for the contention that pre-natal couple conflict is an important factor in determining the quality of children's early family environments. These findings are in-line with theorizing that emphasizes the couple relationship as an important influence in parenting behavior (Belsky, 1981; 1984) and depressive difficulties (Beach, Sandeen, & O'Leary, 1990; Jacobson, Dobson, Fruzzetti, Schmaling, & Salusky, 1991). In addition, the current results highlight the relevance of couple relationship quality for understanding the development of one dimension of co-parenting quality (i.e., co-parental conflict or undermining). This is important because little is known about factors which impact the development of effective vs. dysfunctional co-parenting teams. In sum, hostility and negative affect in the pre-natal couple relationship may be conceptualized as having "spilled over" into insensitive early parenting behaviors characterized by negative affect, undermining co-parenting behaviors, and depressive problems (Erel & Burman, 1995).

The current findings are consistent with and extend prior studies which relied primarily on cross-sectional research to document a relation between inter-parental conflict and parenting negativity (e.g., Cox, Owen, Lewis, & Henderson, 1989; Krishnakumar & Buehler, 2000), co-parenting conflict (McHale, 1995; McHale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000; Margolin, Gordis, & John, 2001), and depressive symptoms (Beach, Fincham, & Katz, 1998). In addition, these findings build on extant longitudinal work documenting a link between pre-natal couple conflict and co-parenting behaviors (Lindahl, Clements, & Markman, 1997) by examining a different co-parenting task. The study by Lindahl and colleagues (1997) used a

marital discussion in the presence of the child as their co-parenting context, whereas the current study examined triadic free-play and teaching tasks to examine co-parenting quality. Finally, these findings extend extant longitudinal work documenting a link between couple conflict and later depression in mothers (Forehand et al., 1988; Liu & Chen, 2006) by using a sample of individuals transitioning to parenthood and by including both mothers and fathers.

This study's findings are consistent with a stress and coping framework and provide longitudinal support for the "spillover" hypothesis (Engfer, 1988). From a stress and coping perspective, couple conflict likely increased environmental demands while reducing available supports and resources (i.e., from one's partner) at an already demanding and stressful time in parents' lives, leading to heightened stress. The additional stress brought on by couple conflict during a time period that already entails such dramatic transitions and increased environmental demands (e.g., child's constant reliance on parents for care, parental changes in sleep patterns, an increased need to balance work and family life) may be especially difficult to manage. Indeed, stressors are thought to have a greater impact on individuals who are already vulnerable because of current or prior stress experiences (Lazarus, 1999).

For such doubly stressed parents, in-the-moment child-rearing demands which are a normative part of this developmental period (resulting from the child's increased mobility, more frequent attempts at independence, and still developing capacities for emotion regulation) may have been appraised as threatening, resulting in harsh and insensitive parenting responses. Further, parents coping with hostile couple conflict over and above the normative demands of new parenthood likely approach parenting tasks with depleted resources for dealing effectively with parent-child interactions. The imbalance of environmental demands and available coping resources may contribute to parents' difficulties with regulating emotions and leave them more

prone to harsh, rejecting, and insensitive parenting behaviors (Muraven & Baumeister, 2000). Indeed, individuals experiencing high levels of couple conflict have been conceptualized as having reduced emotional availability in parent-child interactions, and therefore being less sensitive to their children's needs and abilities (Katz & Gottman, 1996; Fincham, Grych, & Osborne, 1994). Finally, these parents may be less motivated to address difficult parent-child situations in sensitive ways because anger and resentment towards their partner have contributed to resentment of having to care for the child.

Similarly, parents who have been dealing with couple conflict may have fewer cognitive and emotional resources available to support productive negotiation and problem-solving with their partner. Diminished interpersonal problem-solving resources would negatively affect the response to normative co-parenting demands (e.g., child and parent are playing together and the other parent wants to join in; one parent has a different approach to teaching the child to build blocks than the approach the other parent is taking). Instead of appraising these situations as normative triadic challenges to be managed, these situations may be appraised by parents experiencing heightened stress as threats to their own parenting competence or to their relationship with the child, leading parents to respond with undermining (e.g., Mother in triadic play: "No, Daddy, that's not a good way to stack blocks. Do it like this instead.") From a family systems perspective, parents experiencing stress in the couple dyad as a result of frequent, hostile conflict might try to compensate by forming strong alliances with members outside of that dyad (i.e., the child), leading to inappropriate boundary violations and/or unhealthy coalitions (i.e., parent and child vs. other parent) (Minuchin, 1974). Undermining the other partner's parenting may be seen by a parent as a way to maintain such a coalition with the child. Indeed, the current findings provide longitudinal support for the contention that individuals experiencing high levels

of couple conflict may be less supportive in the co-parenting context because they view (consciously or not) triadic interactions as opportunities to gain the control that they lack in the couple relationship and to win the battle for the child's attention and affection (McHale, 1995). It may be through this mechanism that couple conflict "spills over" into co-parenting conflict. Moreover, co-parenting during the early toddler period, when father involvement typically increases compared to the period of infancy (McHale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000), may be particularly challenging for parents coping with couple conflict.

Finally, the heightened stress brought on by the imbalance of support and environmental demands (i.e., couple conflict and normative demands associated with transition to parenthood) may also have contributed to individual adjustment difficulties for new parents. Prior treatment-outcome work has shown that marital therapy can help to alleviate depressive symptoms (Beach, Sandeen, & O'Leary, 1990; O'Leary and Beach, 1990) via improvements in couple relationship quality (Beach & O'Leary, 1992; Jacobson, Dobson, Fruzzetti, Schmaling, & Salusky, 1991). Further, depressive symptoms can result from and/or be maintained by maladaptive cognitions (e.g., hopelessness, helplessness, self-blame) which often develop in the face of couple conflict (Sayers, Kohn, Fresco, Bellack, & Sarwer, 2001). Thus, it is possible that maladaptive cognitions are an important mechanism through which couple conflict influences individual depressive symptoms. The development and generalization of maladaptive cognitions may be particularly likely during times of heightened stress and reduced resources.

These speculations regarding stress and coping and the concept of spillover from couple conflict to other family difficulties are consistent with the current findings. However, an alternative explanation should be acknowledged. It is possible that irritability, stress, and/or poor conflict management skills lead individuals to express negativity towards their partner, their

child, and towards themselves (e.g., internalized anger manifesting as depression; Bridewell & Chang, 1996). *Post-hoc* analyses examining whether pre-natal individual trait hostility predicted post-natal family outcomes did not support this “third variable” explanation (depression: $B = .004$, ns; parenting negativity: $B = .03$, ns; co-parenting conflict: $-.04$, ns). Although trait hostility does not seem to serve as an explanatory third variable, there are of course other factors that might. It is certainly likely that difficulties in children’s early family environment are multiply determined. The current findings demonstrate that one plausible pathway to these difficulties is through couple conflict (Fincham, Grych, & Osborne, 1994).

Parent sex as a moderator of the relation between pre-natal risk and post-natal family context quality

As reviewed above, the results of the current study support and expand prior work linking couple conflict and proximal family environmental features relevant for early childhood mental health. The results also begin to address another question with regard to these pathways: Does couple conflict affect mothers and fathers in the same way? There was evidence in this study that pre-natal couple conflict has a different impact on subsequent parenting, co-parenting, and depression for mothers vs. fathers.

Pre-natal couple conflict was positively associated with parenting and co-parenting difficulties for mothers, but there was no significant relation for fathers. These findings are in contrast with expectations that couple conflict would have a greater effect on men, based on some prior work which has examined parent differences in the links between couple conflict and parenting (e.g., Parke & Tinsley, 1987) and co-parenting (Lindahl, Clements, & Markman, 1997). The results of this study cannot be explained by different rates of conflict reported by

men and women, because men and women displayed and reported statistically similar levels of pre-natal couple conflict (Table 2).

It has been argued that females are socialized to place greater importance on relationships and inter-personal connectedness than males (Gottman & Levenson, 1988). Indeed, females have been shown to be more sensitive to and aware of difficulties in the couple relationship (Cummings & Davies, 1994). In the current study, mothers may have detected couple hostility during problem-solving discussions more readily than fathers. This heightened awareness of couple problems may have led to greater stress and therefore more difficulties in providing sensitive parenting and cooperative co-parenting for mothers. It is also possible that pre-natal couple conflict has an influence on aspects of fathers' parenting (e.g., discipline, warmth) and/or co-parenting (e.g., support of one's partner) that were not assessed in this study.

Although the bulk of prior work has found either negligible parent sex differences in the relation between couple conflict and parenting difficulties (Erel & Burman, 1995; Coiro & Emery, 1998) or a more detrimental effect on fathers' parenting (e.g., Parke & Tinsley, 1987; Crockenberg & Covey, 1991), at least one prior study has documented that couple conflict is more damaging for mothers' parenting quality than for fathers' (Sturge-Apple, Davies, & Cummings, 2006). That study found that marital conflict was a significant predictor of mothers' but not fathers' subsequent observed emotional unavailability (e.g., characterized by low levels of warmth and support, and high levels of rejection). For fathers, *withdrawal* from the marital relationship was found to be critical for predicting future parenting difficulties. Marital cascade models (Gottman, 1993) suggest that some degree of couple conflict is normative and reflects ongoing engagement in the relationship. However, when one or both partners withdraw from the relationship in response to unresolved and escalating conflict, this is believed to be more

detrimental to the family (Gottman, 1993). The results of Sturge-Apple and colleagues' study (2006) indicate that marital withdrawal may be particularly relevant for fathers' insensitive parenting. The current pattern of findings showed that pre-natal hostile conflict had no significant impact on father's parenting negativity or co-parenting conflict, but withdrawal from couple conflict was not examined.

The pattern of findings with regard to parent sex differences was different when predicting post-natal depressive symptoms. Parent sex was found to significantly moderate the association between pre-natal couple conflict and post-natal depressive problems. Pre-natal couple conflict was related to post-natal depressive symptoms in the expected direction (i.e., more conflict was associated with more depressive difficulties) for fathers but the relation was in the opposite direction for mothers (i.e., higher pre-natal conflict was associated with lower depressive symptoms), though neither relation reached statistical significance.

These results are surprising given that females are seen as typically being more concerned about others and more at-risk for turning negative feelings inward in the face of interpersonal difficulties such as couple conflict (Kort-Butler, 2009). In the current study, fathers experiencing hostile conflict may have developed the cognitions of helplessness and hopelessness that have been shown to be associated with couple conflict and with depression in prior work (Sayers, Kohn, Fresco, Bellack, & Sarwer, 2001). However, mothers who expressed hostility and negativity towards their partner in pre-natal couple discussions may have been on a different developmental trajectory. This trajectory may be one that had a lower risk for internalizing (i.e., depressive) problems but a higher risk for externalizing problems that involve directing irritation or anger towards others (i.e., parenting negativity and co-parenting conflict). Women who displayed higher levels of demandingness and hostility during the pre-natal couple

discussion task may approach difficult interpersonal situations in a manner enhancing their sense of dominance. Such an approach may contribute to a sense of control over the situation, leading to lower levels of helplessness and depression (Kort-Butler, 2009). This speculation is supported by a prior study which examined sex-specific predictors of depression and found that being observed as “dominating others” was associated with a *lower* risk of subsequent depressive symptoms for females whereas externalizing difficulties were associated with a higher risk of future depressive problems for males (Block, Gjerde, & Block, 1991). At the same time, a dominance-enhancing approach to confronting difficult inter-personal situations likely also contributes to the risk of other interpersonal difficulties for these mothers (e.g., insensitive, harsh parenting behaviors and undermining co-parenting behaviors).

Alternatively, women who demonstrated hostility in pre-natal couple discussions may have cognitive distortions which are self-protective. For example, these mothers were observed as harsh, insensitive parents, but *post hoc* analyses indicated that they reported lower levels of difficult parent-child interactions ($r = -.22, p < .01$) and marginally higher levels of parenting efficacy ($r = .15, p < .10$). This type of denial or mis-match between (observed) reality and self-perception may be protective against depressive difficulties because it protects the self against thoughts of feeling inadequate or helpless. It is also possible that women who present as hostile and demanding are less likely to report “weaknesses” such as the difficulties assessed on the CESD. Different methods of assessing post-natal depressive difficulties (e.g., clinical interview and observation) that do not rely exclusively on these women’s self-report may have allowed us to detect the expected association between pre-natal conflict and post-natal depressive symptoms for mothers.

In conclusion, the current findings indicate that pre-natal couple conflict places both mothers and fathers at risk for difficulties across the transition to parenthood, though the domains of difficulties related to couple conflict differed by parent sex. Future work should examine sex-specific pathways whereby difficulties in the couple relationship spill over into parenting negativity, co-parenting conflict, and/or depressive symptoms.

HPA axis functioning as a protective factor across the transition to parenthood

Adaptive HPA axis functioning was predicted to reduce the negative impact of pre-natal couple conflict on post-partum parent depressive symptoms, parenting negativity, and co-parenting conflict. Findings from the current study provide some support for two out of three indicators of HPA axis functioning (baseline cortisol and cortisol recovery following conflict) as moderators of these relations, though the direction of findings was not consistently in line with predictions.

Baseline cortisol was found to moderate the relation between self-reported pre-natal couple conflict and post-natal parenting negativity. The direction of moderation was consistent with the hypothesis that lower levels of baseline cortisol are protective whereas higher levels of baseline cortisol may exacerbate the impact of pre-natal conflict on later parenting negativity. Viewed from a stress and coping framework, higher baseline levels may reflect greater lifetime exposure to stressors and greater allostatic load (McEwen, 2003), leaving individuals with diminished resources for managing pre-natal couple conflict over and above the normative demands of the transition to parenthood. These parents might be at greater risk for affective spillover from couple conflict to negative parenting.

There was also evidence that the non-linear (absolute value) baseline cortisol term significantly influenced the relation between self-reported pre-natal couple conflict and post-

natal depressive symptoms. To this author's knowledge, this is the first study to document that baseline cortisol level moderates the relation between a risk factor and individual adjustment using a non-linear approach. These findings suggest that, for post-natal depressive symptoms, baseline cortisol levels in the moderate range (as opposed to high or low) can protect parents against the impact of pre-natal couple conflict. Indeed, in the current study, there was no relation between pre-natal couple conflict and post-natal depressive symptoms for parents who had moderate baseline cortisol levels.

A close examination of the pattern of findings also suggests that having either very high or very low baseline cortisol is not problematic with regards to depressive symptoms in the absence of conflict. Figure 6 illustrates that the lowest levels of post-natal depressive symptoms were found in the low conflict, high absolute value cortisol group. The figure also shows that the highest levels of post-natal depressive symptoms were found in the high conflict, high absolute value cortisol group. Thus, individuals at either extreme of baseline HPA axis functioning (i.e., those with high absolute values of cortisol) seem to function well in the absence of significant couple difficulties but are less able to manage couple contexts that are particularly taxing due to higher levels of conflict. Given the significant negative relation between baseline cortisol and cortisol reactivity to stressors ($r = -.53, p < .01$), individuals with hypercortisolism, (high levels of baseline cortisol) may develop the expectation that they will not be able to respond as readily to potential threats in the interpersonal environment such as couple conflict and may therefore experience the helplessness that is associated with depression. On the other hand, individuals with hypocortisolism, (low levels of baseline cortisol) may have the opposite difficulty. They may develop the expectation that they will be quite reactive to couple conflict (e.g., responding defensively with anger or hostility; Meyer et al., 2001), increasing the perceived threat associated

with conflict and further contributing to adjustment problems. It has also been found in prior meta-analytic studies that chronic, severe stressors are associated with both hyper- and hypo-cortisolism (Miller, Chen, & Zhou, 2007). Thus, new parents who have levels of baseline cortisol which are at either extreme may be more stressed overall and have fewer coping resources for managing couple conflict. In sum, the current findings suggest that future research should consider non-linear models of HPA axis functioning to better understand risk for depressive problems.

Contrary to predictions, cortisol reactivity, the second indicator of HPA axis functioning, did not significantly moderate the relations between pre-natal couple conflict and post-natal family outcomes. The lack of significant moderation with cortisol reactivity warrants some discussion. There were difficulties with the assessment of cortisol reactivity (discussed below), that may account for the failure of this variable to significantly moderate the relations proposed in this study. On the other hand, it may be that reactivity to couple conflict is less helpful or important for understanding the long-term implications of couple conflict for new parents than baseline cortisol or degree of recovery to pre-stressor levels once the conflict is over. For some individuals, reactivity in the moment may be an indicator of healthy engagement in the couple problem-solving task whereas for others, high levels of cortisol reactivity may be an indicator of maladaptive HPA axis functioning as proposed in the current study. If cortisol reactivity reflects some partners' healthy engagement in the relationship and others' tendency to overreact to stressful interpersonal situations, we might not detect a pattern in which reactivity exacerbates or attenuates the influence of conflict on post-natal family outcomes using variable-centered approaches. Future work which combines physiological and psychological assessments of the stress response (e.g., appraisals of environmental demands and one's experienced stress in

response to these demands) could help to detect profiles of individual responding to interpersonal difficulties. These profiles might serve as better predictors of how individuals will fare in the face of couple conflict.

A third indicator of HPA axis functioning, cortisol recovery, was shown to significantly alter the influence of observed pre-natal couple conflict on co-parenting conflict and to change the influence of observed pre-natal conflict on post-natal depressive symptoms and parenting negativity at a trend level. For post-natal depressive symptoms, the direction of moderation was consistent with the idea that greater recovery following a stressor could protect parents from the impact of pre-natal couple conflict on subsequent difficulties. Though this result was only a trend, it supports the idea that greater cortisol recovery may allow individuals to relax following conflict, leading to less dwelling on the conflict and less rumination. Of course, it is also possible that a lack of rumination following a stressor contributed to quicker cortisol recovery, and not vice versa. In any case, more rapid physiological recovery from the stress of couple conflict may lead to appraisals of couple conflict as more controllable and manageable, thereby leading to greater feelings of efficacy (vs. helplessness) with consequent positive effects on mood.

On the other hand, there was evidence that pre-natal conflict had a more detrimental impact on co-parenting conflict and parenting negativity for those who exhibited *higher* levels of cortisol recovery. These results are surprising and warrant some discussion. It has been argued here that individuals whose cortisol levels had not returned to baseline and/or whose levels continued to climb at follow-up (those considered as demonstrating low cortisol recovery) experienced prolonged stress from the couple discussion. It is possible that some of these individuals were motivated to address couple-level difficulties in order to avoid future

experiences of long-lasting stress. Greater engagement in future couple discussions may have contributed to the resolution of difficulties and provided a better post-natal context (i.e., less conflictual, more supportive, less stressful) for parenting and co-parenting. These suggestions are speculative at this point and should be tested in future work with larger samples.

Finally, it should be pointed out that, given the large number of analyses (24) conducted with only three significant and two trend-level findings (although more than would be expected by chance), the current results regarding HPA axis moderation should be viewed with caution until replicated by future research. However, these findings highlight an interesting new direction for family research involving HPA axis functioning.

Social support as a protective factor across the transition to parenthood

Finally, it was predicted that social support would protect parents from the negative impact of pre-natal couple conflict on post-natal depression, parenting, and co-parenting difficulties. No evidence was found for a moderating role of social support in these relations. In addition, social support did not have a main effect in predicting post-natal family difficulties after controlling for parent age, education, intervention status, and pre-natal couple conflict. These results are in contrast with prior work which has emphasized the importance of social support in determining post-natal parental adjustment (e.g., Robertson, Grace, Wallington, & Stewart, 2004) and co-parenting quality (Lindsey, Caldera, & Colwell, 2005) and which has shown a buffering role of social support in the relation between stress and parenting quality (Crockenberg & McCluskey, 1986; Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998).

From a stress and coping perspective, it is surprising that social support during pregnancy was not shown to be protective for new parents experiencing couple conflict. It was argued that instrumental, emotional, and informational resources would allow parents to more adequately

face the additional stress brought on by couple conflict in addition to the normative demands of this transition time. It may be the case that social support is protective against the negative effects of pre-natal couple conflict, but not with regard to the specific outcomes assessed in this study. For example, pre-natal social support may be more relevant for early parent-child difficulties around feeding or sleeping, since grandparents and friends might provide concrete advice in these domains, whereas sensitive parenting may be less explicitly taught.

Alternatively, social support at child age 1 year might be a better predictor of family outcomes at that time as compared to support during pregnancy. However, exploratory, *post-hoc* analyses examining this issue did not reveal evidence for this idea (i.e., HLM models using social support assessed at child age 1 year did not significantly moderate the relations between pre-natal couple conflict and post-natal outcomes).

It may be the case that during pregnancy, a time when the importance of the nuclear family is heightened and when family-related goals are primary, couple conflict and support from *within the couple relationship* are more relevant for post-natal outcomes than support from sources external to the nuclear family. If this were the case, we would not expect to find significant moderation of social support in the relation between pre-natal couple conflict and post-natal family outcomes. Indeed, at least one prior study has found that partner support was more important for understanding females' adjustment to pregnancy than support from other sources (Pajulo, Savonlahti, Sourander, Helenius, & Piha, 2001).

Finally, the lack of significant moderation in this study may have been due to aspects of the measure chosen to assess social support. This measure asks parents to rate how helpful different sources of support have been to them over the past 3-6 months. Therefore, it may be the case that parents who scored high on this measure were experiencing many difficulties that

necessitated the support of multiple others. However, this speculation was not supported by the negative associations between pre-natal social support and both observed ($r = -.20, p < .01$) and self-reported pre-natal conflict ($r = -.18, p < .01$; Table 3). Another potential difficulty with the measure used in this study is that parents might have received a lot of support from grandparents and friends, but not from other sources listed in the measure (e.g., church, professionals), leading to a moderate or low score on the measure. An alternate approach for future work with social support during the transition to parenthood might be to assess *satisfaction* with support and/or to use items assessing how much support an individual felt he/she needed in the past few months in relation to how much he/she received. This would be more in line with the stress and coping framework in which stress is thought to result when environmental demands are perceived as exceeding available resources for dealing with those demands. In addition, assessing different *types* of support posited to be relevant across this transition (e.g., informational, instrumental, emotional) might also have potential for helping understand the role of support in protecting conflictual individuals from difficulties after the arrival of a child. Future research should attempt to elucidate these issues using complex measures of social support which tap the various types of support and particular sources of support which may be of most relevance to new parents.

Clinical implications

The current findings highlight the fact that self-reported and observed couple conflict provide different information about parents' functioning. To understand the risks for couples expecting their first child, clinicians may wish to assess couple functioning using self-report measures and to supplement them with observations. Reliance on self-report alone may not reflect the whole picture of couple functioning. Because self-reported frequency of conflict and

observed hostility of couple conflict were related to different post-natal family difficulties, clinicians working with couples may be well-served to target both the *frequency* of couple conflict as well as the *negative communication patterns* which characterize this conflict.

In addition, the current results regarding parent sex differences in the impact of couple conflict on subsequent depressive, parenting, and co-parenting differences have relevance for working with parents and couples. These findings suggest that couple conflict has detrimental effects for both new mothers and new fathers, but that mothers' difficulties may be more likely to manifest themselves in parenting and co-parenting difficulties whereas fathers may be more likely to suffer from depressive problems. During pregnancy, clinicians and researchers could use this information to create more specific targets for interventions for mothers vs. fathers.

Results indicating that some elements of HPA axis functioning have the potential to moderate the relation between pre-natal couple conflict and post-natal family environments highlight the importance within a clinical context of assessing behavioral, emotional, and physiological responses of individuals to couple conflict in order to better understand the potential impact that this conflict may have on individuals and families over time. As technologies improve and the collection and analysis of physiological data becomes more feasible for practitioners and researchers, the inclusion of such data as a standard part of assessment and treatment monitoring could improve our ability to predict those most at-risk of difficulties over time. In addition, such assessment strategies could strengthen our ability to determine whether treatment makes lasting, meaningful differences in emotional, behavioral, and physiological domains of functioning (Eiden, Veira, & Granger, 2009).

Limitations and Future Directions

There are several limitations of the current study that must be acknowledged. Because the participants were a volunteer sample of couples who agreed to participate in a longitudinal study and who were interested in receiving interventions to assist them in the transition to parenting, it is likely that the full range of family, couple, and individual adjustment qualities was not represented. For example, it is possible that the most highly conflictual couples would not agree to participate in a longitudinal study of a prevention program. On the other hand, more distressed and conflictual couples may have been more likely to seek out and/or agree to participate in such a program. Past cross-sectional research with volunteer and/or intervention samples has suggested that several of the associations posited in the current study exist even among such samples (e.g., McHale & Rotman, 2007; Cowan & Cowan, 1992). Thus, this study was seen as an initial step in documenting the risk that the normative range of couple conflict behaviors within intact couples has on post-natal family environments. Future work which targets at-risk couples and couples with greater ethnic and racial diversity is also warranted and is underway in this lab.

The current study examined pre-natal risk and protective factors associated with family difficulties at child age 1 year, a time when increasing child autonomy and emerging capacities for speech, mobility, and learning call for a flexible and adaptive approach to parenting and co-parenting challenges. Parents' approaches towards monitoring, discipline, displaying affection, and teaching, as well as their strategies for working together in parenting must adapt to fit these newly developing child abilities and needs. Thus, the effects of pre-natal risk and protective factors may be particularly likely to be seen within the family system at this developmental

stage. Future work should examine whether the model proposed in the current project applies across different developmental phases of family life.

Another limitation that should be noted is that the link between pre-natal couple conflict and post-partum depressive problems was only found with the self-report measure of conflict (and this link was only a trend when pre-natal depressive symptoms were covaried). Because the conflict measure and measure of depression were both self-report questionnaires, it is possible that the prediction found in the current study was due to shared method variance, and not due to a true relationship between these variables. However, in past research, the original CESD has been shown to be related to other assessments of depression, including structured interviews (Shean & Baldwin, 2008). In addition, in the current project, the measures of conflict and depression were taken at two different time points over a year apart, reducing the chance that shared method variance provides the primary explanation for a relation between these two variables.

In addition to the issues of shared method variance, some have questioned the use of questionnaires such as the CESD during the post-partum period given the inclusion of symptoms considered part of traditional definitions of depression but which may not differentiate between depressed and non-depressed parents in the period after a baby's arrival (e.g., sleeping difficulties, changes in appetite, weight changes) (Matthey, Barnett, Kavanagh, & Howie, 2001). Instead, the use of depression measures that are specific to the post-partum period has been recommended and such a measure has been developed (e.g., The Edinburgh Postnatal Depression Scale; Cox, Holden, & Sagovsky, 1987). To address this issue in the current study, items reflecting symptoms such as sleep and appetite disturbance were not included in the abbreviated version of the CESD. Nonetheless, future research examining the association

between couple conflict and depressive symptoms across the transition to parenthood could benefit from a multi-method assessment of depression (e.g., using semi-structured interviews in addition to self-report questionnaires).

Several limitations should be noted with regard to the assessment and study of HPA axis functioning. The primary concern lies in the fact that, in order to truly examine cortisol *reactivity* to a stressor and cortisol *recovery* following the stressor, it is necessary to show that individuals' cortisol levels increased from pre-stressor (i.e., prior to the couple problem-solving discussion) to the post-stressor (i.e., approximately 20 minutes after the problem-solving discussion) and then decreased again to approximately the pre-stressor levels (taking into account the normal diurnal decline in cortisol). In the current study, 37% of mothers and 46% of fathers showed a *decrease* from pre- to post-stressor. This may have occurred for several reasons. The couple problem-solving discussion may not have been perceived as stressful for these individuals and/or the lack of cortisol reactivity may reflect an overall lack of engagement with the task. Another potential explanation for the lack of reactivity in some individuals involves the "law of initial value" (Ramsay & Lewis, 2003), reflecting the idea that physiological data such as cortisol levels can not increase much if they were already significantly elevated to begin with. Indeed, in the current study, baseline cortisol was significantly, negatively related to cortisol reactivity (Mothers: $r = -.61, p < .01$; Fathers: $r = -.47, p < .01$). Whatever the explanation for the lack of cortisol increase from pre- to post-discussion, for these individuals it is not precise to refer to their post-discussion HPA axis functioning as "cortisol reactivity" and "recovery." These difficulties have been noted in several other studies involving assessment of HPA axis functioning in response to more "naturalistic" stressors as compared to more laboratory-based stressors (such as the Trier Social Stress test). In these prior studies and in the

current study, it is more accurate to refer to “relative” reactivity and recovery. Future work should attempt to develop standardized stressors to which the majority of people will react.

A related difficulty with assessing HPA axis functioning in naturalistic environments is that what has been referred to here as “baseline” cortisol may also reflect individual’s reactions to having a stranger enter their home and/or the anticipation of what the study might entail. Thus, individuals might have already experienced cortisol reactivity prior to or upon the arrival of the interviewer, and may have already been in the recovery phase by the time the initial cortisol samples were taken. The difficulties with assessing a true cortisol baseline have been discussed (e.g., Eiden, Veira, & Granger, 2009). However, these authors make the argument that what is often termed “baseline” cortisol can accurately be considered an assessment of HPA axis functioning prior to a significant stressor. Thus, in the current study, baseline cortisol is believed to be a reasonable estimate of HPA axis functioning prior to a significant, circumscribed stressor which was perceived as more or less stressful by different individuals.

A final limitation in the current study associated with the role of physiological stress functioning in the relation between pre-natal couple conflict and post-natal family outcomes is the assessment of only one of the body’s systems for managing stress. This is considered an excellent starting point. However, it may be helpful to examine multiple physiological systems simultaneously to determine whether they are working adaptively *in concert*. Many researchers have called for the examination of HPA axis functioning within the broader context of physiological stress functioning (e.g., Doussard-Roosevelt, Montgomery, & Porges, 2003; Gordis, Granger, Susman, & Trickett, 2006; Granger et al., 2006). Physiological systems involved in the stress response do not operate in isolation from each other, yet they are often treated as such in studies such as the current one that examine one element of stress functioning.

In children, it has been recently documented that the *combination* of sympathetic and parasympathetic nervous system functioning was relevant for understanding behaviors problems (El-Sheikh et al., 2009). In addition, recent work has turned attention to the synchrony or concordance of HPA axis functioning *between individuals* (e.g., Goslin, Booth, & Granger, 2009) as an important area for research within a biosocial model of family functioning (Booth, Carver, & Granger, 2000). Thus, the synchrony of physiological stress functioning both *within* the individual and *between* individuals may shed light on how individuals deal with stressors such as pre-natal couple conflict. Future work should take a complex approach to understanding physiological stress functioning.

Another limitation that should be noted is that child effects models, in which difficult child behaviors serve to elicit couple conflict, parental depressive problems, parenting negativity, and co-parenting conflict, were not considered in the current study. In prior work, experimental designs have shown that parental exposure to negative child emotion increases maternal negative emotion and harsh parenting (Arnold & O'Leary, 1995). Thus, the model used in the current project could likely be enhanced by examining reciprocal interactions between child, parent, and co-parenting teams. Future work should attempt to take on this measurement challenge.

From the point of view of analytic strategy, it should be noted that the current project relied on the detection of significant interactions to provide support for moderation hypotheses. The difficulties with detecting and replicating statistical interactions as compared to main effects have been extensively discussed (Jaccard, Wan, & Turrisi, 1990; Aguinis & Stone-Romero, 1997). Future work should utilize large samples to replicate and extend on the findings in this project.

Finally, this study was informed by a stress and coping framework and stress and coping-related moderators of the link between pre-natal couple conflict and post-partum family difficulties were assessed. Given the results of this study, further research should examine the mediators of these associations (e.g., stress, appraisals, coping). In addition, the current study considered parental depression, parenting negativity, and co-parenting conflict as unique post-natal outcomes that could be predicted from pre-natal risk and protective factors. However, it is likely the case that the relations between parental depression, parenting, and co-parenting quality are more complex. For example, high levels of depressive symptoms are likely to interfere with the development of effective parenting strategies, and the parenting difficulties of depressed parents have been extensively documented (Dix, Gershoff, Meunier, & Miller, 2004). Thus, it is possible that the link between pre-natal conflict and negative parenting is mediated by depressive symptoms. In addition, it has been suggested that co-parenting quality is a mediator in the link between marital relationship quality and parenting quality. For example, in one study, the relation between inter-parental conflict and parenting was fully mediated by co-parenting quality (Margolin, Gordis, & John, 2001). Thus, there are likely complex and reciprocal influences among the three family factors assessed in the current project. An examination of the specific relations among parent depression, parenting, and co-parenting was beyond the scope of this project. Future work with appropriate data analytic strategies (e.g., path analysis) could examine these relations more specifically (e.g., pre-natal couple conflict increases depression which increases the risk for both negative parenting and co-parenting difficulties).

In conclusion, the current study expands prior work in establishing pre-natal couple conflict as a risk factor for the development of individual and family difficulties across the transition to parenthood. In addition, parent sex and HPA axis functioning were shown to

moderate the impact of pre-natal couple conflict on post-natal family outcomes. These associations are relevant in and of themselves as they shed light on the development of families following the birth of a first child. Future work linking parental depressive symptoms, parenting negativity, and/or co-parenting conflict to subsequent child adjustment problems using longitudinal designs and advanced statistical approaches can help determine whether the post-natal difficulties in the family environment assessed in the current study serve as full or partial mediators in the link between pre-natal couple conflict and early childhood mental health difficulties. Such work would have clear implications for both couple and family-level prevention programs. If future research documents this potential mediating role, intervening to decrease pre-natal couple conflict could have effects beyond individual and couple level functioning to promote early childhood mental health.

Appendix A

Observational Codes for Pre-natal Couple Conflict Behaviors

Hostility: (Primary Source: Family Life Project, adapted; Secondary Source: Margolin, McHale)
General definition: This dimension is defined as the level of hostility, antagonism or negative affect an individual displays. This category is coded when one person is feeling frustrated or angry with another. The other person is seen as the root of the problem. Researchers may never see a family in which parents raise their voice, engage in a prolonged argument, or exhibit marital conflict. However, this does not mean that parents do not engage in milder behavior that signifies disapproval or disagreement. Parents may exhibit kidding, or “playful” insulting behavior that is unclear in its valence. In addition, it is possible for couples to discuss problems in their relationship in a non-hostile manner. Hostility is a combination both of what is said and the manner/tone in which it is said.

Note: When coding time intervals, there will likely be “borderline” hostile comments that are difficult to know whether or not to code hostility. In those situations, take the entire videotaped interaction into account. If there are no other indications of hostility at any time, then give the individual the benefit of the doubt and do not code hostility. However, if there are more than one borderline hostility incidents, then code hostility.

Common Cues:

- Face displays tension, nervousness (includes eye contact)
- Body is tense, tight
- Speaks with a negative voice (e.g. impatient, angry, whining, cold)
- Escalates negative affect, i.e. reacts with negative affect to own or partner’s negative affect
- Makes critical comments directed at partner or at partner’s relatives or friends
- Puts down, blames
- Disagrees more often than agrees with partner
- Negative mindreading (attributes negative feelings, attitudes, beliefs, or motives to partner) - “You always” or “You never” phrases
- Comments negatively on partner
- Complains in response to partner’s complaint

1- Does not show signs of hostility.

2-

3-Signs of mild irritation or anger are displayed infrequently.*

4-

5- Moderate hostility or repeated mild irritation/anger is displayed.

6-

7-Signs of hostility are pronounced and common during the interaction.

Contempt: (Source: Family Life Project)

General Definition: Contempt is often (but not always) easy to identify in speech and involves any insult, mockery, or sarcasm or derision, of the other person. There is often a definite sense of distance, coldness, and detachment in this category of behavior. Contempt conveys a general lack of respect for the thoughts or feelings of the listener.

Cues:

- Rolls eyes
- Speaks with a cold voice tone which denotes an extreme lack of respect and regard for other person's feelings
- Includes disapproval, judgment, derision, disdain, exasperation, mockery, insult or communication that the other person is absurd or incompetent
- Uses sarcasm (makes a statement with a sarcastic tone of voice or makes a statement which appears to be the opposite of their position or intention in the communication)
- Puts partner down in an attempt to make him/her feel inferior
- Character assassination - a global statement of complaint which attributes a negative personality trait to the listener (uses words like "always" and "never")
- Treats partner in a commanding or controlling way ("You will do what I say") that involves clear contempt or disregard for the other

1- Does not show signs of contempt.

2-

3-Mild display of contempt displayed once in passing*

4-

5-Mild contempt is displayed a few times, or significant degree of contempt displayed once

6-

7-Signs of contempt are pronounced and repeatedly displayed during the interaction.

Demandingness (Source: SPAFF, adapted)

General Definition: This global code indicates the style with which the individual conveys dissatisfaction with their partner and is able to make their point about issues they are unhappy with.

1- Minimizes, avoids, and soft-pedals the dissatisfaction to such a degree that the complaint is not conveyed

2- The point is conveyed, but is minimized to a significant degree.

3- More gentle than assertive, but manages to make the point.

4- Gently but firmly assertive; does not attempt to avoid conflict.

5- Assertive without softening the blow

6- Somewhat harsher than necessary to make the point

7- Consistently exhibits a negative demanding style.

Appendix B

Conflict Tactics Scale-2

“RELATIONSHIP BEHAVIORS”

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other, or just have spats or **fights** because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. This is a list of things that might happen when you have differences. Please check the box by the number that best represents how many times you did each of these things in the past year, and how many times your partner did them.

	Not in the past year, but it did happen before (7)							
	More than 20 times (6)							
	11-20 times (5)							
	6-10 times (4)							
	3-5 times (3)							
	2 times (2)							
	1 time (1)							
IN THE PAST YEAR...	0	1	2	3	4	5	6	7
1. I showed my partner I cared even though we disagreed.	0	1	2	3	4	5	6	7
2. My partner showed care for me even though we disagreed.	0	1	2	3	4	5	6	7
3. I explained my side of a disagreement to my partner.	0	1	2	3	4	5	6	7
4. My partner explained his or her side of a disagreement to me.	0	1	2	3	4	5	6	7
5. I insulted or swore at my partner.	0	1	2	3	4	5	6	7
6. My partner did this to me.	0	1	2	3	4	5	6	7
7. I threw something at my partner that could hurt.	0	1	2	3	4	5	6	7
8. My partner did this to me.	0	1	2	3	4	5	6	7
9. I twisted my partner's arm or hair.	0	1	2	3	4	5	6	7
10. My partner did this to me.	0	1	2	3	4	5	6	7
11. I had a sprain, bruise, or small cut because of a fight with my partner.	0	1	2	3	4	5	6	7
12. My partner had a sprain, bruise, or small cut because of a fight with me.	0	1	2	3	4	5	6	7
13. I showed respect for my partner's feelings about an issue.	0	1	2	3	4	5	6	7
14. My partner showed respect for my feelings about an issue.	0	1	2	3	4	5	6	7
15. I pushed or shoved my partner.	0	1	2	3	4	5	6	7
16. My partner did this to me.	0	1	2	3	4	5	6	7

17. I used a knife or a gun on my partner.	0	1	2	3	4	5	6	7	
18. My partner did this to me.	0	1	2	3	4	5	6	7	
19. I passed out from being hit on the head by my partner in a fight.	0	1	2	3	4	5	6	7	
20. My partner passed out from being hit on the head in a fight with me.	0	1	2	3	4	5	6	7	
21. I called my partner fat or ugly.	0	1	2	3	4	5	6	7	
22. My partner called me fat or ugly.	0	1	2	3	4	5	6	7	
23. I punched or hit my partner with something that could hurt.	0	1	2	3	4	5	6	7	

24. My partner did this to me.	0	1	2	3	4	5	6	7	
25. I destroyed something belonging to my partner.	0	1	2	3	4	5	6	7	
26. My partner did this to me.	0	1	2	3	4	5	6	7	
27. I went to a doctor because of a fight with my partner.	0	1	2	3	4	5	6	7	
28. My partner went to a doctor because of a fight with me.	0	1	2	3	4	5	6	7	
29. I choked my partner.	0	1	2	3	4	5	6	7	
30. My partner did this to me.	0	1	2	3	4	5	6	7	
31. I shouted or yelled at my partner.	0	1	2	3	4	5	6	7	
32. My partner did this to me.	0	1	2	3	4	5	6	7	
33. I slammed my partner against a wall.	0	1	2	3	4	5	6	7	
34. My partner did this to me.	0	1	2	3	4	5	6	7	
35. I said I was sure we could work out a problem.	0	1	2	3	4	5	6	7	
36. My partner was sure we could work it out.	0	1	2	3	4	5	6	7	
37. I needed to see a doctor because of a fight with my partner, but didn't.	0	1	2	3	4	5	6	7	
38. My partner needed to see a doctor because of a fight with my partner, but didn't.	0	1	2	3	4	5	6	7	
39. I beat up my partner.	0	1	2	3	4	5	6	7	
40. My partner did this to me.	0	1	2	3	4	5	6	7	

Appendix C

CES-D

“Feelings”

Listed below are ways people may have felt or behaved. For each question, please indicate how often you have felt this way **during the last week**.

How often during the past week did you.....	Rarely or None of the Time (Less than once a week)	Some or a Little of the Time (1-2 days a week)	Occasionally or a Moderate Amount of Time (3-4 days a week)	Most or All of the Time (5-7 days a week)
1. feel bothered by things that usually don't bother you.	0	1	2	3
2. feel sad.	0	1	2	3
3. feel fearful.	0	1	2	3
4. feel lonely.	0	1	2	3
5. feel that you could not shake off the blues even with help from family/friends.	0	1	2	3
6. feel that your life had been a failure.	0	1	2	3
7. feel depressed.	0	1	2	3
8. have trouble keeping your mind on what you were doing.	0	1	2	3
9. feel that everything was an effort.	0	1	2	3
10. feel hopeful. (R)	0	1	2	3
11. talk less than usual.	0	1	2	3
12. think that people were unfriendly.	0	1	2	3
13. feel you could not “get going.”	0	1	2	3
14. feel happy. (R)	0	1	2	3

Appendix D

Observational Codes for Negative Parenting

SENSITIVITY (adapted from Cox; Ainsworth; EAS; TICS; Marvin & Britner)

This scale focuses on how the parent observes and responds to the child's social gestures, expressions, and signals as well as responds to cries, frets, or other expressions of negative affect. The key defining characteristic of a sensitive interaction is that it is child-centered. The sensitive parent tuned to the child manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her interaction. Sensitivity is assessed on the basis of global judgments about the quality of the caregiver's response to his/her child's signals, seen in the behaviors of paying attention to and noticing child cues, interpreting the signals correctly, and then responding appropriately.

A sensitive parent is predominantly affectively positive, in terms of both facial and vocal expressiveness. But affect should be appropriate--it may be inappropriate to be positive to all things in which the child engages. A sensitive parent shows congruence between verbal and nonverbal emotional expressions.

Other important attributes of sensitive parent include:

- Clarity of perceptions of child's state and appropriate responsiveness
- Awareness of timing of interactions to match the child's needs
- Variety and creativity in modes of play
- Acceptance of the child as a valued individual
- Manages conflict with problem solving, acknowledging child's goals, rather than hostile style

One example of sensitive parenting occurs when the baby's attention is away from the parent. The sensitive parent will gently indicate that they are there for the baby to come back to when the baby is ready. The parent may do this by gently calling the baby's name, starting a new activity at a soft, gentle pace, or rattling an object that was previously part of the play.

1 = Not at all characteristic. There are almost no signs of parent sensitivity. Thus, the parent is either predominantly intrusive or detached. The parent rarely responds appropriately to the child's cues, and does not manifest an awareness of the child's needs. Interactions are characteristically ill timed or inappropriate. When the child cries or frets, the parent responds not at all, or very slowly or inappropriately. If there is a response, it is only after the child becomes very demanding, and the response is so delayed that it cannot be construed to be contingent upon the child's behavior. A parent who typically appears oblivious or punitive to the child's distress would receive this score.

2

3 = Minimally characteristic. This rating should be given to parents who display infrequent or weak sensitivity/responsivity. While the parent is sometimes sensitive, the balance is clearly in

the direction of insensitivity. The parent may give some delayed perfunctory responses to cues. The parent responds rarely or slowly to child's distress signals, and appears more unresponsive than responsive. The responses tend to be minimal or perfunctory. For example, the parent may talk to or briefly pat a crying child, but he/she does not pick up the child. The parent would not typically bring the child to a ventral/ventral position. He/she seems minimally interested in providing genuine comfort.

4

5 = Moderately characteristic. This rating should be given to parents who are predominantly sensitive/responsive. The parent demonstrated sensitivity in most interactions but may neglect to give a fuller response or a well-timed or appropriate response. If the child cries or frets, the parent typically responds promptly to the child's distress, demands, and signals, but there is some time in which clear child signals do not receive a response or in which the response is somewhat delayed. Some of the parent's responses are mixed, i.e. some are half-hearted or perfunctory, but the majority are full responses.

6

7 = Highly characteristic. This rating should be given to parents who are exceptionally sensitive and responsive. Instances of insensitivity are rare and never striking. Interactions are characteristically well timed and appropriate. If the child shows distress, this rating should be given to parents who are exceptionally sensitive and responsive to distress. The parent responds quickly and appropriately to the child's distress. If the child is upset, the parent takes the time to soothe and calm the child. Overall most responses are prompt, appropriate, and effective.

NEGATIVE AFFECT EXPRESSED TOWARD CHILD (Britner & Marvin)

[This scale is based in part on the Minnesota Mother-Child Interaction Project (MCCIP; Sroufe, 1990) rating scale, Maternal Hostility (Sroufe, Matas, & Rahe), which was designed for use with 42 month-olds during problem-solving and teaching tasks. It was modified somewhat for the Strange Situation.]

The scale reflects caregiver's expressions of any negative affect toward the child: anger, disdain, impatience, discounting of, or disgust for the child and his activities. A caregiver high on this scale would express negative affect toward the child clearly, but may or may not overtly reject the child, blame him/her for mistakes, and otherwise make explicit the message that he/she does not support the child emotionally. No judgment need be made (for this score) about the rejection involved in the caregiver's actions, only the severity and frequency of negative affect. High levels of negative affect could be present along with rejection, conflicted interactions, or even an otherwise sensitive interaction.

A caregiver scoring low on this scale may be still be unhelpful or cold, but does not express negative affect toward the child. Given the low frequency and the clinical relevance of overt hostility or negativity toward one's child during a videotaped session, any events which are clearly negative should be weighted strongly in this score.

It is important to note that indirect expressions (e.g., angry gestures behind the child's back, eye rolls, or angry utterances under the caregiver's breath) may or may not be openly communicated to the child or may not be evident to the child, but they are still evidence of

negative affect. The essence is the expression of, not necessarily the communication of, negative affect expressed by the caregiver toward the child.

Finally, it should be noted that sensitive and appropriate irritation at the child's misbehavior, limit-testing, etc., should not, in and of itself, lead to a higher score on this scale.

1-Not at All Negative: Caregiver shows no signs of negative affect, anger, or hostility toward child. He/she may or may not be particularly supportive. Passive or emotionally uninvolved caregivers would be included in this scale point if the caregiver did not display any negative affect toward child.

2-Hint of negative: Caregiver does one or two things that may seem to communicate a little irritation.

3-Slightly Negative: This caregiver does one or two things that seem to communicate negative affect or hostility toward child. These messages are not overt, but rather are muted expressions toward child (e.g., pulling away something with a jerk, putting hand on hips to show exasperation, giving a cold (hostile) look at child briefly, parroting or mimicking child in a negative fashion).

4-Somewhat Negative: Signs of anger or hostility again are fleeting, but at least one sign can be identified as clear and overtly negative, or there is an accumulating sense of unexpressed anger toward child that is seen in caregiver's behavior.

5-Moderately Negative: Several instances of hostile or angry behaviors. Two or more of these events are reliably clear to observers, but expressions are brief and do not set the tone of caregiver's interactions immediately following the episodes (i.e., he/she can be warm following an expression of irritation).

6-Negative: Caregiver is overtly angry or negative several times. Behaviors include overt and clearly communicated expressions of anger which appear intermittently through substantial periods of the session. This caregiver's behavior is more negative than not; either by the frequency of hostile behavior, or by the potency by which anger is communicated several times in the session.

7-Strongly Negative: Caregiver has frequent expressions of anger or hostility directed toward child. There is little or no effort to show warmth during substantial portions of the situation, especially after caregiver becomes irritated with child (i.e., caregiver may initially be warm and then yell at child harshly). Caregiver is frankly and directly angry and negative (e.g., using negative performance feedback but little positive feedback, blaming child for dropping a toy, and overtly refusing to recognize child's success). Any warmth seems superficial relative to the caregiver's distancing from child; anger is used as a control technique against child.

REJECTION (Britner & Marvin)

This scale assesses the extent to which the caregiver rejects and/or avoids the child. The essential quality being assessed as rejection is the quality of "turning back or away" of the child's

dependence (e.g., needing help in the context of using the caregiver as a secure base for exploration), affection, attention, need, and attachment. At the low end of rejection is caregiver behavior that encourages an inappropriate degree of independence from the caregiver; at the high end, the caregiver seems to ignore, openly reject, or in rare cases even not want, the child. The effort and the effect is usually to shift the child's attention away from the caregiver.

Signs of rejection can be seen both overtly and covertly, and should be looked for in both modalities, as the social expectation is for caregivers to accept their children. Thus, a caregiver may show her rejection and lack of acceptance directly by failing to greet the child, ignoring the child's distress or avoidance on reunion, telling child to go play when attachment system is activated, or changing the subject of a child-initiated conversation from the separation to the toys; or by indirect means such as irritation, sarcastic comments, or rough physical handling. He/she may also show rejection indirectly or directly via the comments he/she makes about the child to other people present.

At the low end of the scale, the caregiver shows no, or very little, rejecting behavior. At the midpoint of the scale is the caregiver who is either moderately and actively avoidant/rejecting, pervasively reserved, aloof, cool, stern or unexpressive, or displays a mixture of strong rejection with sensitive acceptance. The midpoint might be applicable to caregivers from some (sub) cultures who, for example, tell their sons on reunion not to cry, yet reassure them that they will not leave again and in other ways are accepting of the child. At the high end of the scale, the caregiver exhibits extremely rejecting behavior that goes well beyond the norm for any (sub) culture, and can be either consistently rejecting throughout the episode, or episodic instances of rejection that may imply the caregiver's wish that the child were not here.

Indices of rejection:

- The caregiver conveys that he/she is assisting the child with the probable implication or tone that he/she is bothered or inconvenienced by having to respond.
- Indirect indices such as eye rolls, sarcastic comments.
- Irritation that is outside the area of appropriate limit-setting/behavior management.
- The caregiver avoids discussing the relationship with child, most notably when it is clear that the child is/has been distressed about the separation and/or reunion, and/or the child has initiated discussion about the separation/reunion.
- Caregiver who avoids, ignores or distracts the child's avoidance on reunion. In this context, pretending to be, or in this situation actually being, absorbed in a magazine to avoid interaction, may or may not be openly communicated to the child, but they are still evidence of rejection. The essence is the expression of, not necessarily the communication of, rejection.
- The caregiver shows disinterest in the child and his/her activities, needs, etc.
- The caregiver criticizes or rejects the child's activities, not in the sense that the caregiver desired the child to produce or do something more pleasing to the caregiver (that would be involving) but simply because the caregiver wanted the child to "get on with it."
- The caregiver is angry with the child when the child gets hurt.
- The caregiver laughs at the child when the child is upset or in some difficult situation.
- The caregiver ridicules the child's attachment (e.g., "Grow up and act tough").
- Communicates an attitude of intolerance regarding child's activities and abilities, or attachment needs.
- Critical or rejecting comments about child's "messiness," or facial expressions suggesting disgust or disapproval.

- Reacts to child's fatigue with irritation and threats of removing him/her from the setting.
- A pattern of comments from caregiver indicating that things regarding child are not the way he/she would wish, without the appropriate positive feedback to serve as a balance. This pattern can be subtle, with the caregiver communicating either to the child or the interviewer that the child or his/her activities ought to be different, better, etc. For example, a pattern of saying things like, "No, that's not how they go!" could be rejecting if not balanced with constructive feedback like, "No, that's not how they go....but you've almost got it!"

Distinguishing Rejection from other scales:

Rejecting of attachment is not simply a lack of affection. Caregivers scored as low in Affection may be Rejecting or show another "negative" pattern such as Neglecting or Role-Reversing. Conversely, a caregiver who is Rejecting of the child may show some Affection. The key to the scale is the caregiver's avoidance of anything personal/intimate, or the direct rejection of a child's behaviors.

1- Not at All Rejecting: There is no indication of rejection of the child during the Episode. There may be disagreements or "spats", but these are not associated with rejection. The caregiver may be entirely supportive of the child and very loving. Alternately, there may be some difficulty with the relationship such as role-reversal or overinvolvement, with the caregiver actively utilizing and heightening rather than turning away the child's dependence, attention, or role-reversed controlling behavior.

3- Mild Rejection

- The caregiver very mildly rejects the child's attachment over the course of the situation. This rejection may be subtle: perhaps mildly sarcastic or reserved. The caregiver may be mildly aloof or have a little difficulty "showing her love" for the child or responding to the child's attachment behavior.
 - OR •
- Alternately, a generally accepting caregiver who is rejecting for a brief period

5- Moderately Rejecting: On balance, the caregiver is somewhat rejecting of attachment. Either:

- The caregiver is consistently somewhat reserved, removed, or physically cold, "stern." The rejection is not confined to a single brief period or interaction. The caregiver's affectional response to the child is consistently and disappointingly limited.
 - OR •
- A "5" may also be assigned as an average, where a caregiver is rejecting in some ways or at some times, but accepting in other ways or at other times. For example, the caregiver consistently and moderately rejects, distracts or avoids the child's attachment behavior, but is accepting in the context of exploratory or other behaviors.

7- Strongly Rejecting: This caregiver is clearly rejecting of attachment. Either:

- The absence of intimacy or closeness between child and caregiver is strongly thematic of their interaction, and rejection of the child appears to be a pervasive quality of the interaction throughout the episode. (The caregiver is more than reserved, aloof, removed, or business-like.)
 - OR •

- b. Rejection is sustained and very strong at periods, but is combined or alternates with some, limited warmth and/or acceptance.

Appendix E

Observational Codes for Co-parental Conflict

(LACK OF) ENDORSEMENT (*McHale*)

Each parent's endorsement of the other's parenting

- 1 Pervasive disapproval and distrust; actual disdain for the other parent
- 2 Shows at least some overt disapproval of partner's parenting
- 3 Hint of, or slight doubt about partner's parenting. Parent might occasionally offer gentle, but unsolicited direction
- 4 Fairly neutral, parent is neither significantly doubtful nor satisfied with other parent's interaction with the child
- 5 Approving and trusting; generally satisfied with the other parent's interaction with the child
- 6 Parent enjoys, appreciates, or even revels in the other parent's interaction with the child

Appendix F

Social Support
“Support”

Consider each of the persons or groups of people listed below. Place a checkmark to indicate how helpful each source has been to YOUR family during the past 3 to 6 months. Check NA (not applicable) for any source that has not been available to the family during this period of time (for example, deceased).

	Not at all Helpful	Sometimes Helpful	Generally Helpful	Very Helpful	Extremely Helpful	NA
1. Your parents	0	1	2	3	4	NA
2. Your partner’s parents.	0	1	2	3	4	NA
3. Your relatives/kin	0	1	2	3	4	NA
4. Your partner’s relatives/kin	0	1	2	3	4	NA
5. Husband/wife or partner	0	1	2	3	4	NA
6. Your friends	0	1	2	3	4	NA
7. Your partner’s friends	0	1	2	3	4	NA
8. Your own children	0	1	2	3	4	NA
9. Other parents	0	1	2	3	4	NA
10. Church	0	1	2	3	4	NA
11. Social groups/clubs	0	1	2	3	4	NA
12. Co-workers	0	1	2	3	4	NA
13. Parent groups	0	1	2	3	4	NA
14. Your family or child’s physician	0	1	2	3	4	NA

15. Professional helpers (social workers, therapists, teachers etc.)	0	1	2	3	4	NA
16. School/daycare	0	1	2	3	4	NA
17. Professional agencies (public/mental health, social service, etc.)	0	1	2	3	4	NA

Appendix G
Tables and Figures

Table 1: Demographic Information during Pregnancy for Whole Sample and by Parent Sex

Variable	Mothers Mean (SD) or Frequency (Percent)	Fathers Mean (SD) or Frequency (Percent)	Whole Sample Mean (SD) or Frequency (Percent)	ANOVA or Chi Square Results (Examining parent sex differences)
Age in Years	28.33 (4.93)**	29.76 (5.58)**	29.05 (5.30)	$t(1, 331) = 3.82, p < .01$
Years of Education	15.06 (1.82)**	14.51 (2.20)**	14.78 (2.03)	$t(1, 331) = -3.86, p < .01$
Annual Income	-	-	\$65,335 (\$34,218)	N/A
Weeks of Gestation	22.85 (5.33)	-	-	N/A
Race/Ethnicity				$\chi^2(5, 333) = 3.56, ns$
Hispanic	1 (.59%)	1 (.59%)	2 (.59%)	
Non-Hispanic White	156 (92.31%)	153 (90.55%)	309 (91.42%)	
Non-Hispanic Black	7 (4.14%)	8 (4.73%)	15 (4.44%)	
American Indian, Eskimo or Aleut	0 (0%)	1 (.59%)	1 (.30%)	
Asian or Pacific Islander	4 (2.37%)	2 (1.18%)	6 (1.78%)	
Other (e.g., mixed race)	1 (.59%)	4 (2.37%)	5 (1.48%)	
Marital status				N/A
Married	-	-	139 (82.2%)	
Not married; cohabitating	-	-	30 (17.8%)	

† $p < .10$, * $p < .05$, ** $p < .01$

Table 2: Means and Standard Deviations for Independent, Dependent, and Moderator Variables for Whole Sample and by Parent Sex

Variable	Mothers Mean (SD)	Fathers Mean (SD)	Whole Sample Mean (SD)	ANOVA Results (Examining parent sex differences)
Self-reported Conflict Frequency	14.90 (16.70)	11.87 (14.34)	13.38 (15.62)	$t(1, 179) = -1.20, ns$
Observed Conflict Hostility	-0.02 (.81)	.05 (.92)	.01 (.86)	$t(1, 179) = .23, ns$
Pre-Natal Depressive Symptoms	3.32 (3.49)*	1.82 (2.08)*	2.57 (2.96)	$t(1, 179) = -2.56, p < .05$
Post-Natal Depressive symptoms	2.23 (2.92)	1.84 (2.44)	2.04 (2.70)	$t(1, 179) = 1.12, ns$
Parenting Negativity	-.31 (.72)	-.16 (.62)	-.24 (.67)	$t(1, 179) = 1.42, ns$
Co-parenting Conflict	2.07 (.52)	2.00 (.36)	2.03 (.45)	$t(1, 179) = -1.04, ns$
Pre-natal Social Support	16.14 (5.40) [†]	15.03 (5.05) [†]	15.59 (5.25)	$t(1, 179) = -1.92, p < .10$
Residualized Baseline Cortisol (T1)	.00 (.42)	.00 (.52)	.00 (.47)	$t(1, 179) = -1.02, ns$
Residualized Cortisol Reactivity (T2-T1)	.00 (.04) [†]	.00 (.04) [†]	.00 (.04)	$t(1, 179) = -1.73, p < .10$
Residualized Cortisol Recovery (T2-T3)	.00 (.02)	.00 (.02)	.00 (.02)	$t(1, 179) = -.46, ns$

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 3: Correlation Matrix: Independent, Dependent, and Moderator Variables for the Whole Sample

Variable	1	2	3	4	5	6	7	8	9
1. Self-reported conflict frequency	-	.29**	-.04	.07	.20**	.13*	-.09	-.01	-.18**
2. Observed conflict hostility		-	-.07	.17**	.11 [†]	-.00	.04	-.03	-.20**
3. Change in depressive symptoms (T3 CESD – T1 CESD)			-	.00	.04	-.09	.18**	-.10	.00
4. Parenting negativity				-	.21**	.01	.03	-.03	-.10 [†]
5. Co-parenting conflict					-	.07	-.13 [†]	-.02	-.10
6. Residualized baseline cortisol						-	-.53**	.24**	-.00
7. Residualized cortisol reactivity							-	.03	.02
8. Residualized cortisol recovery								-	-.08
9. Social Support									-

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 4: Correlation Matrix: Independent, Dependent, and Moderator Variables (Mothers above the diagonal; Fathers below diagonal; Correlation between mother and father variables on the shaded diagonal)

Variable	1	2	3	4	5	6	7	8	9
1. Self-reported conflict frequency	.52**	.40**	-.10	.02	.23**	.14	-.08	.09	-.22**
2. Observed conflict hostility	.18*	.44**	-.13	.30**	.19*	-.05	-.00	.13	-.20*
3. Change in depressive symptoms (T3 CESD – T1 CESD)	.09	-.02	.16 [†]	-.13	.07	-.11	.19*	-.08	.09
4. Parenting negativity	.16 [†]	.04	.15 [†]	.36**	.22*	.12	-.01	-.01	-.08
5. Co-parenting conflict	.14	.01	.01	.21*	.24**	.13	-.14	.05	-.22*
6. Residualized baseline cortisol	.13	.04	-.07	-.10	-.00	.08	-.61**	.22*	-.01
7. Residualized cortisol reactivity	-.09	.08	.19*	.11	-.12	-.47**	-.01	-.00	.04
8. Residualized cortisol recovery	-.13	-.20*	-.13	-.05	-.16	.26**	.06	-.20*	-.18*
9. Social Support	-.14 [†]	-.20*	-.08	-.11	.04	.01	-.02	.04	.41**

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 5: Summary of Hierarchical Linear Models Predicting Parenting Negativity

	Observed Conflict			Self-Reported Conflict		
	B	SE	p	B	SE	p
Control Variables						
Intervention status (0=control, 1=intervention)	-.21*	.10	< .05	-.21*	.10	< .05
Parent age	-.0005	.001	ns	-.0005	.001	ns
Parent education	-.04 [†]	.02	< .10	-.04 [†]	.02	< .10
Pre-natal Conflict Main Effects						
Pre-natal conflict	.30*	.13	< .05	.005	.03	ns
Moderation by Parent Sex						
Pre-natal conflict	.56**	.17	< .01	-.004	.03	ns
Parent sex (0=mother, 1=father)	.44**	.15	< .01	.04	.15	ns
Sex x Conflict	-.51*	.21	< .05	.03	.04	ns
Moderation by Social Support						
Pre-natal conflict	.73*	.34	< .05	.06	.07	ns
Social support	.01	.02	ns	.01	.02	ns
Support x Conflict	-.03	.02	ns	-.003	.005	ns
Moderation by Baseline Cortisol						
Pre-natal conflict	.34*	.15	< .05	.02	.03	ns
Baseline cortisol	-.06	.21	ns	-.43*	.21	< .05
Baseline x Conflict	.22	.31	ns	.14*	.05	< .05
Moderation by Cortisol Reactivity						
Pre-natal conflict	.31*	.15	< .05	.01	.03	ns
Baseline cortisol	.06	.12	ns	.02	.12	ns
Cortisol reactivity	-1.32	3.23	ns	.96	3.13	ns
Reactivity x Conflict	1.91	4.49	ns	-.48	.83	ns
Moderation by Cortisol Recovery						
Pre-natal conflict	.33*	.14	< .05	.01	.03	ns
Baseline cortisol	.08	.13	ns	.03	.13	ns
Cortisol reactivity	.13	1.80	ns	-.62	1.77	ns
Cortisol recovery	-7.13	4.76	ns	-3.23	5.99	ns
Recovery x Conflict	8.74 [†]	5.17	< .10	.70	1.35	ns

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 6: Summary of Hierarchical Linear Models Predicting Co-Parenting Conflict

	Observed Conflict			Self-Reported Conflict		
	B	SE	p	B	SE	p
Control Variables						
Intervention status (0=control, 1=intervention)	-.04	.06	ns	-.04	.06	ns
Parent age	-.0001	.001	ns	-.0001	.001	ns
Parent education	-.02	.02	ns	-.02	.02	ns
Pre-natal Conflict Main Effects						
Pre-natal conflict	.10	.09	ns	.06**	.02	< .01
Moderation by Parent Sex						
Pre-natal conflict	.26*	.13	< .05	.08**	.02	< .01
Parent sex (0=mother, 1=father)	.10	.11	ns	.08	.11	ns
Sex x Conflict	-.29 [†]	.16	< .10	-.04	.03	ns
Moderation by Social Support						
Pre-natal conflict	-.01	.24	ns	.09	.06	ns
Social support	-.01	.01	ns	.002	.01	ns
Support x Conflict	.01	.01	ns	-.002	.004	ns
Moderation by Baseline Cortisol						
Pre-natal conflict	.09	.10	ns	.06**	.02	< .01
Baseline cortisol	.17	.15	ns	-.03	.14	ns
Baseline x Conflict	-.14	.22	ns	.03	.04	ns
Moderation by Cortisol Reactivity						
Pre-natal conflict	.08	.10	ns	.07**	.02	< .01
Baseline cortisol	.01	.08	ns	-.04	.08	ns
Cortisol reactivity	-4.17 [†]	2.45	< .10	-2.85	2.18	ns
Reactivity x Conflict	3.03	3.28	ns	.12	.57	ns
Moderation by Cortisol Recovery						
Pre-natal conflict	.12	.10	ns	.07**	.02	< .01
Baseline cortisol	.02	.09	ns	-.05	.09	ns
Cortisol reactivity	-2.21 [†]	1.30	< .10	-2.77*	1.24	< .05
Cortisol recovery	-6.02 [†]	3.31	< .10	-2.74	3.99	ns
Recovery x Conflict	8.73*	3.62	< .05	.87	.91	ns

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 7: Summary of Hierarchical Linear Models Predicting Change in Depressive Symptoms

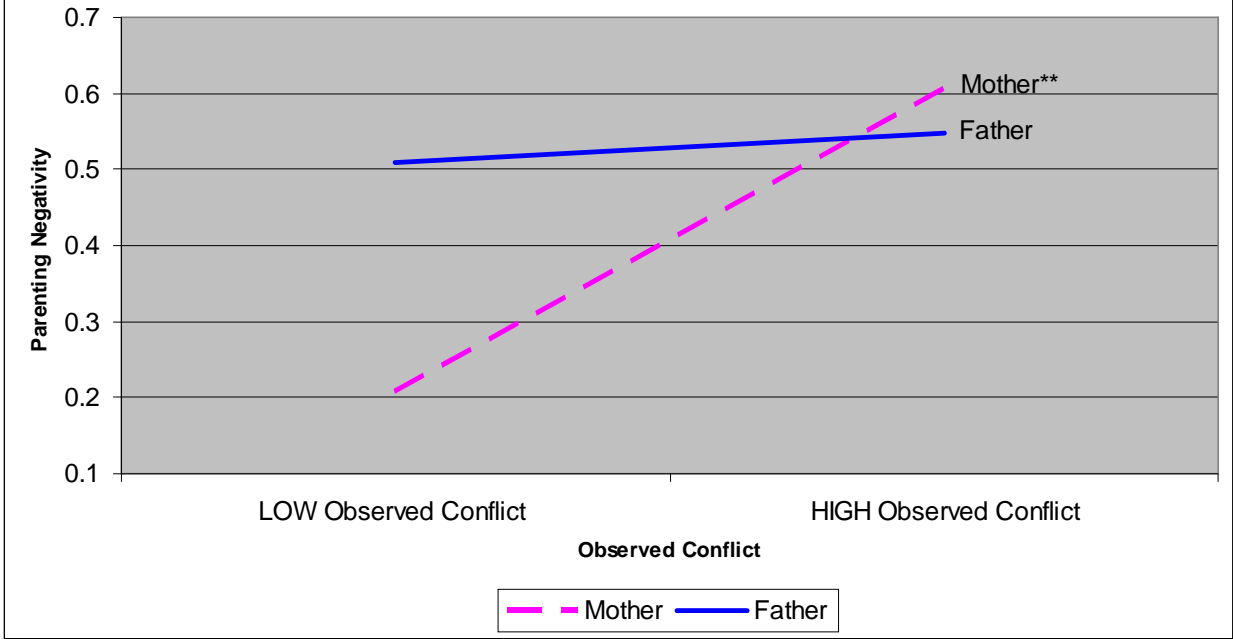
	Observed Conflict			Self-reported Conflict		
	B	SE	p	B	SE	p
Control Variables						
Intervention status (0=control, 1=intervention)	.01	.03	ns	.01	.03	ns
Parent age	.0001	.00	ns	.0001	.00	ns
Parent education	-.001	.01	ns	-.001	.01	ns
Pre-natal depression	.46**	.05	< .01	.46**	.05	< .01
Pre-natal Conflict Main Effects						
Pre-natal conflict	-.01	.04	ns	.01 [†]	.01	< .10
Moderation by Parent Sex						
Pre-natal conflict	-.09	.06	ns	.01	.01	ns
Parent sex (0=mother, 1=father)	-.07	.05	ns	-.01	.05	ns
Sex x Conflict	.15*	.07	< .05	.01	.01	ns
Moderation by Social Support						
Pre-natal conflict	-.09	.11	ns	.02	.02	ns
Social support	-.01	.01	ns	-.002	.01	ns
Support x Conflict	.004	.01	ns	-.001	.001	ns
Moderation by Baseline Cortisol						
Pre-natal conflict	-.03	.04	ns	.01	.01	ns
Baseline cortisol	-.05	.07	ns	-.06	.07	ns
Baseline x Conflict	.06	.10	ns	.01	.02	ns
Moderation by Cortisol Reactivity						
Pre-natal conflict	-.04	.04	ns	.02 [†]	.01	< .10
Baseline cortisol	.03	.04	ns	.01	.04	ns
Cortisol reactivity	1.14	1.03	ns	1.67 [†]	.97	< .10
Reactivity x Conflict	-.19	1.38	ns	-.26	.25	ns
Moderation by Cortisol Recovery						
Pre-natal conflict	-.05	.04	ns	.01	.01	ns
Baseline cortisol	.04	.04	ns	.03	.04	ns
Cortisol reactivity	1.09 [†]	.57	< .10	1.09 [†]	.56	< .10
Cortisol recovery	1.52	1.54	ns	-1.54	1.86	ns
Recovery x Conflict	-3.05 [†]	1.73	< .10	.09	.43	ns

[†] $p < .10$, * $p < .05$, ** $p < .01$

**Figure 2: Observed Pre-natal Couple Conflict x Parent Sex
Predicting Depressive Symptoms at Child Age 1 Year**



**Figure 3: Observed Pre-natal Couple Conflict x Parent Sex
Predicting Parenting Negativity at Child Age 1 Year**



**Figure 4: Observed Pre-natal Couple Conflict x Parent Sex
Predicting Co-parenting Conflict at Child Age 1 Year**

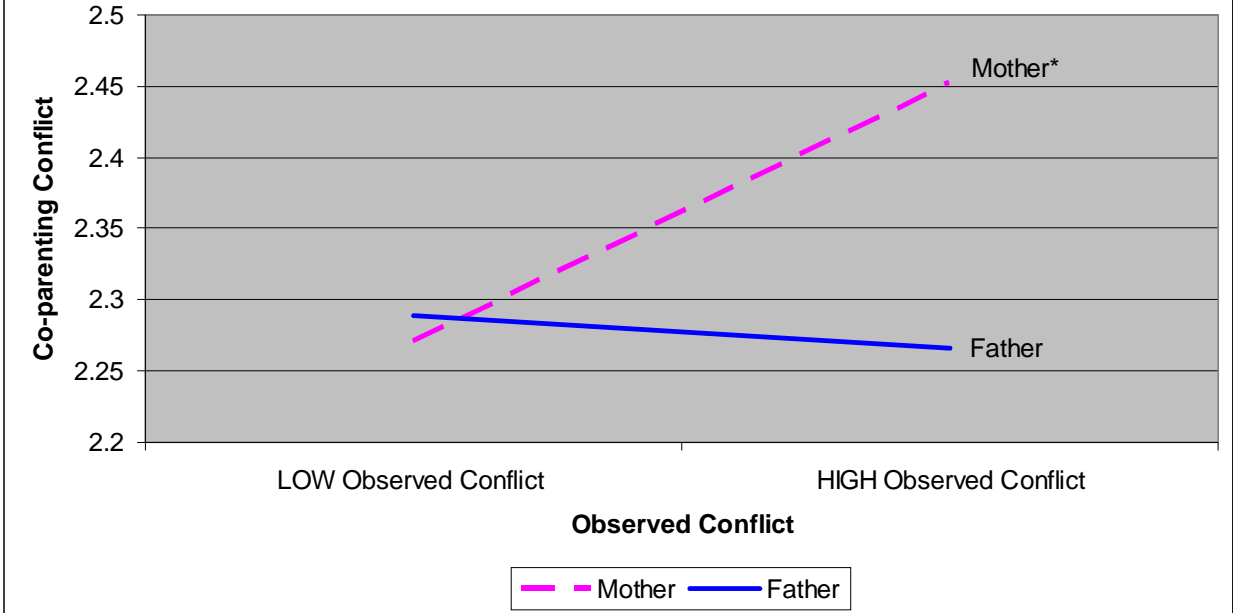


Figure 5: Self-reported Pre-natal Couple Conflict x Baseline Cortisol Predicting Parenting Negativity at Child Age 1 Year

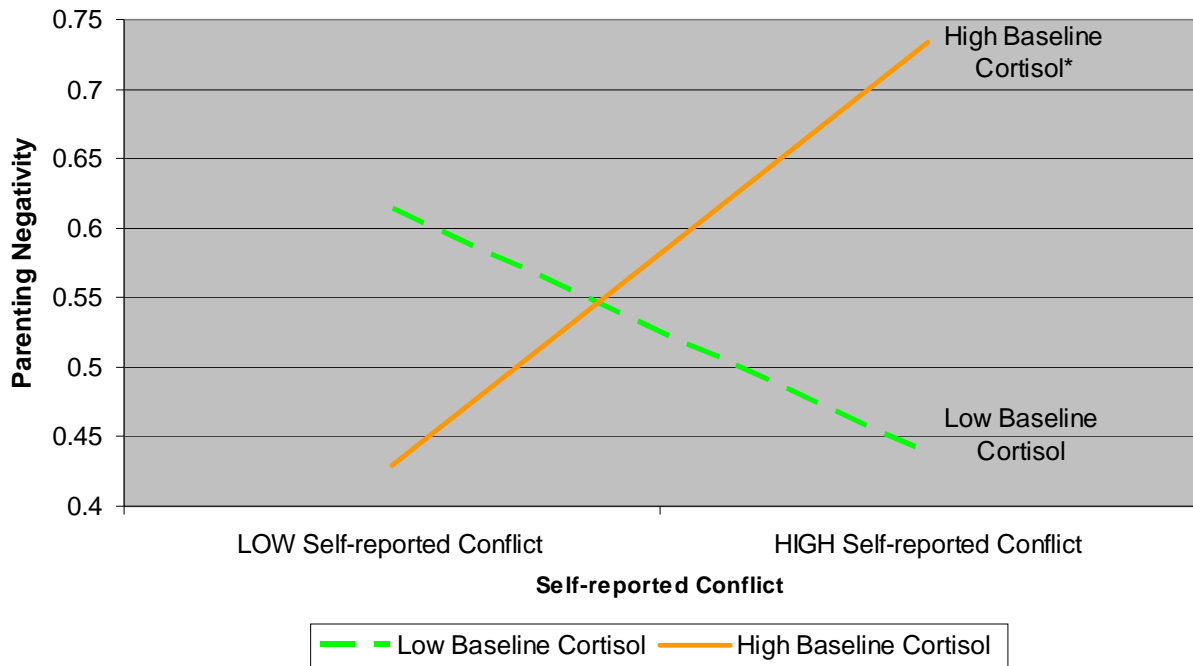


Figure 6: Self-reported Pre-natal Couple Conflict x Absolute Value of Baseline Cortisol Predicting Depressive Symptoms at Child Age 1 Year

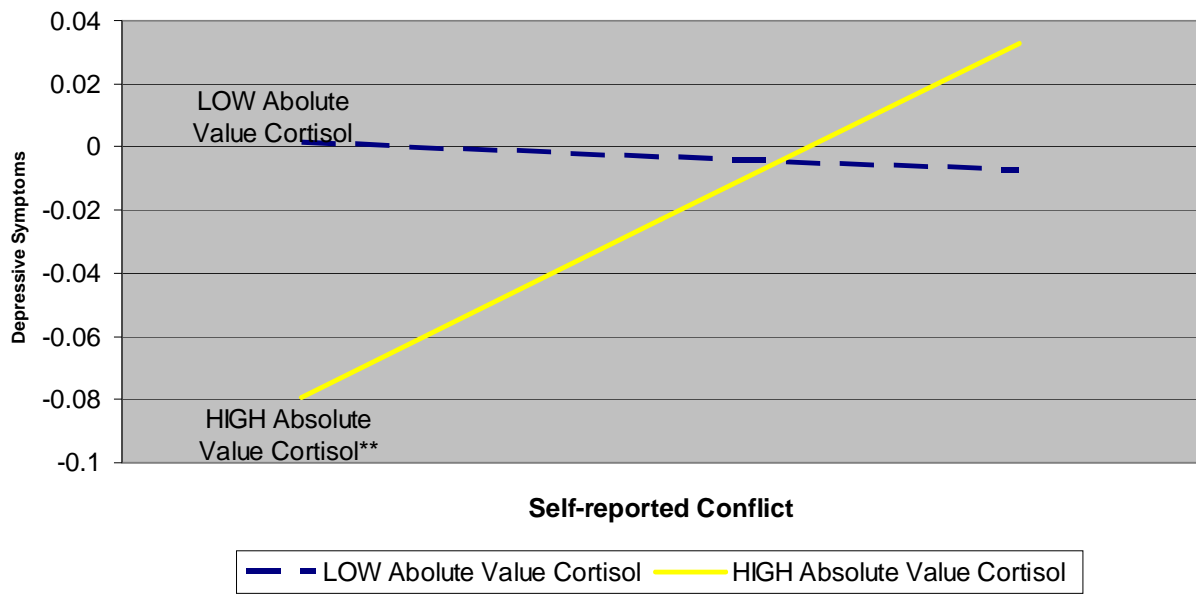


Figure 7: Observed Pre-natal Couple Conflict x Cortisol Recovery Predicts Co-parenting Conflict

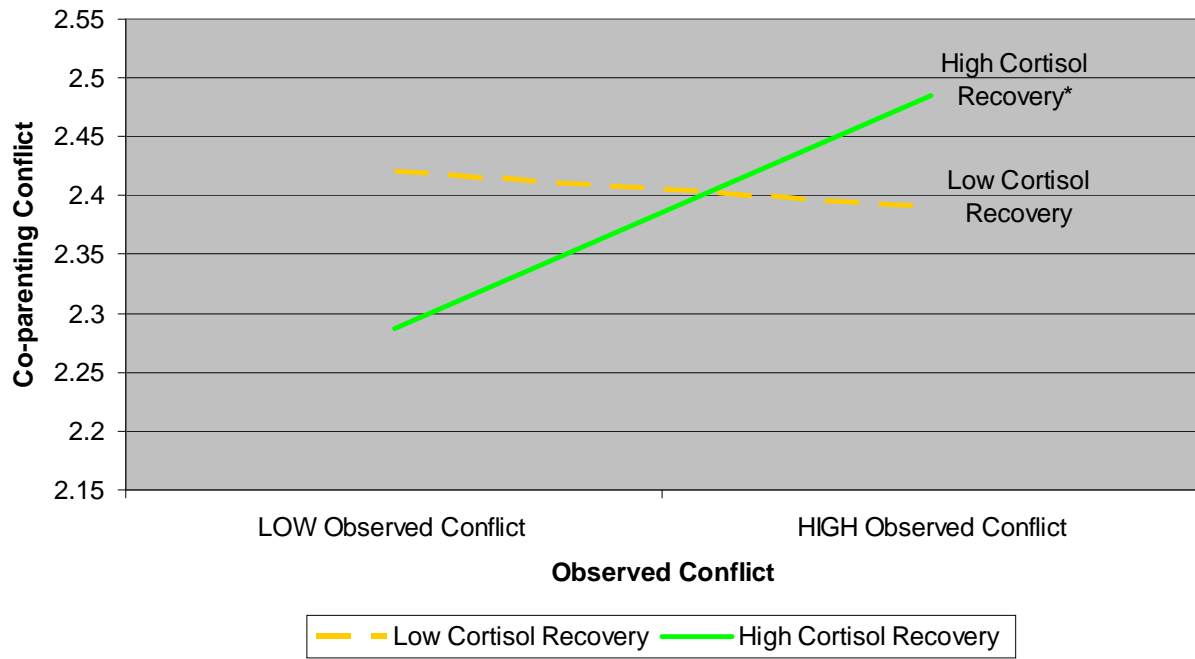


Figure 8: Observed Pre-natal Couple Conflict X Cortisol Recovery Predicting Depressive Symptoms at Child Age 1 Year

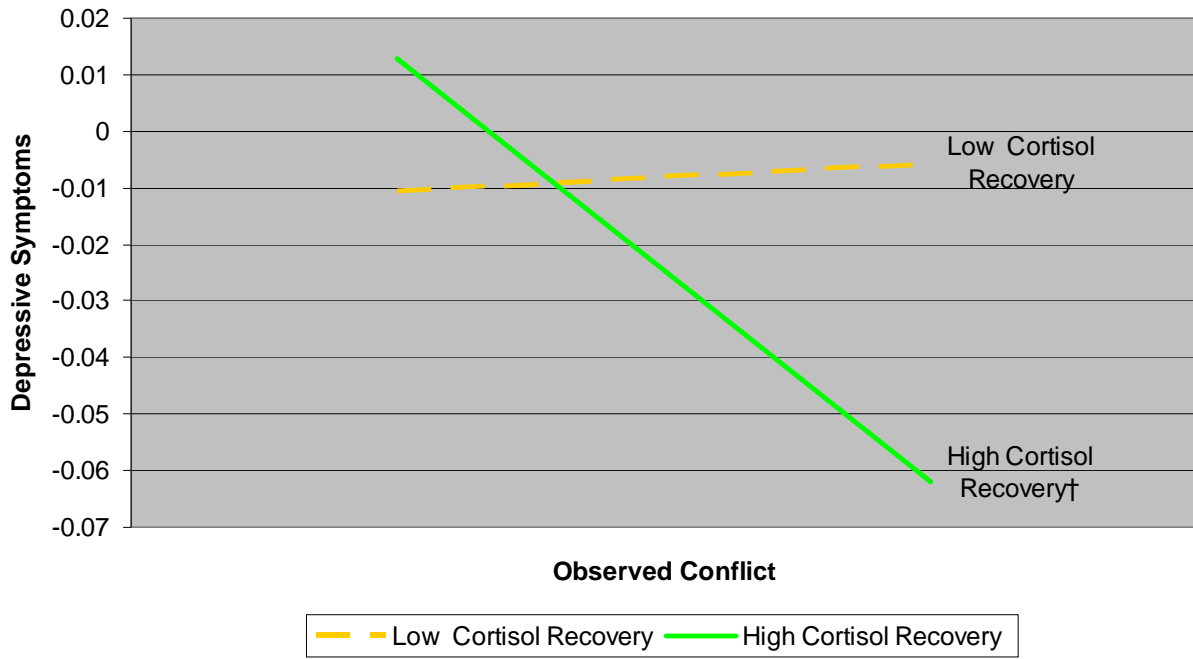
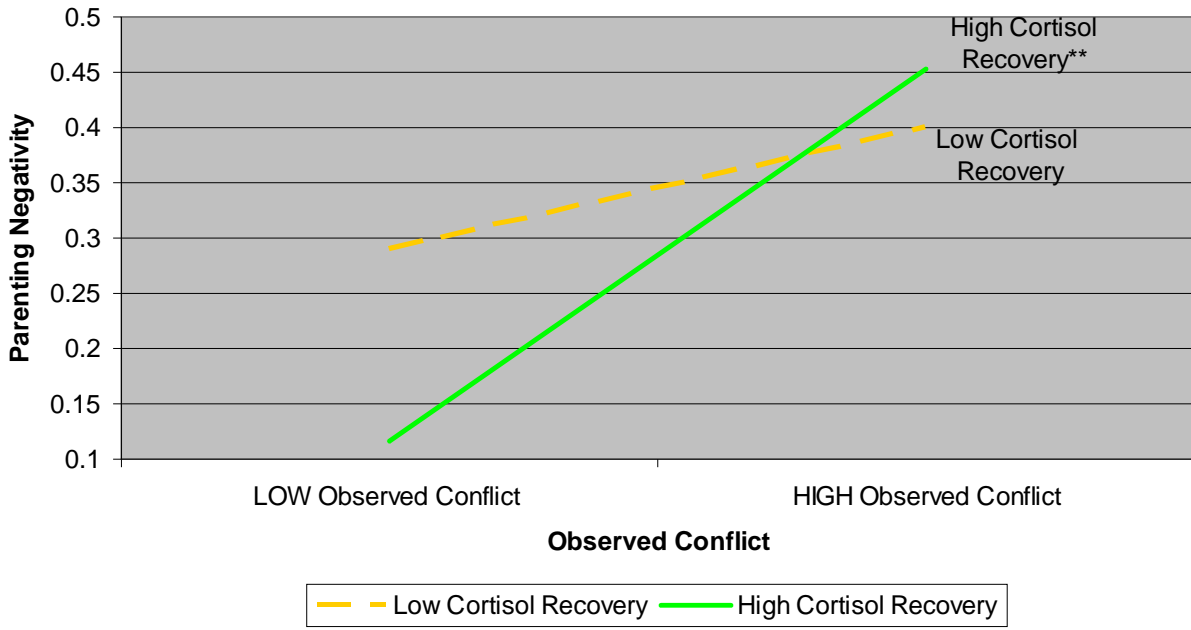


Figure 9: Observed Pre-Natal Couple Conflict X Cortisol Recovery Predicting Parenting Negativity at Child Age 1 Year



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- Booth, A., **Goslin, M. C.**, Johnson, D., & Granger, D. (under revision). Cortisol Concordance within Families and the Moderating Role of Relationship Quality.
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