

ACTOR AND PARTNER EFFECTS IN RELATIONSHIPS AMONG
MATERNAL/PATERNAL PARENTING BEHAVIORS AND MATERNAL/PATERNAL
PERCEPTIONS OF CHILD AGGRESSION IN EARLY CHILDHOOD

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ABSTRACT

ACTOR AND PARTNER EFFECTS IN RELATIONSHIPS AMONG MATERNAL/PATERNAL PARENTING BEHAVIORS AND MATERNAL/PATERNAL PERCEPTIONS OF CHILD AGGRESSION IN EARLY CHILDHOOD

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Family systems theory suggests that there are interrelationships among subsystems in the family over time, including the parenting subsystem. As such, parenting may be characterized in terms of the stability of a parent's behavior over time such that a parent's behavior influences his/her subsequent behavior, known as a spillover process. Likewise, the effects of one parent's behavior on the other parent are salient and reflect crossover processes. Methodological approaches testing systemic effects in family research, specifically the Actor-Partner Interdependence model (APIM), term spillover as "actor" effects and crossover as "partner" effects. Based on family systems theory and utilizing APIM, this dissertation examined mothers' and fathers' parenting behaviors and perceptions of child behaviors. Specifically, the purposes of this dissertation were to (1) examine actor and partner effects in the stability of maternal and paternal parenting from 24 months to 36 months (Study 1; $N = 151$ mother-father dyads); (2) examine actor and partner effects in the relationship between maternal/paternal parenting behaviors (positive/negative) at 36 months and maternal/paternal perceptions of child aggression at 5 years (Study 2; $N = 114$ mother-father dyads). Data were drawn from the Early Head Start Research and Evaluation Project (EHSREP) and the Father and Child Interaction during Toddlerhood Sub-study (FACITS; a substudy of the EHSREP). Mothers and fathers included in the two studies resided with the child and were in a relationship together.

Two actor-partner interdependence models (i.e., positive parenting model, negative parenting model) were analyzed by using Bayesian Structural Equation Modeling (BSEM) for each study. In the positive parenting model of Study 1, actor effects were found for both mothers and fathers. In terms of partner effects, fathers' positive parenting behaviors at 24 months positively predicted mothers' positive parenting behaviors at 36 months. In the negative parenting model of Study 1, only mothers had significant actor effects and mothers' negative parenting behaviors at 24 months positively predicted fathers' negative parenting behaviors at 36 months. In Study 2, mothers' positive parenting behaviors at 36 months marginally predicted fathers' perceptions of child aggression at 5 years. Crossover effects between mothers and fathers were not found in both studies, indicating that systems in families are more complex and there might be some other influences in family dynamics which I could not explain in the current studies.

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CHAPTER 1

INTRODUCTION

According to family systems theory (Bowen, 1978), families are systems composed of subsystems, including the mother-father dyad. These subsystems in the larger family system continuously shift. In other words, individuals in families continuously change through interactions with other family members across time. The interrelationships and reciprocities between subsystems are the sources which trigger change in individuals (Bavelas & Segal, 1982; Broderick, 1993; Cox & Paley, 2003; Miller, Ryan, Keitner, Bishop & Epstein, 2000). In the current study, individual change includes shifts in mothers' and fathers' parenting behaviors in relation to each other. Family systems theory is the theoretical framework which highlights the importance of examining systems, rather than individuals, in order to better understand behavior and development in the context of the family.

As open systems in a family, interactions between mothers and fathers are thought to shape their parenting behaviors (Barnett, Deng, Mills-Koonce, Willoughby & Cox, 2008) and their perceptions of their children (Dijksterhuis & Bargh, 2001). Specifically, interactions between family members are interdependent such that the behaviors and perceptions of one person impact the behaviors and perceptions of another person (Dijksterhuis & Bargh, 2001). In the case of the current studies, mothers' and fathers' behaviors and perceptions are expected to influence each other. The systems literature defines this process as reflecting crossover and spillover effects (Bakker & Demerouti, 2013). As will be explained in detail, the term "spillover effects" generally refer to an intra-individual transmission of behavior and "crossover effects" refer to an inter-individual transmission of behavior between persons.

Examining such spillover and crossover effects is critical given the role of parenting in children's outcomes. Mothers and fathers reflect salient systems which influence the development of children in a family context. A wealth of research has shown that mothers' and fathers' parenting behaviors are significant predictors of children's behavior problems (e.g. Besnard, Verlaan, Davidson, Vitaro, Poulin & Capuano, 2012; Gryczkowski, Jordan & Mercer, 2010; Martin, Ryan & Brooks-Gunn, 2010; Stover et al., 2012; Verhoeven, Junger, Van Aken, Dekovic & Van Aken, 2010). However, there has been insufficient research to date on the spillover and crossover effects of maternal and paternal parenting on maternal/paternal perceptions of children's behavior problems. Existing studies have typically obtained parenting and perception data only from one parent (either mothers or fathers) or created a single composite based on mothers' and fathers' data for each variable of the study (e.g., combining mothers' and fathers' parenting scores, creating a single perception score of child behaviors by summing or averaging ratings of mothers and fathers) (Cook & Kenny, 2005; Phares et al., 2005). These approaches are limited because the interdependence among maternal/paternal parenting behaviors and maternal/paternal perceptions toward their child (reflected in crossover and spillover effects within the parental dyad) are ignored.

This dissertation aims to embrace the dyadic nature of maternal and paternal parenting by examining spillover and crossover effects among mothers' and fathers' parenting behaviors and their perceptions of child aggression. Studies in this dissertation explored two dyadic models utilizing mother-father dyadic data via the actor-partner interdependence model (APIM) (Kenny, Kashy & Cook, 2006). This study takes advantage of the methodological strengths of the actor-partner interdependence model (APIM)--an effective statistical model for dyadic data, in that the interdependence of dyadic family members can be explained (Kenny et al., 2006). Dyadic data

are those data best understood within the context of the larger system. Thus, mothers' parenting is best understood in the contexts of fathers' parenting and vice-versa. Bayesian Structural Equation Modeling (BSEM) is used to investigate two actor-partner interdependence models. Using BSEM shares the benefits of Bayesian analysis with those of the Structural Equation Modeling (SEM) approach. First, Structural Equation Modeling (SEM) is a commonly used technique for the actor-partner interdependence model (APIM) with dyadic data (Kenny et al., 2006). Second, a Bayesian analysis is an advanced estimation to appropriately handle characteristics of the data in the current study (e.g., small sample size, skewness of variables). In particular, Bayesian analysis supports the running of Structural Equation Modeling (SEM) with small sample sizes (Muthén & Asparouhov, 2012). In addition, the Bayesian approach is tailored to allow for data analysis with non-normally distributed data (Muthén & Asparouhov, 2012; Schoot et al., 2014; Schoot & Depaoli, 2014).

This dissertation consists of two studies. The first study accounts for how mothers' and fathers' parenting (positive/negative) behaviors affect their own (spillover processes termed actor effects) and their partner's (crossover processes termed partner effects) parenting (positive/negative) behaviors when toddlers are 24 months old and then when they are 36 months old. The first study deals with the dyadic parenting experience of both mothers and fathers during toddlerhood. The second study of this dissertation examines how maternal/paternal (positive/negative) parenting behaviors at 36 months influence their own (actor effects) and their partners' (partner effects) perceptions of children's social development at 5 years of child age. In particular, I focus on maternal and paternal perceptions of child externalizing behavior problems—aggression—as outcomes for the model (see Figure 1). Spillover and crossover processes in parenting, termed actor and partner effects, are depicted in Figure 2.

Parenting is a complex construct in which behaviors function differently in their relations to child development, and the field is moving away from characterizations of parenting as being either “good” or “bad”. However, for the sake of this study, the categories of positive and negative parenting were used for the following reasons: first of all, using the concepts of positive and negative parenting gives researchers a chance to look at a broad picture about how maternal and paternal parenting are functionally related to each other. Specifically, this is the first step in looking at overall parenting differences in the actor-partner interdependence models so that the finding of the current study will inform future examinations of multiple components of parenting in dyadic models. Second, previous studies regarding maternal and paternal parenting provide examples of categorizing parenting into positive or negative parenting behaviors (e.g., Barnett et al., 2008; Besnard et al., 2012; Cabrera, Shannon & Tamis-LeMonda, 2007; Karreman, van Tuijl, van Aken & Deković, 2008; Tamis-LeMonda, Shannon, Cabrera & Lamb, 2004). For the purpose of this writing, positive parenting is defined as "supportive parenting behaviors such as sensitivity, positive regard, stimulation of cognitive development" and negative parenting is defined as "less effective parenting behaviors such as detachment, intrusiveness, and negative regard".

This dissertation is a multiple-study format. The first study (Chapter 2) focuses on actor and partner effects in the relationship between maternal and paternal parenting behaviors in toddlerhood (Study 1). The second study (Chapter 3) focuses on actor and partner effects in the relationship between maternal/paternal parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years (Study 2). Chapters 2 and 3 each have their own literature review, method, results and discussion sections, respectively. Each study notes what its

unique contribution to the literature is in chapter 2 and 3. Chapter 4 is a combined conclusion for Study 1 and Study 2.

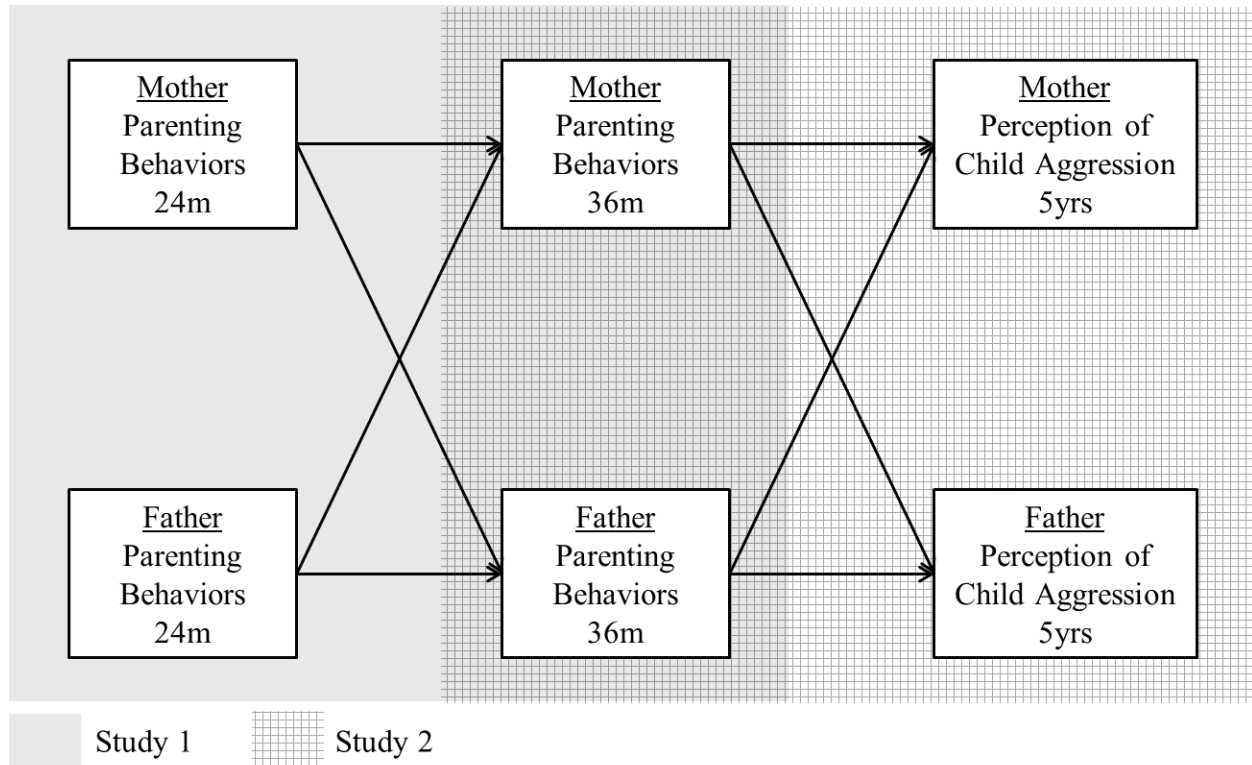


Figure 1. Conceptual Model.

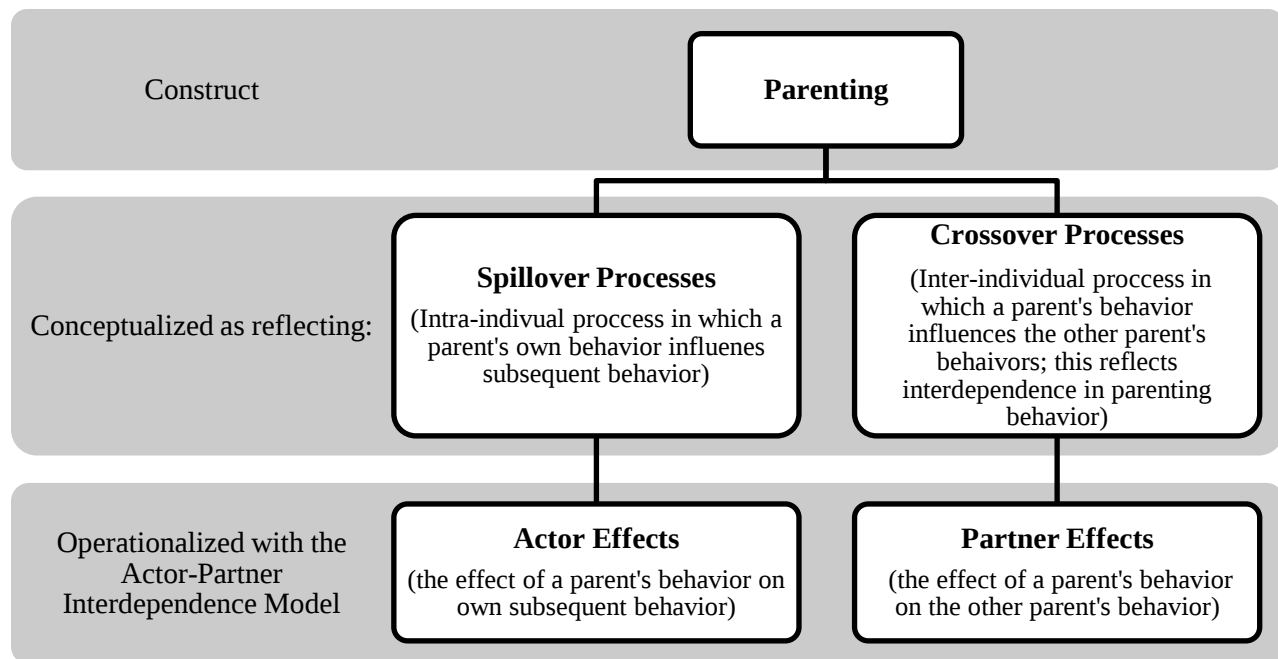


Figure 2. General Model for Parenting and its Conceptual and Operational Definitions

CHAPTER 2

STUDY 1: ACTOR AND PARTNER EFFECTS IN THE RELATIONSHIP BETWEEN MATERNAL AND PATERNAL PARENTING BEHAVIORS IN TODDLERHOOD

Literature Review for Study 1

Over the course of the first three years of their children's lives, parents have major tasks in developing their parenting styles. Several studies suggest that it is during toddlerhood that parenting styles become stable (Dallaire & Weinraub, 2005; Verhoeven et al., 2007). This study focuses on toddlerhood because it marks the period in parenting when parenting behaviors are thought to reflect stabilized styles of parenting for the first time (Barlow et al., 2005; Dallaire & Weinraub, 2005; Waylen & Stewart-Brown, 2010). Stability in early parenting, however, must also be considered from systems perspectives which underscore the bidirectional influences of mothers' and fathers' behaviors on each other. Examining such bidirectional influences on the stability of parenting provides a more robust perspective on the cumulative effects of parenting that influence children's later development (Maccoby, 2000). In fact, a wealth of research has shown that parents' parenting behaviors are significant predictors of children's outcomes—cognitive development (e.g. Cabrera, Fagan, Wight & Schadler, 2011; Magill-Evans & Harrison, 2001; Pancsofar & Vernon-Feagans, 2006; Tamis-LeMonda et al., 2004) and social development in early childhood (e.g., Besnard et al., 2012; Cabrera et al., 2011; Karreman et al., 2008; Lunkenheimer, Olson, Hollenstein, Sameroff & Winter, 2011). I argue that stability in parenting reflects not only parents' growing mastery of their parenting experience but that more importantly, stability also reflects the “spillover” of parenting behavior from one time point to the next. Considering spillover effects for explaining stability of parenting is important because

it provides more completed pictures compared to describing only growing changes of parenting behaviors of parents.

In the following sections, I begin by reviewing the general literature on stability in parenting. Next, I turn to system perspectives on the examination of parenting behavior, including crossover effects in examining mothers' and fathers' parenting. Finally, I will discuss the implications of this systems-based research for the study of the stability of mothers' and fathers' early parenting behaviors.

Stability of Maternal and Paternal Parenting Behaviors during Toddlerhood

Stability of parenting behaviors examines the degree to which each parent's parenting behaviors is stable over time. Because parenting styles and practices generally are settled in toddlerhood (Dallaire & Weinraub, 2005; Verhoeven et al., 2007), a high level of stability of parenting behaviors may be often reported during this period. In particular, parenting behaviors of each parent at the beginning of toddlerhood are closely related to their own subsequent parenting behaviors in early childhood (Dallaire & Weinraub, 2005; Huang, Caughy, Lee, Miller & Genevro, 2009; Verhoeven, Junger, Van Aken, Dekovic & Van Aken, 2007). For instance, mothers' early positive parenting behaviors (e.g., sensitive and stimulating parenting behaviors) at 15 months are highly correlated with their later positive parenting behaviors from toddlerhood to preschool years--24, 36 and 54 months (Dallaire & Weinraub, 2005). In terms of negative parenting behaviors, mothers report moderate stability in negative parenting behaviors (e.g., punitive discipline) during toddlerhood (i.e., from 16-18 month to 34-37 months) (Huang, Caughy, Lee, Miller & Genevro, 2009). Mothers' parenting (both positive and negative parenting) have a tendency to be stable over time during toddlerhood, although mothers are generally more engaged in responsive and supportive parenting than negative aspects of

parenting behaviors (Dallaire & Weinraub, 2005). Verhoeven et al.'s study (2007) consistently reported the high stability of all five parenting facets (i.e., support, structure, positive discipline, psychological control, physical punishment) over three waves (i.e., 17, 23 and 29 months). Stability of positive and negative parenting behaviors is similarly high for both mothers and fathers, indicating that mothers' and fathers' positive/negative parenting behaviors are stable during toddlerhood (Verhoeven et al., 2007).

Earlier parenting behaviors are an important cue to predict subsequent parenting behaviors. Thus, some researchers have explained stability of parenting behaviors by looking at the prediction of earlier parenting behaviors on later parenting behaviors (Dallaire & Weinraub, 2005; Else-Quest, Clark & Owen, 2011). Maternal parenting behaviors (i.e., parenting construct with 4 indicators: sensitivity, stimulation, negative regard and detachment) at 15 months positively predict consecutive parenting behaviors in toddlerhood (i.e., 24, 36 and 54 months) (Dallaire & Weinraub, 2005). Similarly, Else-Quest et al. (2011) reported that all positive (i.e., positive affect, sensitivity and scaffolding) and negative (i.e., negative affect and intrusiveness) aspects of mothers' parenting behaviors at 1 year positively predicted those of mothers' parenting behaviors at 4.5 years. Stability of mothers' positive parenting behaviors is stronger than that of negative parenting behaviors (Else-Quest et al., 2011).

In sum, previous research have supported that there exist high levels of parenting stability during toddlerhood, which means parents' earlier parenting behaviors are robust evidence which serve to account for their parenting behaviors at later years. Because most studies regarding parenting stability include not both parents, but only mothers, the current study, which considers both mothers and fathers with dyadic perspectives, would contribute to research for parenting stability in toddlerhood. Moreover, the unique contribution of this study lies in the exploration

of why parenting is likely stable across time. As noted, I posit that spillover processes illustrate the process through which a parent's behaviors likely remain stable. Pursuant to this point, I turn next to systemic perspectives on parenting, including the implications of systemic perspectives for the study of stability in parenting.

Mothers' and Fathers' Parenting Behaviors: Family System Theory

In general, parenting studies have ignored the systemic nature of parenting and traditionally have been more focused on associations between mothers and children's child outcomes. About two decades ago, however, scholarship began to focus more intensively on fathering. Specifically, researchers have been paying more attention to the role of fathers as co-caregivers who affect children's development (Lamb, 2010) and, as such, research studies on fathers and studies examining parenting in mothers and fathers became more prevalent. This shift in parenting research contributed to an appreciation for the importance of understanding the effects of both parents' parenting on child development in family contexts, rather than looking at the individual influence of maternal or paternal parenting on children's development (Lewis & Lamb, 2003; Lamb, 2010). In particular, needs for studies which investigate the causal processes of reciprocal relationships between family subsystems are increasing (Cox & Paley, 2003). Specifically, parenting research benefits from a dyadic approach, one in which mothers and fathers are considered as subsystem in the family with each parent influencing the other's parenting behavior.

Parenting behaviors of both mothers and fathers need to be considered together from a systemic perspective. Family system theory suggests that each family member has unique relationships with other family members and that these relationships continuously influence other relationships which occur inside and outside of families (Bowen, 1978; Cox & Paley,

2003). Parents are crucial subsystems for children, and one parent's dyadic relationship with his/her child interacts mutually with the partners' relationship with the child (Bavelas & Segal, 1982; Broderick, 1993; Cox & Paley, 2003; Miller, Ryan, Keitner, Bishop & Epstein, 2000).

Processes of the interrelationships between parents and their parenting can be explained theoretically based on the spillover hypothesis and crossover hypothesis. The spillover hypothesis refers to an intra-individual transmission of behavior (Bakker & Demerouti, 2013). Spillover effects are the processes through which an individual's affect or behaviors in a certain context/domain transfer his/her own affect or behaviors in another context/domain. For example, the spillover hypothesis is often adapted in work-family research which investigates how one parent's stress at work transfers to his/her own family life at home (e.g., Demerouti, 2012; Demerouti, Bakker & Schaufeli, 2005; Thompson, Kirk & Brown, 2005; Rodríguez-Muñoz, Sanz-Vergel, Demerouti & Bakker, 2014). However, the process of spillover is relevant to the study of stability in parenting as well. In the current study, the spillover hypothesis suggests that a parent's own parenting behaviors at one time point would be related to subsequent parenting at a later time point (i.e., intra-individual transmission). Thus, the term "stability" reflects the intra-individual transmission or spillover of parenting across time.

The crossover hypothesis refers to the inter-individual transmission (Bakker & Demerouti, 2013). In a family context, the crossover hypothesis accounts for the reciprocity between subsystems. For example, mothers' family stress transfers to and affects fathers' responses to children's negative emotions. Accordingly, fathers' family stress impacts mothers' responses to negative emotions of children (Nelson, O'Brien, Blankson, Calkins & Keane, 2009). The crossover hypothesis explains the bidirectional relationship between mothers and fathers (Newland, Ciciolla & Crnic, 2014). In the current study, the interdependence between

maternal/paternal parenting behaviors at 24 months and maternal/paternal parenting behaviors at 36 months can be theoretically understood by the crossover hypothesis.

Crossover Effects between Maternal Parenting Behaviors and Paternal Parenting Behaviors

The purpose of this section is to review the existing literature on relations between maternal parenting behaviors and paternal parenting behaviors from a systemic dyadic perspective. Research studies which included both fathers and mothers of children in early childhood were chosen to be reviewed in this section.

Research regarding the interdependence of maternal and paternal parenting (i.e., crossover effects between mothers' and fathers' parenting) is rarely found in the literature. As a first step in understanding the association between maternal and paternal parenting behaviors, research providing evidence of the interrelationship between mothers' and fathers' parenting behaviors from correlational studies is reviewed. Studies on maternal and paternal parenting have consistently reported that maternal parenting behaviors and paternal parenting behaviors are correlated (Barnett et al., 2008; Karreman et al., 2008; Martin et al., 2007; Murdock et al., 2014; Sturge-Apple, Davies, Cicchetti & Cummings, 2009; Verhoeven et al., 2010). For example, positive parenting of mothers (e.g., parental support, sensitivity, cognitive stimulation, positive regard, responsiveness and warmth) is positively correlated to positive parenting of fathers, indicating that mothers' high level of positive parenting is correlated to high level of paternal positive parenting, and vice-versa. Accordingly, the negative parenting behaviors of mothers and of fathers (e.g., intrusiveness, detachment, negative regard, psychological control, harsh parenting and inconsistency) are positively correlated (Barnett et al., 2008; Karreman et al., 2008; Martin et al., 2007; Murdock et al., 2014; Sturge-Apple et al., 2009; Verhoeven et al.,

2010). That is, one parent's high level of negative parenting correlates with his/her partner's high level of negative parenting. These findings suggest that mothers and fathers share more similarities than differences in parenting behaviors, regardless of its direction (i.e., positive or negative). In addition, these consistent results support the idea that maternal and paternal parenting behaviors are interrelated with each other. However, longitudinal correlations between maternal and paternal parenting behaviors, along with the matter of who initiates and causes their partners' parenting behaviors among couples, were rarely addressed or examined in these studies. Because comparisons between current correlations between mothers' and fathers' parenting and future correlations between maternal and paternal parenting behaviors do not account for stability of parenting over time, it is not guaranteed that current correlations remain continuously and will be similarly shown in future parenting between mothers and fathers.

Beyond correlations between mothers' parenting and fathers' parenting behaviors, researchers have investigated the causal relationship between maternal and paternal parenting behaviors considering the perspective of family system theory. Existing work suggests the stronger influence of mothers' parenting behaviors on fathers' parenting behaviors (Maroto-Navarro et al., 2013; Wang, 2013). For example, more negative parenting behaviors of mothers (e.g., intrusiveness and negative regard in interaction with the child) positively predict fathers' negative parenting regardless of parents' marital quality; however, fathers' negative parenting does not influence mothers' negative parenting behaviors (Barnett et al., 2008). This finding highlights the idea that maternal parenting behaviors and mothers' perceptions regarding marriage may more heavily influence paternal parenting and perceptions than vice-versa across positive and negative parenting behaviors. It may be because mothers tend more to do gatekeeping, or because mothers may be more likely to be socialized to believe that they are

more effective parents than fathers are. Mothers' roles as primary caregivers may also explain this relationship. For instance, studies regarding coparenting and maternal gatekeeping (Allen & Hawkins, 1999; Pedro, Ribeiro & Shelton, 2012; Schoppe-Sullivan, Brown, Cannon, Mangelsdorf & Sokolowski, 2008) consistently highlight the role of mothers as primary caregivers. They argue that mothers initiate developing their own parenting behaviors and manipulate their partners' parenting behaviors; this suggests that mothers hold a dominant position in terms of parenting practices (Allen & Hawkins, 1999; Pedro et al., 2012; Schoppe-Sullivan et al., 2008).

Even though the current study does not focus on the marital relationships of mothers and fathers, reviewing parenting studies, along with parents' marital relationships, helps us to understand the dynamics of mother-father interactions in a family context. Each parent's marital quality (including the concepts of marital satisfaction and marital conflict) is a factor which influences the interrelation between maternal parenting and paternal parenting (Barnett et al., 2008; Pedro et al., 2012; Schoppe-Sullivan et al., 2008). In Barnett et al.'s study, interdependence of positive parenting behaviors between mothers and fathers was found when parents showed higher levels of marital satisfaction. Marital quality is a moderating factor influencing the relationship between maternal sensitive parenting and paternal positive parenting. If mothers are satisfied with their marriages, they tend to engage in higher quality of coparenting, and their sensitive parenting predicts positive parenting behaviors (e.g., sensitivity and positive regard, cognitive stimulation) in their partners. Accordingly, fathers' positive parenting positively influences mothers' positive parenting only when fathers report higher levels of marital quality (Barnett et al., 2008). This result highlights the bidirectional relationship between

maternal and paternal parenting behaviors while couples are satisfied with their marriage and relationship.

Unlike Barnett et al. (2008)'s findings, those of Pedro et al. (2012) stress that mothers' opinions of their marriages' quality are more influential on the relationship between maternal positive parenting and paternal positive parenting than those of fathers. In particular, mothers' marital satisfaction significantly affects fathers' positive parenting practices (e.g., emotional support), whereas fathers' marital satisfaction does not predict mothers' parenting behaviors when mothers are happy with their children's fathers. However, if the quality of the marital relationship is low, mothers tend to withdraw or exclude fathers from parenting activities (Pedro et al., 2012; Schoppe-Sullivan et al., 2008). These findings support the idea that mothers tend to play more of a role as gatekeepers in the family (Allen & Hawkins, 1999; Schoppe-Sullivan et al., 2008), which means that fathers' parenting behaviors may be more heavily influenced by the parenting beliefs of their partners. For example, fathers tend to engage more in positive parenting behaviors, as their partners strongly believe that parenting is the significant factor in promoting child development (Simons, Whitbeck, Conger & Melby, 1990).

Previous research has shown that the relationship between maternal and paternal positive parenting behaviors is different from the relationship between maternal and paternal negative parenting behaviors in that the quality of marital relationship (i.e., marital satisfaction and marital conflict) tends to closely affect positive parenting behaviors but not negative parenting behaviors. It is clear that parents can show optimal capacity of positive parenting when the quality of their relationship with their partner is high (Barnett et al., 2008; Pedro et al., 2012). However, if they are distressed or depressed due to other circumstances, providing positive parenting behaviors to their children can be more challenging because intentional efforts of

parents are required to treat their children positively in this situation (e.g., regulating parental negative emotions). Relative to positive parenting behaviors, negative parenting behaviors may be habitual and unconscious behaviors regardless of parents' psychological conditions. In this regard, dyadic effects of maternal and paternal negative parenting behaviors can be more apparent in the previous research, regardless of the conditions in the marital relationship.

Although Barnett et al. (2008)'s study sheds light on the dyadic interdependence between maternal and paternal parenting (positive/negative) behaviors, the cross-sectional nature of their study did not allow for the exploration of longitudinal dyadic relationships between mothers' parenting and fathers' parenting. As a result, the systemic, longitudinal perspectives about interrelations between maternal and paternal parenting behaviors have not been addressed. It is important to investigate spillover and crossover effects at multiple time points, because parenting behaviors of both mothers and fathers have been shaped and changed through interaction between mothers and fathers over time, and parental dyadic effects of parenting practices on child outcome may be influenced differently, depending on longitudinal change of mothers' and fathers' parenting behaviors (Besnard et al., 2012).

Factors which Influence Maternal and Paternal Parenting Behaviors

In this section, I discuss characteristics which I need to consider when studying maternal and paternal parenting behaviors. In the dissertation substudies, these characteristics were considered to be covariates. Belsky (2005) argued that there are several social-contextual factors which come into play to shape and determine parenting behaviors. He categorized the social contextual factors into: child characteristics, parental characteristics and social relations which occur through inter-social interactions. In the current study, based on Belsky's model, I consider family race, child gender, and child temperature to be characteristics of children. Parents'

parenting stress and risk factors can be considered to be characteristics of parents as well as social-contextual factors which occur due to social interactions. Family race (Ho et al., 2008; Kotchick & Forehand, 2002), child gender (Kopala-Sibley, Zuroff & Koestner, 2011; Lundberg, 2005; Maccoby, 2003; McKee et al., 2007; Raley & Bianchi, 2006), child temperament (Belsky, 1984; Kiff, Lengua & Zalewski, 2011; Verhoeven et al., 2007), parents' risk factors (Burchinal, Vernon-Feagans & Cox, 2008; Cabrera et al., 2011; Verhoeven et al., 2007) and parents' parenting stress (Crnic, Gaze & Hoffman, 2005; Deater-Deckard, 2008) have been empirically discussed in previous research as characteristics which influence parents' parenting behaviors. Thus, it was logical in the current study to control for these influences on parenting to better parcel out the spillover and crossover relationships of interest. In subsequent work, the full contributions of such characteristics may be examined. However, the initial step in the current study is to isolate and define spillover and crossover processes.

Family race/ethnicity. Each family establishes and shares different values and beliefs depending on the race/ethnicity (cultural context) of the family. A family's ethnicity is the one of the significant socio-emotional factors which makes for variations in parenting behaviors of parents (Ho et al., 2008; Kotchick & Forehand, 2002). Kotchick & Forehand (2002) noted that the possibility of ethnic minorities facing risks and lack of resources is high and that these adverse environments affect their parenting styles and parenting practices.

Child gender. Research findings regarding maternal and paternal parenting consistently reports that fathers and mothers treat their children differently, depending on child gender (Lundberg, 2005; Maccoby, 2003; Paquette, 2004; Raley & Bianchi, 2006). Generally, mothers tend to spend more time with their preschool daughters (Moon & Hoffman, 2003) and fathers share their time with their sons more than with their daughters during toddlerhood (Rouyer,

Frascarolo, Zaouche-Gaudron & Lavanchy, 2007). Gender differences among parent-child dyads (i.e., mother-daughter dyads, mother-son dyads, father-daughter dyads and father-son dyads) are more apparent when a child reaches preschool years. For example, types of verbal communication between parent-child are similar between boys and girls during toddlerhood (Lindsey, Cremeens & Calder, 2010; Rowe, Coker & Pan (2004). Fathers respond to their daughters more sensitively at 24 months, whereas mothers treat sons and daughters similarly (Tamis-LeMonda et al., 2004). During the preschool years, on the other hand, mothers and fathers are more likely to differentiate their parenting behaviors for daughters and sons. Both mothers and fathers talk more with girls than with boys about emotions when their child reaches preschool age (Fivush, Brotman, Buckner & Goodman, 2000). Mothers are more likely to control their daughters' behaviors than sons' at child aged 5 years (Kopala-Sibley et al., 2011), whereas, fathers positively support their daughters and sons receive higher level of intrusiveness and negative regard from their fathers (Tamis-LeMonda et al., 2004). Fathers share more physical activities with preschool sons than with preschool daughters (Flanders, Leo, Paquette, Pihl & Seguin, 2009). In sum, there are clear child gender effects on mothers' and fathers' parenting behaviors and these effects are more generally observed during preschool years than toddlerhood. Children learn more gender roles and gender stereotypes as they grow; thus, they may tend more to elicit differentiated parenting behaviors from mothers and fathers during preschool years.

Child temperament. In Belsky (1984)'s parenting process model, characteristics of a child is one of the determinants of parenting behaviors of parents. Temperament is typically considered a biologically-based disposition of children which possess dimensions such as emotionality, activity and sociability (Goldsmith et al., 1987; Buss & Plomin, 1984). Verhoeven

et al. (2007) empirically tested the Belsky's process model (1984) and found that children's characteristic such as temperament (i.e., inhibitory control and activity level) are related to maternal support and maternal/paternal lack of structures (i.e., inconsistent discipline). As children gain better ability to exert inhibitory control, mothers tend more to support their children. In addition, mothers and fathers are more likely to control as the activity level of the child is higher. Although contribution of child temperament is small as compared to parental characteristics and contextual components in their study, these findings support that child temperament is one of the important components which influence parenting behaviors of both mothers and fathers.

Maternal risk and paternal risk. The present study included a maternal risk index and a paternal risk index as covariates based on the research evidence which examines the relationship between risk factors and parenting behaviors of mothers and fathers. Cumulative social risks (e.g., maternal low level of education, low family income, single parenthood, stressors, unemployment of parents, the number of children and safety of neighborhood) are strong predictors of negative parenting behaviors (Burchinal et al., 2008). For example, as mothers are more exposed to several risk factors (e.g., teenage pregnancy, low education, lack of English language ability and unemployment), both mothers and fathers are less sensitive and less supportive to their children (Cabrera et al., 2011). In addition, parents in low-SES families more readily control and physically punish their children. Indeed, SES contributes the most to parenting behaviors of mothers and fathers among characteristics of parent and child, as do other contextual factors (Verhoeven et al., 2007).

Parenting stress. Crnic and his colleagues (2005) found that parents who suffer from parenting stress (e.g., parental hassle) when a child is 3 years old tend to report high levels of

parenting stress when the child becomes at 5 years old. They found strong stability of stress related to parenting, and these cumulative parenting stresses over several years negatively influence the parenting behaviors of parents (Crnic et al., 2005; Deater-Deckard, 2008). For example, parents with high parenting stresses are less interested in the lives of their children and tend more to be harsh to them. In addition, these parents are more likely to be authoritarian parents who verbally and physically punish/control their children (Deater-Deckard, 2008).

Research Questions and Hypotheses

The primary purpose of this study was to examine stability in parenting over time utilizing a dyadic perspective. A major contribution of this study to the larger literature is the focus on the interdependent or dyadic relationship between mothers and fathers in their parenting. As has been described, this interdependence in parenting can be characterized as reflecting spillover (intra-person transmission) and crossover (between partners) effects. Because the goal was to embrace, rather than ignore, the interdependence in maternal and paternal parenting, a unique statistical model specifically designed for the examination of dyadic relationships was employed. Specifically, the current study utilizes the actor-partner interdependence model (APIM) with two time points in order to investigate mothers' and fathers' parenting influenced their own and their parents' subsequent parenting. The APIM model terms spillover as "actor" effects (e.g. a mother's parenting influences her subsequent parenting at a later point) and labels crossover as "partner" effects (e.g. a mother's parenting influences the father's subsequent parenting). Figure 3, below, summarizes the terminology for the dyadic processes of interest in the current study.

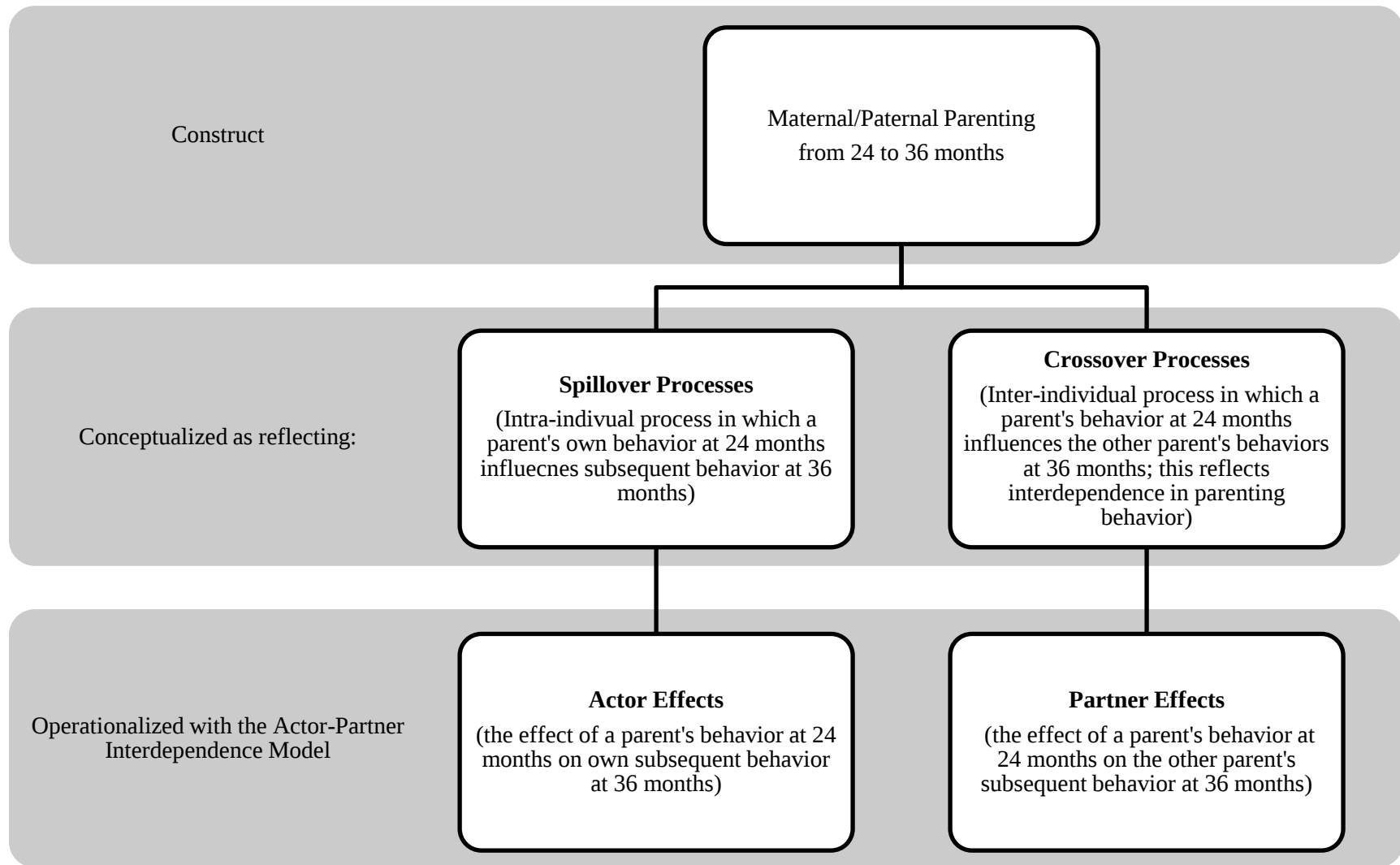


Figure 3. Construct, Conceptual and Operational Definitions of Study Foci

Examining parenting during toddlerhood, when parenting behaviors are thought to reflect stabilized styles of parenting (Barlow et al., 2005; Dallaire & Weinraub, 2005; Waylen & Stewart-Brown; 2010), provides a first opportunity in the course of parenting to examine the dyadic nature of parenting. Examining the interdependent nature of parenting early on has potential implications for how to support early parenting in the family context. Thus, the present study will address the following two research questions using the actor-partner interdependence model (APIM) with dyadic (maternal and paternal parenting) data across two time waves. Hypotheses are addressed under their corresponding research questions. Note that for the purposes of this study; I have conceptualized parenting as “positive”, reflecting behaviors including sensitivity, positive regards and cognitive stimulation; “negative”, which included intrusiveness and negative regards. Throughout the parenting literature, parenting behaviors have been functionally classified into positive/constructive parenting and negative/destructive parenting, though this classification is not absolute across all recent studies related to parenting. In particular, parenting behaviors which are typically considered more positive include behaviors such as sensitivity (Barnett et al., 2008; Karreman et al., 2008; Keown, 2011; Murdock, Lovejoy & Oddi, 2014; Tamis-LeMonda et al., 2004; Verhoeven et al., 2010), positive regard of the child (Barnett et al., 2008; Keown, 2011; Tamis-LeMonda, et al., 2004), cognitive stimulation (Barnett et al., 2008; Keown, 2011; Tamis-LeMonda, et al., 2004). Parenting which is considered more negative generally reflects behaviors such as negative regard towards the child (Barnett et al., 2008; Keown, 2011; Tamis-LeMonda, et al., 2004), intrusiveness (Barnett et al., 2008; Cabrera et al., 2007; Keown, 2011; Tamis-LeMonda, et al., 2004), and detachment from the child (Barnett et al., 2008; Keown, 2011; Tamis-LeMonda, et al., 2004; Verhoeven et al., 2010). Thus, characterizing parenting as “positive and negative parenting” is consistent with the parenting

literature. Such differentiations in positive and negative parenting are necessary given the work discussed previously (Barnett et al., 2008; Cabrera et al., 2007; Karreman et al., 2008; Keown, 2011; Murdock et al., 2014; Tamis-LeMonda et al., 2004; Verhoeven et al., 2010) reporting that partner effects may vary for positive versus negative behaviors.

Research question 1. How do mothers' and fathers' positive parenting behaviors at 24 months affect their own (actor effects) and their partner's (partner effects) positive parenting behaviors at 36 months?

Hypothesis 1.a. I hypothesize that there are significant actor effects for both mothers and fathers. In particular, both maternal and paternal positive parenting behaviors at 24 months will positively predict their own positive parenting behaviors at 36 months.

Hypothesis 1.b. I hypothesize that there is a significant partner effect of maternal positive parenting behaviors at 24 months on paternal positive parenting behaviors at 36 months. As mothers provide positive parenting behaviors to their child at 24 months, I expect that their partners—fathers of the child—will show positive parenting behaviors at 36 months. For fathers, I hypothesize that fathers' positive parenting behaviors at 24 months will not show strong partner effects on mothers' positive parenting behaviors at 36 months.

Research question 2. How do mothers' and fathers' negative parenting behaviors at 24 months affect their own (actor effects) and their partner's (partner effects) negative parenting behaviors at 36 months?

Hypothesis 2.a. I hypothesize that there are significant actor effects for both mothers and fathers. In particular, I hypothesize that mothers' and fathers' negative parenting behaviors at 24 months will positively predict their own negative parenting behaviors at 36 months.

Hypothesis 2.b. I hypothesize that mothers' negative parenting behaviors at 24 months will positively predict their partners' negative parenting behaviors at 36 months. In other words, the more mothers show negative parenting behaviors at 24 months, the more fathers provide negative parenting behaviors to their child at 36 months.

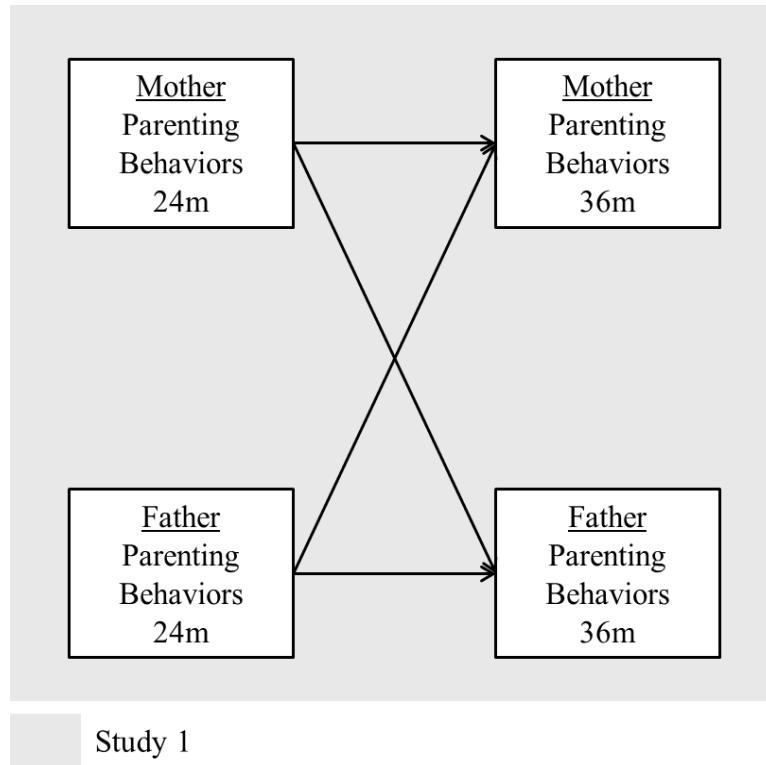


Figure 4. Conceptual Model for Study 1.

Methods for Study 1

In this section, data collection procedure, participants, measurements and data analysis plan are addressed.

Data Collection Procedure

Data collection in the Early Head Start Research and Evaluation Project The data for both dissertation studies were collected as part of the Early Head Start Research and Evaluation Project (EHSREP)—a longitudinal evaluation study which was conducted as part of the Early Head Start (EHS) program (Love et al., 2005). The Early Head Start Research and Evaluation Project (EHSREP) was comprised of 17 national research sites across the US. To participate in the study, families needed to meet the income guidelines of the program and be expecting a baby or have a child younger than 12 months old. The national sample reflected 3,001 families who were randomly assigned into two groups: Early Head Start service group ($N = 1,513$) and a comparison group ($N = 1,488$). The comparison group could not access Early Head Start programs, but could access all other services in the communities. The baseline data were gathered when families enrolled in the EHSREP and again when a child reached 14 months, 24 months, 36 months, 54 months old (5 years) and 5th Grade (Love et al., 2005). The present study utilizes data at 14 months, 24 months and 36 months.

Data collection of father sub-study: Father and child interaction during toddlerhood sub-study (FACITS). Father and Child Interaction during Toddlerhood Sub-study (FACITS) is a part of the Early Head Start Research and Evaluation Project (EHSREP) (Boller et al., 2006). Nine of 17 EHS sites participated in FACITS and the families in the FACITS had fathers or father figures (including both resident and non-resident fathers/father figures) who resided with the mother and the focus child. With children aged at 24 months and 36 months, father-child interactions were observed and videotaped in 7 sites separately from the data collection of mothers. The total number of father-child dyads in this sub-study was 339 at 24 months (resident biological father $N = 230$, nonresident biological father $N = 52$, resident father

figure $N = 50$, nonresident father figure $N = 7$) and 340 at 36 months (resident biological father $N = 219$, nonresident biological father $N = 49$, resident father figure $N = 62$, nonresident father figure $N = 10$) (Boller et al., 2006). In the current study, observation data for father-child interactions at both 24 months and 36 months was utilized.

Participants in the Current Study

Participants in this study are 151 mother-father dyads which are drawn from families in both the National Early Head Start Research and Evaluation Project (EHSREP) and the Father and Child Interaction during Toddlerhood Sub-study (FACITS). For the final sample in this study, families in which the same mother and father pairs who participated in two iterations—at 24 months and 36 months--were selected. In addition, the current study only included families whose father resides with the study child in the same household. At last, families whose father figures are biological fathers, adopted fathers, or mothers' romantic partners were chosen for the final sample in this study.

Mean ages of the study child at each wave were 27.17 months ($SD = 2.85$) at Time 1 and 39.38 months ($SD = 2.88$) at Time 2. Mean age of mothers was 24.10 ($SD = 5.74$) years at enrollment in the EHSRE project and that of fathers was 28.95 ($SD = 6.96$) years at 24 months. The majority of couples were White ($N = 104$; 68.9%). 52.3% of families ($N = 79$) had boys and 47.7% of families ($N = 72$) had girls. Fathers were primarily employed ($N = 138$; 91.4%); whereas only 29.1% of mothers ($N = 44$) were employed. 21.1% of mothers ($N = 32$) and 19.3% of fathers ($N = 29$) had no more than a high school education. 27.2% of mothers ($N = 41$) and 7.9% of fathers ($N = 12$) were teenagers when the study child was born. Marital status of mothers and fathers were mixed and inconsistent, although all mothers and father figures in this study live with the focus child. 65.8% of mothers ($N = 100$) and 82.1% of fathers ($N = 124$)

reported they are married. 90.7% of fathers ($N = 137$) were biological fathers, 7.9% of fathers were adoptive fathers ($N = 12$) and there were 2 families whose father figures were mothers' romantic partners (1.3%). Average yearly gross income of these families at 24 months was \$12,089 ($SD = \$9,271$). See Table 1 for more demographic information from this study.

Table 1. *Demographic Characteristics for Final Sample ($N = 151$)*

Demographic	Family	Mother	Father
Early Head Start Treatment Group¹	74 (49.0%)	-	-
Child Race			
White	104 (68.9%)	-	-
African American	30 (19.9%)	-	-
Hispanic	13 (8.6%)	-	-
Other	2 (1.3%)	-	-
No Response	2 (1.3%)	-	-
Child Gender			
Male	79 (52.3%)	-	-
Female	72 (47.7%)	-	-
Education			
Less than High School Diploma (<12)	-	32 (21.2%)	28 (18.8%)
High School Diploma or GED	-	55 (36.4%)	52 (34.4%)
More than High School Diploma (>12)	-	62 (41.1%)	69 (45.0%)
No Response	-	2 (1.3%)	2 (1.3%)
Employment Status			
Unemployed	-	105 (69.5%)	11 (7.3%)
Employed	-	44 (29.1%)	138 (91.4%)
No Response	-	2 (1.3%)	2 (1.3%)
Marital Status			
Single	-	29 (19.1%)	0 (0%)
Married	-	100 (65.8%)	124 (82.1%)
Separated	-	4 (2.6%)	0 (0%)
Divorced	-	4 (2.6%)	1 (0.7%)
Unmarried	-	13 (8.6%)	26 (17.2%)
No Response	-	1 (0.7%)	0 (0%)
Adolescent Parenthood²	-	41 (27.2%)	12 (7.9%)

Note. ¹ Early Head Start Treatment Group = Families which were assigned to the Early Head Start program. ² Adolescent Parenthood = Mother or father became a parent during adolescence.

Measures

Parenting behaviors. Parenting behaviors were measured through a 3-bag assessment. Trained interviewer-assessors visited families' homes and videotaped maternal and paternal parenting behaviors separately at 24 months (Time 1) and 36 months (Time 2). Each parent was asked to have semi-structured free play time with their child separately for 10 minutes. Each parent-child dyad received three different sets of toys which were in three separate bags with number labels (e.g., "1", "2," or "3"). Contents of the three bags at 24 months for mothers were *The Very Hungry Caterpillar* book in Bag #1; stove, pots, pans and utensils in Bag #2; Noah's Ark and animals in Bag #3. Contents of the three bags at 24 months for fathers were *The Very Busy Spider* book in Bag #1; plates, pizza utensils and telephone in Bag #2; Chunky Farm and farm animals in Bag #3. Contents of the three bags at 36 months for mothers were *The Very Hungry Caterpillar* book in Bag #1; groceries, shopping basket and cash register in Bag #2; Duplo blocks in Bag #3. Contents of the three bags at 36 months for fathers were *The Very Busy Spider* book in Bag #1; animal toys and medical kits in Bag #2; Duplo blocks in Bag #3. Parents were asked to play sequentially with the toys, starting from Bag #1 and finishing with Bag #3 (Brady-Smith, Fauth & Brooks-Gunn, 2005).

Parenting behaviors were coded based on Brady-Smith, O'Brien, Berlin, Ware & Brooks-Gunn (1999)'s coding system at 24 months and Brady-Smith, O'Brien, Berlin, Ware, Fauth & Brooks-Gunn (2000)'s coding system at 36 months. The original scales for parenting behaviors consisted of six constructs: (1) parental sensitivity, (2) positive regard, (3) stimulation of cognitive development, (4) intrusiveness, (5) negative regard and (6) detachment (Brady-Smith, O'Brien, Berlin, Ware & Brooks-Gunn; 1999; Brady-Smith, O'Brien, Berlin, Ware, Fauth, & Brooks-Gunn, 2000).

(1) Parental sensitivity refers to parents' child-centered responses. This scale captures parents' awareness and responses to children's needs and interests during play (e.g., praise, encouragement and supporting independence). (2) Positive regard reflects the degree of parents' warmth, respect and expression of love for the children (e.g., smiling, hugging and positive verbal expressions). (3) Parental stimulation of cognitive development refers to the effortful teaching of parents for their children in order to facilitate children's learning (e.g., labeling, engaging in pretend play, elaboration, making connections between children's play and their real life). (4) Parental intrusiveness involves parents' control behaviors (i.e., parent-centered behaviors). This scale measures how much parents exert power and the degree to which parents do not allow children's autonomy. (5) Parental negative regard reflects negative verbal and behavioral expressions (e.g., coldness, harsh punishment and physical roughness). Parents' negative expressions are related to anger, disapproval, and rejection. (6) Detachment reflects the degree of parents' inattentive and indifferent interaction with their children (e.g., lack of eye contact, emotionless and indifferent verbal interaction). The scores were rated on a seven-point Likert scale (1 = very low, 7= very high) for each construct. Parenting behavior variables were considered as ordered categorical variables in this study.

Graduate students at Columbia University were trained for coding videos of three bag assessments. Coders had regular meetings, discussed the scales and watched videos together for reaching high reliability. Coders reached averaged 93% agreement at 24 months (ranges from 84% to 100%) and averaged 94% agreement at 36 months (ranges from 86% to 100%) (Brady-Smith et al., 2005; Tamis-LeMonda et al., 2004). The range of intraclass correlations (ICCs), Kappa coefficients for multiple raters, was from .64 to .70 (Faldowski, Chazan-Cohen, Love & Vogel, 2013; Love, Chazan-Cohen, Raikes & Brooks-Gunn, 2013).

Based on previous parenting research, positive parenting behaviors in this study consists of parental sensitivity, positive regard and parental stimulation of cognitive development. Negative parenting behaviors include parental intrusiveness, parental negative regard and detachment. To test the reliability and dimensionality of subscales for positive/negative parenting behavior constructs of mothers/fathers, Confirmatory Factor Analyses (CFA) with Bayesian estimation were conducted. CFA models used the Gibbs sampler with four chains, 50,000 iterations with 25,000 burn-in and a 50 thinning interval. Estimated potential scale reduction (PSR) value for all CFA models were small enough (i.e., around 1.0) which indicates that four chains converged the distributions well.

Since subscales of parenting behaviors at 24 and 36 months were rated by using the same coding system, I treated them as repeated measures. As the first step, measurement invariance across groups and times were considered for repeated measures. To set up measurement invariance across groups, group membership has to be independent. To be independent means that two people who share a high degree of dependence cannot be treated as two separate groups (e.g., couples--parents of a child). In particular, it is difficult to treat mothers and fathers in families as different groups, due to their high level of interdependence (Kenny et al., 2006; Kenny, 2014). Indeed, similar patterns in factor loadings, similarities in means and range between mothers and fathers were found in this study. Moreover, setting up measurement invariance across group as well as time violates model identification in the current study. As a result, measurement invariance across groups is not appropriate to apply to this study's sample, so only measurement invariance across time points was considered in this study. All CFA models specified exact invariance across two time points for all factor loadings,

intercepts and thresholds (i.e., strong or scalar invariance). CFA models for mothers and fathers were tested separately.

Confirmatory factor analysis for positive parenting behaviors. CFA model for mothers' positive parenting behaviors fit the data well. The posterior predictive p -value was .17 and the 95% confidence interval for the model fit included zero [-9.68, 26.07]. All three indicators such as sensitivity, positive regard and stimulation of cognitive development significantly loaded on a latent variable of mothers' positive parenting. Expected a posteriori (EAP) estimates of standardized factor loadings for indicators ranged from .70 to .95 (see Table 2 and Table 3). The reliability for mothers' positive parenting behaviors at 24 months was .84 and its lower and upper limits of the 95% credibility interval were .79 and .87, respectively. The reliability for maternal positive parenting behaviors at 36 months was .84 and its lower and upper bounds of the 95% credibility interval were .80 and .88, respectively.

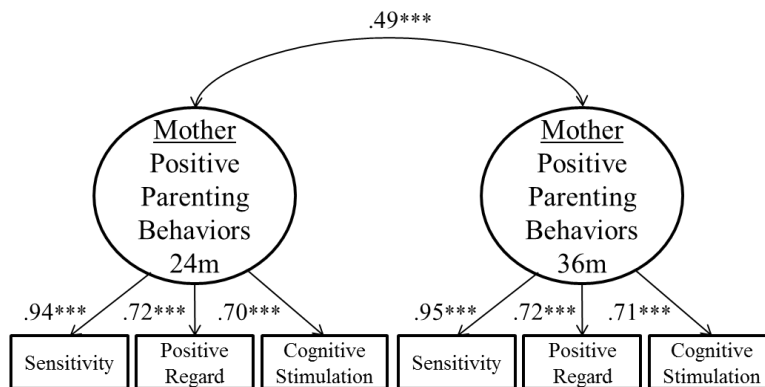


Figure 5. Confirmatory Factor Analysis (CFA) for Maternal Positive Parenting Behaviors at 24 and 36 Months.

Note. Residuals are suppressed to simplify the figure.

*** $p < .001$.

The CFA model for fathers' positive parenting behaviors showed good model fit. The posterior predictive p -value was .52 and the 95% confidence interval contained zero [-19.54, 17.61]. All factors (i.e., sensitivity, positive regard and stimulation of cognitive development) were significantly loaded on the latent variable of paternal positive parenting. EAP estimates of standardized factor loadings for indicators ranged from .69 to .86 (see Table 4 and Table 5). The reliability of paternal positive parenting behaviors at 24 months was .83 and its lower and upper endpoints of the 95% credibility interval were .78 and .87, respectively. The reliability of paternal positive parenting behaviors at 36 months was .84 and its lower and upper bounds of the 95% credibility interval were .80 and .88, respectively.

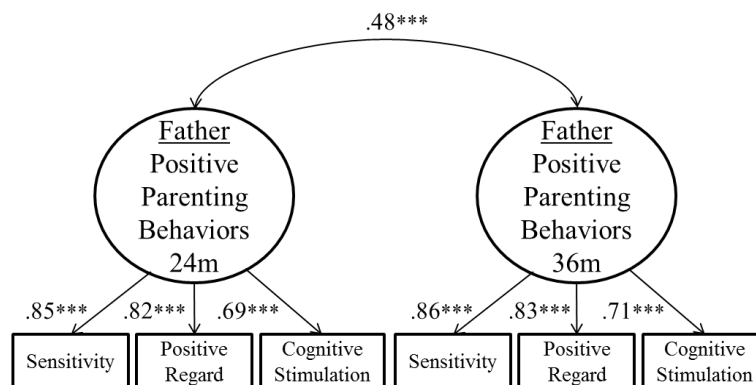


Figure 6. Confirmatory Factor Analysis (CFA) for Paternal Positive Parenting Behaviors at 24 and 36 Months.

Note. Residuals are suppressed to simplify the figure.

*** $p < .001$.

Table 2. *Unstandardized Factor Loadings for Maternal/Paternal Positive Parenting*

Factor	Unstandardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Positive Parenting				
Sensitivity 24m	.95***	.07	.83	1.09
Positive Regard 24m	.72***	.06	.61	.86
Cognitive Stimulation 24m	.71***	.06	.59	.84
Sensitivity 36m	.95***	.07	.83	1.09
Positive Regard 36m	.72***	.06	.61	.86
Cognitive Stimulation 36m	.71***	.06	.59	.84
Fathers' Positive Parenting				
Sensitivity 24m	.84***	.07	.72	.98
Positive Regard 24m	.82***	.07	.69	.96
Cognitive Stimulation 24m	.69***	.07	.57	.83
Sensitivity 36m	.84***	.07	.72	.98
Positive Regard 36m	.82***	.07	.69	.96
Cognitive Stimulation 36m	.69***	.07	.57	.83

Note . EAP, expected a posteriori.

*** $p < .001$.

Table 3. *Standardized Factor Loadings for Maternal/Paternal Positive Parenting*

Factor	Standardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Positive Parenting				
Sensitivity 24m	.94***	.03	.89	.99
Positive Regard 24m	.72***	.04	.64	.79
Cognitive Stimulation 24m	.70***	.04	.62	.77
Sensitivity 36m	.95***	.03	.89	.99
Positive Regard 36m	.72***	.04	.64	.79
Cognitive Stimulation 36m	.71***	.04	.63	.78
Fathers' Positive Parenting				
Sensitivity 24m	.85***	.03	.78	.91
Positive Regard 24m	.82***	.03	.75	.88
Cognitive Stimulation 24m	.69***	.04	.60	.77
Sensitivity 36m	.86***	.03	.79	.91
Positive Regard 36m	.83***	.03	.76	.89
Cognitive Stimulation 36m	.71***	.04	.62	.78

Note . EAP, expected a posteriori.

*** $p < .001$.

Confirmatory factor analysis for negative parenting behaviors with three indicators.

Firstly, CFA models with three negative parenting indicators (i.e., intrusiveness, negative regard and detachment) were conducted for mothers and fathers respectively. In the CFA model for the mothers' negative parenting behaviors, model fit was good with three indicators. The posterior predictive p -value was .55 and the 95% of confidence interval contained zero [-12.58, 11.70].

Intrusiveness ($\beta = .65$) and negative regard ($\beta = .72$) significantly loaded on the latent variable of maternal negative parenting behaviors. Maternal detachment, however, did not significantly load on the latent variable of maternal negative parenting behaviors and its EAP estimates of standardized factor loading was very low ($\beta = .08, p = .21$). Thus, detachment was not proper to use as an indicator for the latent variable in the mothers' negative parenting model.

Accordingly, in the CFA model for fathers' negative parenting behaviors, the model fit the data well with three negative parenting indicators (i.e., intrusiveness, negative regard and detachment). The posterior predictive p -value was .18 and the 95% of confidence interval included zero [-6.80, 17.63]. Paternal intrusiveness ($\beta = .68$) and negative regard ($\beta = .81$) significantly loaded on the latent variable of paternal parenting behaviors. However, paternal detachment did not significantly load on the latent variable of paternal negative parenting behaviors, which suggests that detachment was not acceptable to use as an indicator for paternal negative parenting behaviors. As a result, the maternal and paternal detachment variables were deleted from the models and the CFA models for mothers and fathers were reanalyzed with two indicators (i.e., maternal/paternal intrusiveness and maternal/paternal negative regard) on maternal and paternal negative parenting latent constructs.

Confirmatory factor analysis for negative parenting behaviors with two indicators.

CFA model for mothers' negative parenting behaviors with two indicators (i.e., intrusiveness and

negative regard) fit the data well. The posterior predictive p -value was .45 and the 95% confidence interval included zero [-13.39, 14.50]. Both indicators significantly loaded on the latent variable of maternal negative parenting behaviors. EAP estimates of standardized factor loadings for indicators ranged from .71 to .79 (see Figure 5, Table 4 and Table 5). The reliability for negative parenting behaviors of mothers at 24 months was .71 and its lower and upper bounds of the 95% credibility interval were .61 and .78, respectively. The reliability for maternal negative parenting behaviors at 36 months was .73 and its lower and upper limits of the 95% credibility interval were .65 and .80, respectively.

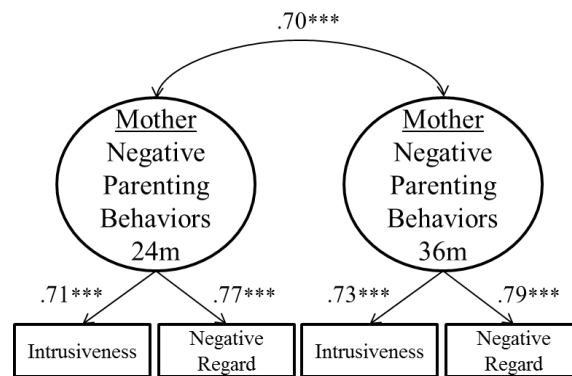


Figure 7. Confirmatory Factor Analysis (CFA) for Maternal Negative Parenting Behaviors at 24 and 36 Months.

Note. Residuals are suppressed to simplify the figure.

*** $p < .001$.

In the CFA model for paternal negative parenting behaviors, its model fit with two negative parenting indicators (i.e., intrusiveness and negative regard) was good. The posterior predictive p -value was .10 and the 95% confidence interval contained zero [-5.50, 23.27]. All indicators (i.e., intrusiveness and negative regard) loaded significantly on the latent variable of paternal negative parenting behaviors. EAP estimates of standardized factor loadings for these indicators ranged from .58 to .71 (see Figure 6, Table 4 and Table 5). The reliability for fathers'

negative parenting behaviors at 24 months was .63 and its lower and upper endpoints of the 95% credibility interval were .50 and .73, respectively. The reliability for maternal negative parenting behaviors at 36 months was .59 and its lower and upper bounds of the 95% credibility interval were .42 and .72, respectively.

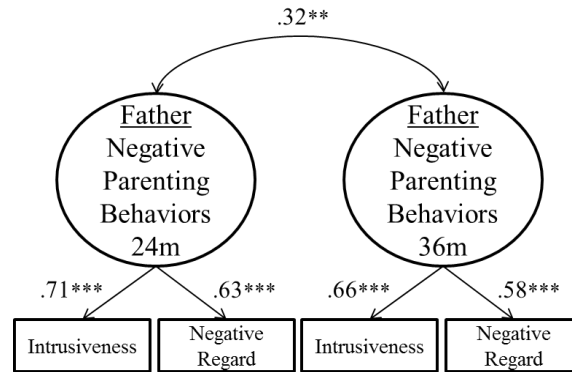


Figure 8. Confirmatory Factor Analysis (CFA) for Paternal Negative Parenting Behaviors at 24 and 36 Months.

Note. Residuals are suppressed to simplify the figure.

** $p < .01$, *** $p < .001$.

Table 4. Unstandardized Factor Loadings for Maternal/Paternal Negative Parenting

Factor	Unstandardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Negative Parenting				
Intrusiveness 24m	.70***	.08	.56	.86
Negative Regard 24m	.76***	.08	.61	.93
Intrusiveness 36m	.70***	.08	.56	.86
Negative Regard 36m	.76***	.08	.61	.93
Fathers' Negative Parenting				
Intrusiveness 24m	.73***	.14	.45	1.00
Negative Regard 24m	.65***	.14	.41	.94
Intrusiveness 36m	.73***	.14	.45	.100
Negative Regard 36m	.65***	.14	.41	.94

Note. EAP, expected a posteriori.

*** $p < .001$.

Table 5. *Standardized Factor Loadings for Maternal/Paternal Negative Parenting*

Factor	Standardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Negative Parenting				
Intrusiveness 24m	.71***	.06	.59	.81
Negative Regard 24m	.77***	.06	.65	.87
Intrusiveness 36m	.73***	.05	.62	.83
Negative Regard 36m	.79***	.05	.68	.88
Fathers' Negative Parenting				
Intrusiveness 24m	.71***	.13	.45	.96
Negative Regard 24m	.63***	.12	.41	.90
Intrusiveness 36m	.66***	.14	.43	.96
Negative Regard 36m	.58***	.12	.40	.90

Note . EAP, expected a posteriori.

*** $p < .001$.

Covariates. Covariates including family race, child gender, maternal risk, paternal risk, child temperament and maternal/paternal parenting stress were included for both models (i.e., positive parenting model and negative parenting model). All covariates were controlled for at the 24 month point.

Child race/ethnicity. Family race was measured as categorical variables when it was collected. For this study, binary variables for family race were recoded respectively for White (White = 1; others = 0), African American (African American = 1; others = 0), and Hispanic (Hispanic = 1; others = 0).

Child gender. Child gender was measured and used as a dichotomous variable (1 = male; 0 = female).

Maternal risk. Maternal risk was binary-coded (1 = the risk factors are present; 0 = the risk factors are absent) for each risk factor and then it was summed up. For the analysis, the number signifying the risk index was counted as the maternal risk variable (ranged from 0 to 5).

The risk index for mothers includes less than high school education, single parenthood, adolescent parenthood at the time of the child's birth, and unemployment and welfare status (i.e., low income).

Paternal risk. Paternal risk indexes were parallel with maternal risk indexes, except for one risk factor—welfare status. Because welfare status for fathers was not assessed, paternal risk indexes consisted of four risk factors: low level of education (i.e., less than high school education), single parenthood, adolescent parenthood at the child birth and unemployment (ranges from 0 to 4).

Child temperament. Emotionality scores from the Emotionality, Activity, Sociability, and Impulsivity inventory (EASI; Buss & Plomin, 1984) were used for child temperament. Emotionality captures a child's intensity of emotional reaction and it was assessed when children were around 14 months old. The average score of 5 items was used in this study. Scores of each item range from 1 (not at all like my child) to 5 (very much like my child). Higher scores indicate higher levels of emotionality. Cronbach's alpha for emotionality was .76 in the current study.

Parenting stress. Parent-child dysfunctional interaction, which is one of subscales of Parenting Stress Index – short form (PSI-SF; Abidin, 1995) was used. Parent-child dysfunctional interaction assesses the degree of dissatisfaction for parent-child relationship. In particular, higher scores in this scale indicate the low quality of parent-child interaction, and that parents have high stress and disappointment toward their child. Parent-child dysfunctional interaction scores of mothers and fathers were each assessed at 24 months. The final score that I used in this study is the sum of 12 items for mothers and fathers, respectively. Scales on each item range from 1 (strongly agree) to 5 (strongly disagree). Cronbach's alpha for mother-child

dysfunctional interaction was .74. Cronbach's alpha for father-child dysfunctional interaction was .65.

Missing Data

Because data were collected over two time points and multiple persons (i.e., mothers and fathers) were involved in observations, missing data existed in this study. Since I selected the final sample based on the demographical information of fathers (e.g., whether father figures live with their child; whether the same fathers participated in the study at 24 months and 36 months) and the presence of father data at Time 1, no missing data for variables of fathers' parenting behaviors at 24 months (i.e., paternal sensitivity at 24 months, paternal positive regard at 24 months, paternal cognitive stimulation at 24 months, paternal intrusiveness at 24 months and paternal negative regard at 24 months) were found. However, some fathers did not return for the study at Time 2; therefore, 27 cases had data missing on variables of paternal parenting behaviors at 36 months. There were also a few missing data for mothers' parenting behaviors across measurement time points. There were no cases which did not have any data for mothers and fathers at both 24 and 36 months, which indicating that missing data for variables of parenting behaviors were only present at either 24 months or 36 months (see Table 6).

Little's (2014) Missing Completely at Random (MCAR) test was conducted for study variables in order to check the type of missingness. I could assume that the data of this study were MCAR, based on the non-significant value of Chi-square ($\text{Chi-Square} = 45.31; df = 48; p = .58$). In order to deal with missing data in the current study, multiple imputation (MI) was conducted through Mplus 7.3 (Muthén & Muthén, 2014). Mplus has practical advantages for handling missing data because it can impute missing data using any classical estimation method, as well as Bayesian estimation (Asparouhov & Muthén, 2010). For example, maximum

likelihood estimation under missing completely at random (MCAR), missing at random (MAR) and not missing at random (NMAR) for several different variable types (e.g., continuous, ordinal, binary, nominal, counts or combination of multiple types) are available in Mplus (Muthén & Muthén, 2012). In addition, multiple imputation (MI) is possible to conduct in a study model using Bayesian analysis in Mplus (Asparouhov & Muthén, 2010; Muthén & Muthén, 2012). In the present study, 50 imputed data sets were created for multiple imputation using Bayesian estimation.

Table 6. *Data Missingness in the Final Sample (N = 151)*

Variable	Mother		Father	
	Missing N	Missing %	Missing N	Missing %
Covariate				
Child Race	2	1.3%	--	--
Child Gender	0	0%	--	--
Child Temperament	2	1.3%	--	--
Parental Risk	15	9.9%	3	2.0%
Parenting Stress	1	0.7%	13	8.6%
Positive Parenting				
Sensitivity 24m	3	2.0%	0	0%
Sensitivity 36m	6	4.0%	27	17.9%
Positive Regard 24m	3	2.0%	0	0%
Positive Regard 36m	6	4.0%	27	17.9%
Cognitive Stimulation 24m	3	2.0%	0	0%
Cognitive Stimulation 36m	6	4.0%	27	17.9%
Negative Parenting				
Intrusiveness 24m	3	2.0%	0	0%
Intrusiveness 36m	6	4.0%	27	17.9%
Negative Regard 24m	3	2.0%	0	0%
Negative Regard 36m	6	4.0%	27	17.9%

Data Analysis

Actor-Partner Interdependence Model (APIM). The actor-partner interdependence model (APIM) (Kenny et al., 2006) was used to test this study's hypotheses. The actor-partner interdependence model (APIM) is one type of dyadic design and it is designed for explaining the transactional relationship of two persons in a family. APIM allows us to account for mutual influences between two persons and bidirectional interaction over time. For example, it simultaneously estimates the effects of an individual's predictor variable (at Time 1) on not only that person's own outcome, but also the partner's outcome (at Time 2).

The key difference between dyadic models and traditional linear models is that dyadic models consider the nonindependence of dyad but traditional linear models ignore the nonindependence of dyads. Kenny, Kashy and Cook (2006) defined the dyadic nonindependence as follows: "If the two scores from the two members of the dyad are nonindependent, then those whose scores are more similar to (or different from) one another than are two scores from two people who are not members of the same dyad" (Kenny et al., 2006, *p.* 4.). The traditional linear models assume "independence of cases" which means that data of one participant is not influenced by responses from another participant. Dyadic models, though, deal with dyadic family data, and consider reciprocities of dyads. First, in dyadic analysis, all data can be analyzed in one analysis. Second, dyadic models consider a dyad as the unit of analysis. Furthermore, nonindependence of responses of two dyad members is directly measured in the dyadic models (Cook & Kenny, 2005; Kenny et al., 2006).

In the APIM model, variables are measured with respect to both the actor and his/her partner. It means that each variable for a dyad should be collected from the same measures. For example, both members in a dyad should answer the same questionnaire or utilize the same

coding system for observation (Kenny et al., 2006). Following these rules, maternal and paternal parenting behaviors in this study are rated based on the same coding system.

The use of APIM with dyadic data is increasing in child development research (Klausli & Owen, 2011; Murdock et al., 2014; Ponnet et al., 2012; Ponnet et al., 2013; Raikkonen et al., 2006; Rholes, Simpson & Friedman, 2006), reflecting the trend of researchers being more interested in the bi-directional interactions for dyad members (Kenny et al., 2006). In particular, studies on parenting within APIM across the two time period are increasing, and this study follows the recent trend of its analysis (Murdock et al., 2014; Ponnet et al., 2013).

Bayesian Structural Equation Modeling (BSEM). According to Kenny et al. (2006), Structural Equation Modeling (SEM) is a useful technique which is generally used for the actor-partner interdependent model (APIM) with dyadic data. In this study, the Bayesian Structural Equation Modeling (BSEM), a specific type of structural equation modeling best suited to the current study was used.

There are several theoretical advantages of using Bayesian analysis. First, Bayesian statistics can incorporate uncertainty of the unknown parameters in a model. Frequentist statistics (i.e., conventional statistics) assume that an unknown parameter has one true population value. Bayesian statistics, however, incorporate the uncertainty of parameter value; therefore Bayesian statistics provide a probability distribution (interval) of the value rather than give us only one true value. Prior distributions (prior) capture the uncertainty of parameters before the data are observed. There are two types of priors: noninformative priors and informative priors. When we do not possess enough prior information, we use noninformative priors to handle the uncertainty of parameters. Informative prior information is based on our background knowledge and results from the previous research. Informative priors increase the precision, thus the

researcher can get more accurate estimations (Kaplan, 2014; Kaplan & Depaoli, 2012; Schoot et al., 2014; Schoot & Depaoli, 2014). In this study, I used non-informative priors because dyadic studies regarding maternal/paternal parenting behaviors are rarely found; thus, prior information from previous studies could not fully support this study. Using non-informative priors could provide the basic prior information for the future studies. In other words, study results with non-informative priors (i.e., posterior information) in this study lays groundwork for future parent dyad studies and will contribute the valuable information to the field. In particular, my study can contribute to the field by providing information to use informative priors in future studies. Because Bayesian analysis is becoming an increasingly used approach in the social science (Kaplan, 2014; Schoot et al., 2014), my study is timely in its conceptual and methodological contributions to furthering the science.

Second, results from Bayesian analysis reflect the comparisons between previous research and the current data; therefore, researchers can update knowledge through use of this analysis (Kaplan, 2014; Kruschke, 2011; Schoot et al., 2014; Schoot & Depaoli, 2014). Bayes' theorem has three ingredients such as prior distribution, likelihood and posterior distribution. The first ingredient is *prior distribution* which reflects the accumulated background knowledge for the parameters of our interest. As discussed earlier, it is related to the uncertainty of population parameter values and it is preset before we observe the data. The second ingredient is *likelihood* which is obtained from the data. In other words, it is the observed evidence which reflects the information from the data set. The third ingredient is *posterior distribution* which is made by combining two other ingredients: prior distribution and likelihood. The value of posterior distribution is calculated by multiplying the likelihood by the prior of parameters. We consider posterior distribution as updated knowledge; therefore, we are able to compare previous research

and the current data through the process of the Bayesian inference, whereas Frequentist statistics only use likelihood (data) to get estimations (Kaplan, 2014; Kaplan & Depaoli, 2012; Schoot et al., 2014; Schoot & Depaoli, 2014).

In addition, Bayesian methods provide useful practical advantages. First, Bayesian analysis can be used for data with small sample sizes (Lee & Song, 2004; Muthén & Asparouhov, 2012). Bayesian analysis does not depend on large-sample theory (Muthén & Asparouhov, 2012). Since the sample size is small, the effect of prior specification is bigger (Muthén & Asparouhov, 2012; Schoot et al., 2014; Schoot & Depaoli, 2014). Second, Bayesian analysis provides accurate estimation with parameters which are not normally distributed, whereas conventional statistical analysis (e.g., maximum likelihood) assumes normal distribution for model parameters (Muthén & Asparouhov, 2012; Schoot et al., 2014; Schoot & Depaoli, 2014). Third, we can analyze complex models by using Bayesian analysis. For example, Bayesian analysis allows the models to be explored with many parameters which cannot be estimated by using maximum likelihood estimation (Kruschke, 2011; Muthén & Asparouhov, 2012; Schoot & Depaoli, 2014). Therefore, Bayesian analysis makes it possible to aid in model identification by adding more variables (e.g., covariates) in the model. Table 7 describes the differences between frequentist statistics and Bayesian statistics.

There are three main reasons for using Bayesian analysis in this study. First, the sample size of this study (i.e., 151 mother-father dyads) was not sufficient to utilize the maximum likelihood in the Structural Equation Modeling (SEM) because a small sample size may violate the assumptions of the Structural Equation Modeling (SEM). A Bayesian analysis, however, supports the running of Structural Equation Modeling (SEM) with sample sizes under 200 (Muthén & Asparouhov, 2010).

Table 7. Comparison between Frequentist Statistics and Bayesian Statistics

	<i>Frequentist statistics</i>	<i>Bayesian Statistics</i>
Sample size	Larger sample is preferred because ML is based on asymptotic (large-sample) theory	Not necessary
Use of prior knowledge	No	Yes
Nature of parameters	Unknown but fixed	Unknown and therefore random
Parameters are viewed as	Constants	Variables
Model fit	Likelihood-ratio chi-square testing	Posterior predictive checking
Population parameter	One true value	Probability distribution
Parameter estimates	Assume a normal distribution	Do not assume a normal distribution and allow a skewed distribution
Estimated interval	Critical interval	Credibility interval

Note. (Kaplan, 2014; Kaplan & Depaoli, 2012; Lee & Song, 2012; Lee & Song, 2004; Muthén & Asparouhov, 2012; Schoot & Depaoli, 2014; Schoot et al., 2014).

Secondly, the Bayesian analysis was used to deal with skewness of the data of this study. The normality test (e.g., the Shapiro-Wilk test, z-scores of skewness and kurtosis) was conducted and visual methods (e.g., checking histograms, the probability-probability plot and the quantile-quantile plot) were used with the data of the current study following the guidance of Ghasemi and Zahediasl (2012). The results of the normality test revealed that all maternal/paternal positive parenting factors were normally distributed, whereas maternal/paternal negative parenting factors were skewed left, which violates the normality assumption of maximum likelihood. In Bayesian analysis, Gibbs sampling, one of Markov chain Monte Carlo's (MCMC) algorithms, is used to solve the non-normality issue, because Gibbs sampling is the recommended iteration method for data which are too narrowly or too broadly distributed (Kruschke, 2011). In sum, in this study I chose to use the Bayesian analysis with Gibbs sampling, because this analysis allows estimating model parameters with data which are not

normally distributed (Kaplan & Depaoli, 2012; Muthén & Asparouhov, 2010; Schoot et al., 2014; Schoot & Depaoli, 2014).

Third, Bayesian statistics were used to analyze models with several covariates in the current study. As discussed earlier, Bayesian analysis allows testing complex model with many parameters, which is not possible in frequentist statistics (Kruschke, 2011; Muthén & Asparouhov, 2012; Schoot & Depaoli, 2014). Including more covariates in the model means the overall number of parameters increased. In order to achieve enough power of a test of model fit, we need to either have a large sample or decrease the number of parameters (Lee, Cai & MacCallum, 2012). Because I have a relatively small sample size in this study, I could drop covariates which are not significant to increase statistical power for the study models.

At last, utilizing the Bayesian approach will contribute the future works in this filed. Specifically, results of the current study will contribute to informative priors in this literature; therefore, this study which used non-informative priors makes a strong methodological contribution to the field.

Data analysis in this study. IBM SPSS Statistics 21 was used to manage data and conduct preliminary analyses (i.e., descriptive statistics and bivariate correlations). The degree of nonindependence between mother and father data (e.g., nonindependence between maternal and paternal parenting behaviors at 24 months) was calculated per Kenny et al.'s guidelines (Kenny et al., 2006). Because our sample is distinguishable dyads, the degree of nonindependence was obtained through Pearson product-moment correlation.

Mplus version 7.3 (Muthén & Muthén, 2014) was used to analyze dyadic data for maternal/paternal positive and negative parenting behaviors across the two time waves. Analyses for two separate models were carried out respectively. The actor-partner interdependence model

(APIM) for maternal/paternal positive parenting behaviors at 24 and 36 months were analyzed with the Bayesian Structural Equation Modeling (BSEM) approach (see Figure 9). Accordingly, the actor-partner interdependence model (APIM) for maternal/paternal negative parenting behaviors at 24 and 36 months were analyzed with the Bayesian Structural Equation Modeling (BSEM) approach (see Figure 10). Each analysis used the Gibbs sampler with four chains and 12,000 iterations with 6,000 burn-ins and a 5 thinning interval. All models appropriately converged per the potential scale reduction factor (PSRF) diagnostic of Brooks and Gelman (1998). Estimated potential scale reduction (PSR) values for these models were ranged around 1.0, indicating that the target distributions were thoroughly converged by four chains. Convergence plots, posterior density plots and autocorrelations plots were inspected to check whether the convergence was properly conducted (see Appendix A).

Mothers' parenting behaviors at 24 and 36 months and fathers' parenting behaviors at 24 and 36 months were rated with the same coding system; therefore, maternal/paternal parenting behaviors at 24 and 36 months are treated as repeated measures in this study. As explained previously, it is inappropriate to treat mothers and fathers as two different groups, because mothers and fathers of a child share high interdependence (Kenny et al., 2006, Kenny, 2014). Consequently, measurement invariance across time was considered for the two main models, whereas measurement invariance for groups was disregarded in this study. All models specified exact invariance across two time points for all factor loadings, intercepts and thresholds (i.e., strong or scalar invariance). For this study, non-informative prior was used for the final analysis. Priors for loadings, intercepts and thresholds are set as $N(0, \text{infinity})$ and variances are set as $IG(0, -1)$. Prior for covariance matrices is $IW(0, -p-1)$.

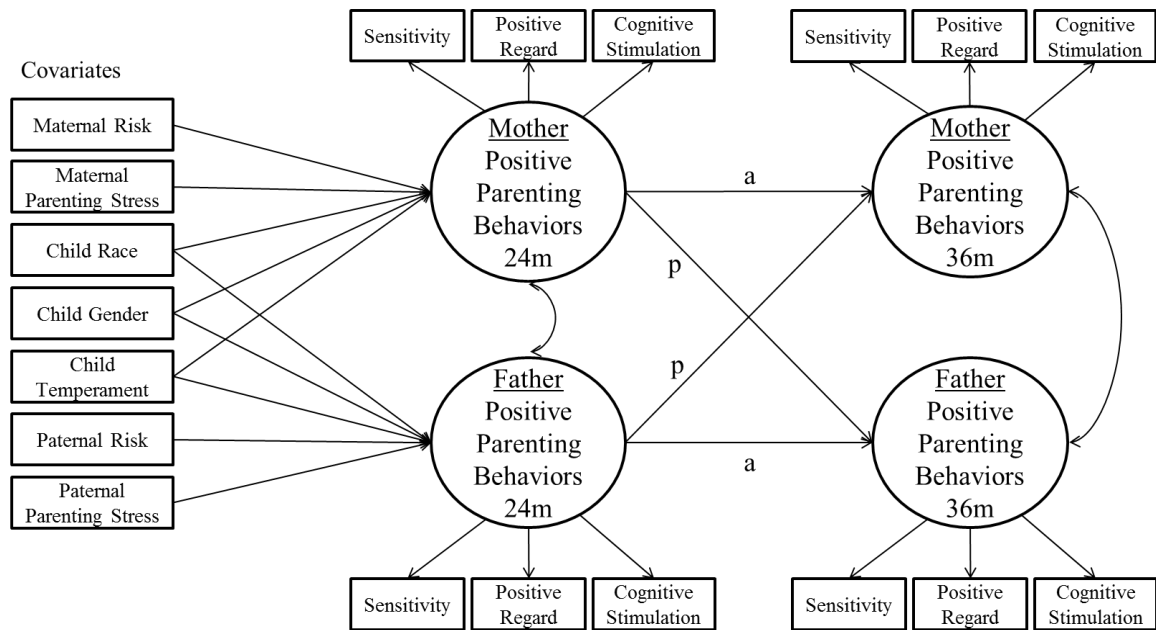


Figure 9. Model 1: The Actor-Partner Interdependence Model (APIM) for Maternal/Paternal Positive Parenting Behaviors at 24 and 36 Months.

Note. a = actor effect; p = partner effect.

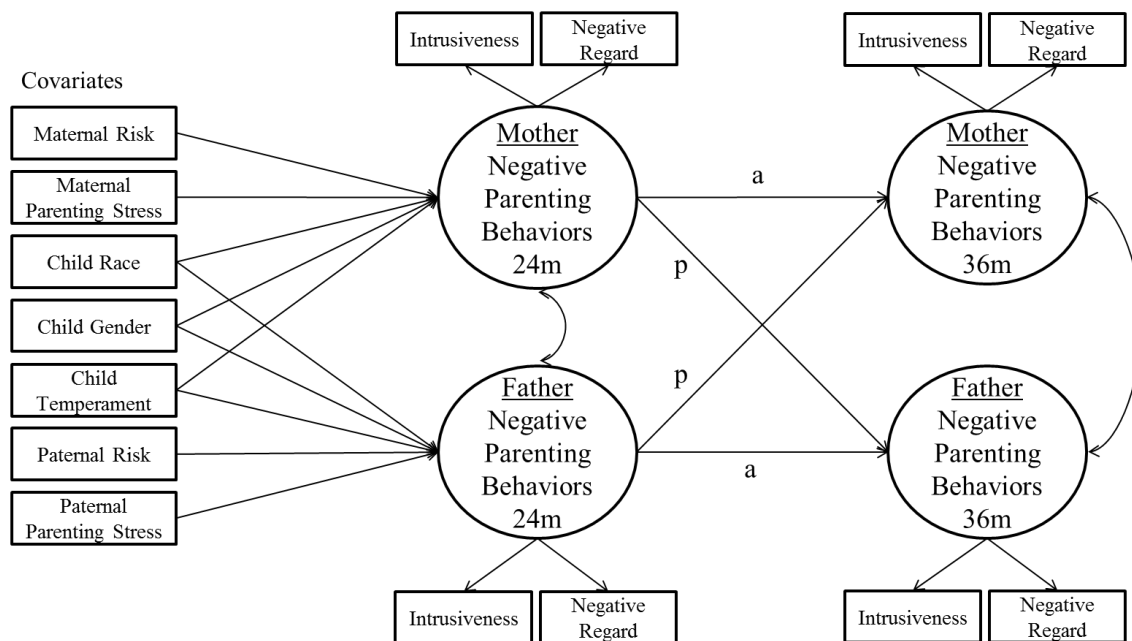


Figure 10. Model 2: The Actor-Partner Interdependence Model (APIM) for Maternal/Paternal Negative Parenting Behaviors at 24 and 36 Months.

Note. a = actor effect; p = partner effect.

Results for Study 1

Preliminary Analysis

Descriptive statistics for study variables are displayed in Table 8. Bivariate correlations were conducted to analyze the relationships among study variables and covariates for Model 1 (see Table 9) and Model 2 (see Table 10) respectively. Spearman correlations were used for dummy coded variables of family race, child gender and subscales for parenting behaviors because they were treated as ordered categorical variables. Pearson correlations were used for all other variables which were continuous.

The degree of interdependence for distinguished dyads was measured based on Pearson product-moment correlation (i.e., the ordinary correlation coefficient). According to Cohen (1988), $r < .10$ indicates small effect size; $.30$ means medium, and $r > .50$ indicates large effect size. For the positive parenting model, the degree of nonindependence between maternal and paternal sensitivity at 36 months was $.19$ ($p < .05$). The degree of nonindependence between maternal and paternal positive regard at 36 months was $.12$ ($p > .05$). The degree of nonindependence between maternal and paternal cognitive stimulation at 36 months was $.15$ ($p > .05$). For the negative parenting model, the degree of nonindependence between maternal and paternal intrusiveness at 36 months was $.35$ ($p < .001$). The degree of nonindependence between maternal and paternal negative regard at 36 months was $.21$ ($p < .05$).

Table 8. *Demographic Statistics for Study 1*

Variable	Mother			Father		
	Mean	SD	Range	Mean	SD	Range
Covariate						
Child Temperament	2.95	.90	1.20 - 5.00	-	-	-
Parental Risk	1.77	1.21	0 - 5	.51	.84	0 - 3
Parenting Stress	16.41	4.68	12 - 41	14.17	3.65	11 - 30
Positive Parenting						
Sensitivity 24m	5.01	.91	3 - 7	4.68	1.01	2 - 7
Sensitivity 36m	4.99	1.04	2 - 7	4.71	.89	2 - 6
Positive Regard 24m	4.17	1.19	1 - 6	3.70	1.41	1 - 7
Positive Regard 36m	3.89	1.13	1 - 6	3.81	.99	1 - 6
Cognitive Stimulation 24m	4.28	1.07	2 - 7	4.08	1.00	2 - 6
Cognitive Stimulation 36m	4.12	1.17	2 - 6	3.90	1.04	2 - 6
Negative Parenting						
Intrusiveness 24m	1.64	.87	1 - 5	1.83	1.02	1 - 5
Intrusiveness 36m	1.37	.73	1 - 5	1.31	.52	1 - 3
Negative Regard 24m	1.22	.52	1 - 5	1.27	.63	1 - 5
Negative Regard 36m	1.20	.55	1 - 4	1.06	.23	1 - 2

Table 9. *Model 1: Correlation for Maternal/Paternal Positive Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	--																				
2	-.76	--																			
3	-.47	-.16	--																		
4	-.06	.00	.10	--																	
5	-.22	.17	.05	-.09	--																
6	-.29	.20	.12	-.02	.55	--															
7	-.10	.14	.00	.00	.11	.05	--														
8	.05	-.04	-.05	-.02	.08	-.07	.13	--													
9	-.01	-.02	-.00	.04	.14	.15	.10	.20	--												
10	.38	-.24	-.23	-.04	-.22	-.14	-.15	-.13	-.16	--											
11	.28	-.15	-.22	.00	-.13	-.08	-.18	-.18	-.05	.62	--										
12	.18	-.06	-.19	-.02	-.26	-.09	-.09	-.15	-.17	.71	.51	--									
13	.21	-.11	-.20	-.10	-.23	-.29	-.04	-.08	-.23	.29	.24	.31	--								
14	.17	-.03	-.24	-.08	-.26	-.21	-.08	-.12	-.29	.24	.18	.31	.69	--							
15	.06	-.05	-.06	-.12	-.16	-.09	-.04	-.07	-.18	.14	-.02	.13	.56	.55	--						
16	.35	-.27	-.15	.01	-.26	-.27	-.11	.07	-.10	.41	.35	.35	.29	.24	.11	--					
17	.32	-.23	-.21	.05	-.13	-.19	-.08	.07	-.16	.33	.32	.26	.17	.15	.11	.71	--				
18	.13	-.10	-.03	.03	-.14	-.11	.05	-.00	.03	.27	.18	.35	.15	.14	.14	.61	.47	--			
19	.13	-.11	.01	-.13	-.10	-.08	.09	-.00	-.28	.19	.04	.17	.30	.36	.44	.19	.24	.14	--		
20	.09	-.11	.03	-.09	-.12	-.03	.09	-.14	-.34	.10	.08	.11	.28	.40	.36	.15	.12	.03	.77	--	
21	-.15	.10	.13	.02	-.12	.04	.12	-.03	-.29	.01	.01	.06	.22	.32	.38	.10	.10	.15	.64	.61	--

Note. 1 = Race: White; 2 = Race: African American; 3 = Race: Hispanic; 4 = Child Gender; 5 = Maternal Risk; 6 = Paternal Risk; 7 = Child Temperament; 8 = Maternal Parenting Stress; 9 = Paternal Parenting Stress; 10 = Maternal Sensitivity at 24 Months; 11 = Maternal Positive Regard at 24 Months; 12 = Maternal Cognitive Stimulation at 24 Months; 13 = Paternal Sensitivity at 24 Months; 14 = Paternal Positive Regard at 24 Months; 15 = Paternal Cognitive Stimulation at 24 Months; 16 = Maternal Sensitivity at 36 Months; 17 = Maternal Positive Regard at 36 Months; 18 = Maternal Cognitive Stimulation at 36 Months; 19 = Paternal Sensitivity at 36 Months; 20 = Paternal Positive Regard at 36 Months; 21 = Paternal Cognitive Stimulation at 36 Months. $p < .05$ = bolded.

Table 10. *Model 2: Correlation for Maternal/Paternal Negative Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	--																
2	-.76	--															
3	-.47	-.16	--														
4	-.06	.00	.10	--													
5	-.22	.17	.05	-.09	--												
6	-.29	.20	.12	-.02	.55	--											
7	-.10	.14	.00	.00	.11	.05	--										
8	.05	-.04	-.05	-.02	.08	-.07	.13	--									
9	-.01	.02	-.00	.04	.14	.15	.10	.20	--								
10	-.34	.28	.16	-.03	.09	.25	.07	-.00	.19	--							
11	-.22	.30	-.04	.06	.05	.16	.05	.01	.04	.39	--						
12	-.20	.09	.15	-.07	.05	.23	.15	.03	.13	.30	.13	--					
13	-.14	.11	.09	.11	.06	.21	.24	-.03	.14	.17	.19	.50	--				
14	-.25	.23	.06	-.01	.24	.28	-.03	-.03	.03	.32	.39	.26	.12	--			
15	-.13	.14	.03	-.02	.04	.06	-.08	.05	.01	.34	.33	.15	.04	.44	--		
16	-.12	.02	.15	.09	.00	-.03	-.09	.05	.10	.10	.03	.20	.18	.35	.17	--	
17	-.13	.21	-.07	.10	-.07	-.11	.03	-.07	-.08	.08	.16	.06	.22	.12	.21	.25	--

Note. 1 = Race: White; 2 = Race: African American; 3 = Race: Hispanic; 4 = Child Gender; 5 = Maternal Risk; 6 = Paternal Risk; 7 = Child Temperament; 8 = Maternal Parenting Stress; 9 = Paternal Parenting Stress; 10 = Maternal Intrusiveness at 24 Months; 11 = Maternal Negative Regard at 24 Months; 12 = Paternal Intrusiveness at 24 Months; 13 = Paternal Negative Regard at 24 Months; 14 = Maternal Intrusiveness at 36 Months; 15 = Maternal Negative Regard at 36 Months; 16 = Paternal Intrusiveness at 36 Months; 17 = Paternal Negative Regard at 36 Months. $p < .05$ = bolded.

Actor-Partner Interdependence Models

Model 1: APIM for positive parenting behaviors. The model was estimated using Bayesian Structural Equation Modeling approach (BSEM). The model for positive parenting behaviors provided a good fit to the data. The posterior predictive p -value was .10 and the 95% posterior probability intervals included zero [-21.87, 95.71]. Figure 11 depicts the results of an actor-partner interdependence model (APIM) for positive parenting behaviors. Table 11 presents EAP estimates of unstandardized path loadings for positive parenting behaviors. Table 12 displays EAP estimates of standardized path loadings for positive parenting behaviors.

Covariates. This model was analyzed with covariates: child race, child gender, child temperament, maternal risk, paternal risk, maternal parenting stress and paternal parenting stress. These covariates were controlled for at 24 months. Child race and maternal parenting stress significantly predicted maternal positive parenting behaviors. Child race, paternal risk and paternal parenting stress significantly influenced paternal positive parenting behaviors.

Child race had significant relationships with mothers' positive parenting behaviors and fathers' positive parenting behaviors. In particular, White families had differences in mothers' positive parenting behaviors as compared to other ethnic groups. Mothers in White families showed a higher level of positive parenting behaviors than did mothers in other ethnic families ($B = 1.29, p < .05$, a 95% of credibility interval was between -.05 and 2.72; $\beta = .53, p < .05$; a 95% of credibility interval was between -.02 and 1.09). In addition, Hispanic families had differences in fathers' positive parenting behaviors as compared to other ethnic groups. Fathers in Hispanic families showed a lower level of positive parenting behaviors than did fathers in families of other ethnicities ($B = -1.18, p < .10$, a 95% of credibility interval was between -2.86 and .47; $\beta = -.31, p < .10$; a 95% of credibility interval was between -.74 and .12).

Paternal risk negatively affected fathers' positive parenting behaviors ($B = -.21, p < .05$, a 95% of credibility interval was between $-.40$ and $-.03$; $\beta = -.20, p < .05$; a 95% of credibility interval was between $-.36$ and $-.02$), whereas the relationship between maternal risk and mothers' positive parenting behaviors was not significant. As fathers have more risk factors, the level of fathers' positive parenting was lower.

Maternal parenting stress negatively affected mothers positive parenting behaviors ($B = -.06, p < .001$, a 95% of credibility interval was between $-.10$ and $-.03$; $\beta = -.26, p < .001$; a 95% of credibility interval was between $-.41$ and $-.11$). Accordingly, fathers' parenting stress negatively affected fathers' positive parenting ($B = -.07, p < .01$, a 95% of credibility interval was between $-.12$ and $-.02$; $\beta = -.25, p < .01$; a 95% of credibility interval was between $-.41$ and $-.07$). As the level of maternal and paternal parenting stress was higher, the value of mothers' and fathers' positive parenting behaviors was lower.

Actor effects. A significant actor effect of mothers' positive parenting behaviors at 24 months on their own positive parenting behaviors at 36 months was found ($B = .45, p < .001$, with a 95% probability between $.27$ and $.64$; $\beta = .45, p < .001$, with a 95% credibility interval between $.27$ and $.61$). The actor effect between fathers' positive parenting behaviors at 24 months and their own positive parenting behaviors at 36 months was statistically significant ($B = .47, p < .001$, with a 95% credibility interval between $.26$ and $.69$; $\beta = .46, p < .001$, a 95% credibility interval was between $.25$ and $.63$). These results indicate that a higher value of maternal/paternal positive parenting behaviors at 24 months is associated with a higher value of their own positive parenting behaviors at 36 months.

Partner effects. The results revealed that there was no significant partner effect from maternal positive parenting behaviors at 24 months to paternal positive parenting behaviors at 36

months. However, the partner effect of paternal positive parenting behaviors at 24 months on maternal positive parenting behaviors at 36 months was significant ($B = .17, p < .05$, with a 95% probability between $-.02$ and $.37$; $\beta = .16, p < .05$, with a 95% credibility interval between $-.02$ and $.34$). A higher value of paternal positive parenting behaviors at 24 months was associated with a higher value of maternal positive parenting behaviors at 36 months.

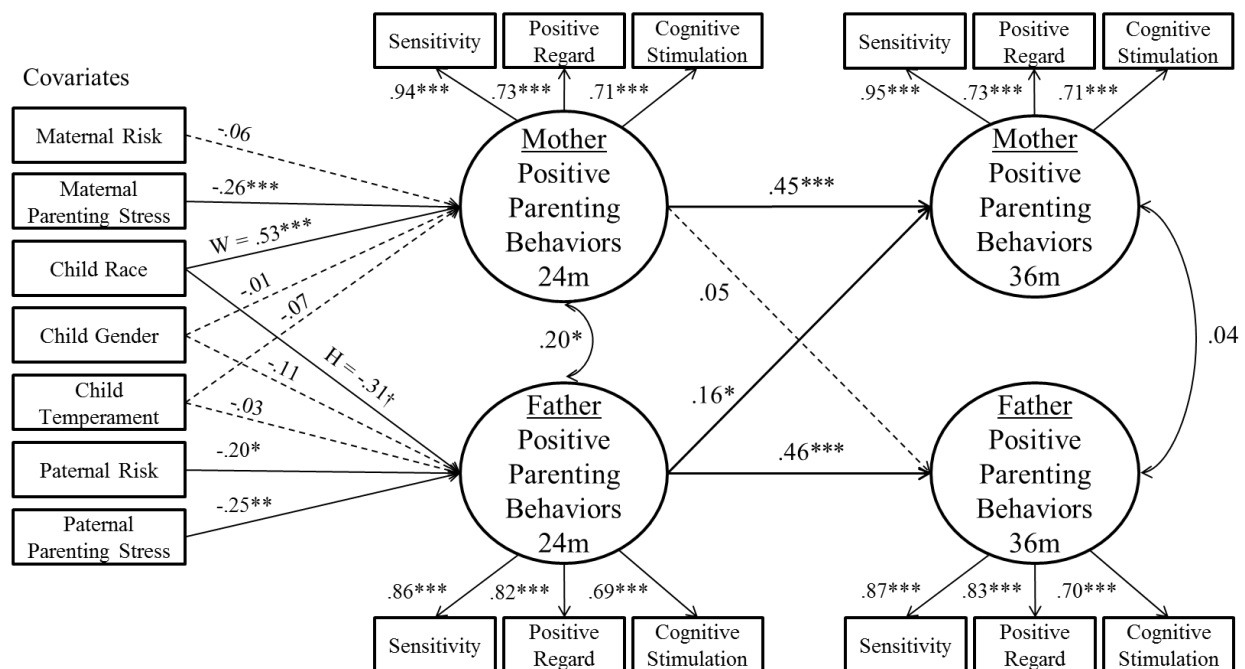


Figure 11. Model 1: EAP Estimates of Standardized Path Loadings for Maternal/Paternal Positive Parenting Behaviors at 24 Months and 36 Month.

Note. W = White; H = Hispanic; Only significant covariates are presented and residuals are suppressed to simplify the figure.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 11. *Model 1: Unstandardized Path Loadings for Maternal/Paternal Positive Parenting*

Pathways	Unstandardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Positive Parenting 24m	1.29*	.71	-.05	2.72
Child Race: White → F Positive Parenting 24m	-.43	.80	-2.00	1.14
Child Race: African American → M Positive Parenting 24m	.44	.72	-.95	1.90
Child Race: African American → F Positive Parenting 24m	-.57	.82	-2.16	1.04
Child Race: Hispanic → M Positive Parenting 24m	.14	.76	-1.31	1.64
Child Race: Hispanic → F Positive Parenting 24m	-1.18†	.85	-2.86	.47
Child Gender → M Positive Parenting 24m	-.03	.18	-.37	.31
Child Gender → F Positive Parenting 24m	-.23	.18	-.58	.13
Child Temperament → M Positive Parenting 24m	-.09	.11	-.30	.12
Child Temperament → F Positive Parenting 24m	-.03	.10	-.24	.17
Maternal Risk → M Positive Parenting 24m	-.07	.10	-.26	.12
Paternal Risk → F Positive Parenting 24m	-.21*	.10	-.40	-.03
Maternal Parenting Stress → M Positive Parenting 24m	-.06***	.02	-.10	-.03
Paternal Parenting Stress → F Positive Parenting 24m	-.07**	.03	-.12	-.02
Actor Effects				
M Positive Parenting 24m → M Positive Parenting 36m	.45***	.10	.27	.64
F Positive Parenting 24m → F Positive Parenting 36m	.47***	.11	.26	.69
Partner Effects				
M Positive Parenting 24m → F Positive Parenting 36m	.05	.10	-.15	.25
F Positive Parenting 24m → M Positive Parenting 36m	.17*	.10	-.02	.37

Note. EAP, expected a posteriori.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 12. *Model 1: Standardized Path Loadings for Maternal/Paternal Positive Parenting*

Pathways	Standardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Positive Parenting 24m	.53*	.28	-.02	1.09
Child Race: White → F Positive Parenting 24m	-.18	.35	-.88	.49
Child Race: African American → M Positive Parenting 24m	.16	.26	-.35	.67
Child Race: African American → F Positive Parenting 24m	-.22	.31	-.82	.39
Child Race: Hispanic → M Positive Parenting 24m	.04	.19	-.33	.40
Child Race: Hispanic → F Positive Parenting 24m	-.31†	.22	-.74	.12
Child Gender → M Positive Parenting 24m	-.01	.08	-.17	.14
Child Gender → F Positive Parenting 24m	-.11	.08	-.27	.06
Child Temperament → M Positive Parenting 24m	-.07	.08	-.24	.10
Child Temperament → F Positive Parenting 24m	-.03	.09	.20	.15
Maternal Risk → M Positive Parenting 24m	-.06	.09	-.23	.11
Paternal Risk → F Positive Parenting 24m	-.20*	.09	-.36	-.02
Maternal Parenting Stress → M Positive Parenting 24m	-.26***	.08	-.41	-.11
Paternal Parenting Stress → F Positive Parenting 24m	-.25**	.09	-.41	-.07
Actor Effects				
M Positive Parenting 24m → M Positive Parenting 36m	.45***	.09	.27	.61
F Positive Parenting 24m → F Positive Parenting 36m	.46***	.10	.25	.63
Partner Effects				
M Positive Parenting 24m → F Positive Parenting 36m	.05	.10	-.15	.25
F Positive Parenting 24m → M Positive Parenting 36m	.16*	.09	-.02	.34

Note. EAP, expected a posteriori.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Model 2: APIM for negative parenting behaviors. The model was estimated using the Structural Equation Modeling approach (SEM). The model fit for negative parenting behaviors was acceptable. The posterior predictive p -value was .06 and the 95% posterior probability intervals contained zero [-10.37, 94.01]. Figure 12 depicts results of the actor-partner interdependence model (APIM) for negative parenting behaviors. Table 13 presents EAP estimates of unstandardized path loadings for negative parenting behaviors. Table 14 shows EAP estimates of standardized path loadings for negative parenting behaviors.

Covariates. This model was analyzed with covariates: child race, child gender, child temperament, maternal risk, paternal risk, maternal parenting stress and paternal parenting stress. These covariates were controlled for at 24 months. Child race was the significant predictor of maternal negative parenting behaviors. Child temperament and paternal parenting stress significantly influenced paternal negative parenting behaviors.

African American families had differences in mothers' negative parenting behaviors as compared to other ethnic groups. Mothers in African American families showed a higher level of negative parenting behaviors than mothers in other ethnic groups ($B = 1.34, p < .10$, a 95% of credibility interval was between -.55 and 3.28; $\beta = .50, p < .10$; a 95% of credibility interval was between -.21 and 1.17).

Child temperament (i.e., child emotionality) positively affected paternal negative parenting behaviors ($B = .42, p < .01$, with a 95% credibility interval between .13 and 1.77; $\beta = .31, p < .01$, a 95% of probability was between .10 and .53). Higher value of child temperament (i.e., child emotionality) was associated with a higher value of fathers' negative parenting behaviors.

Fathers' parenting stress positively predicted fathers' negative parenting ($B = .11, p < .01$, a 95% of credibility interval was between .03 and .39; $\beta = .33, p < .01$; a 95% of credibility interval was between .10 and .55). As the level of paternal parenting stress was higher, the value of fathers' negative parenting behaviors became higher.

Actor effects. A significant actor effect of mothers' negative parenting behaviors at 24 months on their own negative parenting behaviors at 36 months was found ($B = .75, p < .001$, with a 95% credibility interval between .50 and 1.02; $\beta = .70, p < .001$, a 95% probability was between .49 and .87). This result indicates that higher value of maternal/paternal negative parenting behaviors at 24 months is associated with a higher value of their own negative parenting behaviors at 36 months. However, there was no significant actor effect of fathers' negative parenting behaviors at 24 months on fathers' own negative parenting behaviors at 36 months.

Partner effects. There was a significant partner effect of maternal negative parenting at 24 months on paternal negative parenting at 36 months ($B = .41, p < .01$, a 95% probability was between .10 and 3.69; $\beta = .42, p < .01$, a 95% credibility interval was between .11 and .96). However, the partner effect from paternal negative parenting at 24 months to maternal negative parenting at 36 months was not significant.

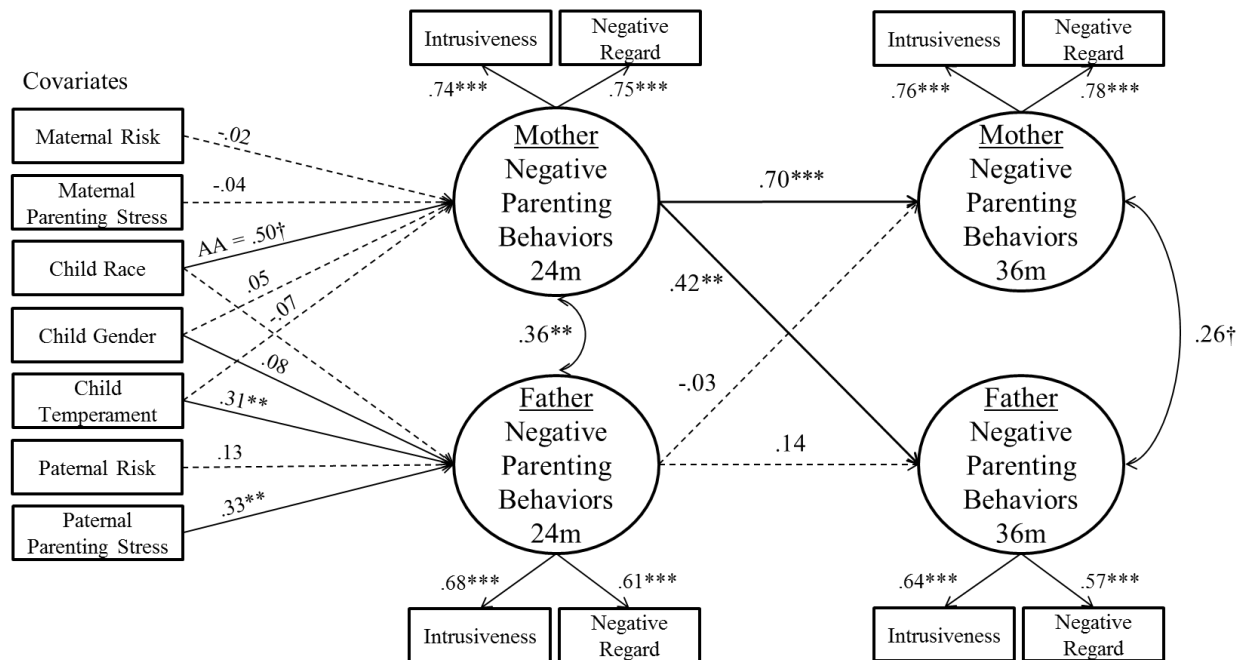


Figure 12. Model 2: EAP Estimates of Standardized Path Loadings for Maternal/Paternal Negative Parenting Behaviors at 24 Months and 36 Month.

Note. AA = African American; Only significant covariates are presented and residuals are suppressed to simplify the figure.

† $p < .10$. ** $p < .01$. *** $p < .001$.

Table 13. *Model 2: Unstandardized Path Loadings for Maternal/Paternal Negative Parenting*

Pathways	Unstandardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Negative Parenting 24m	.09	.96	-1.78	1.97
Child Race: White → F Negative Parenting 24m	-.74	3.37	-16.96	1.16
Child Race: African American → M Negative Parenting 24m	1.34†	.98	-.55	3.28
Child Race: African American → F Negative Parenting 24m	-.45	2.93	-13.11	1.49
Child Race: Hispanic → M Negative Parenting 24m	.60	1.01	-1.35	2.57
Child Race: Hispanic → F Negative Parenting 24m	.09	2.46	-10.73	2.11
Child Gender → M Negative Parenting 24m	.12	.20	-.27	.51
Child Gender → F Negative Parenting 24m	.21	.38	-.28	1.09
Child Temperament → M Negative Parenting 24m	-.08	.12	-.31	.15
Child Temperament → F Negative Parenting 24m	.42**	.51	.13	1.77
Maternal Risk → M Negative Parenting 24m	-.02	.11	-.23	.19
Paternal Risk → F Negative Parenting 24m	.16	.37	-.10	1.46
Maternal Parenting Stress → M Negative Parenting 24m	-.01	.02	-.05	.03
Paternal Parenting Stress → F Negative Parenting 24m	.11**	.11	.03	.39
Actor Effects				
M Negative Parenting 24m → M Negative Parenting 36m	.75***	.13	.50	1.02
F Negative Parenting 24m → F Negative Parenting 36m	.13	.16	-.20	.42
Partner Effects				
M Negative Parenting at 24m → F Negative Parenting at 36m	.41**	.76	.10	3.69
F Negative Parenting at 24m → M Negative Parenting at 36m	-.03	.12	-.27	.19

Note . EAP, expected a posteriori.

† $p < .10$. ** $p < .01$. *** $p < .001$.

Table 14. *Model 2: Standardized Path Loadings for Maternal/Paternal Negative Parenting*

Pathways	Standardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Negative Parenting 24m	.04	.40	-.75	.80
Child Race: White → F Negative Parenting 24m	-.28	.43	-1.47	.44
Child Race: African American → M Negative Parenting 24m	.50†	.35	-.21	1.17
Child Race: African American → F Negative Parenting 24m	-.15	.38	-1.06	.50
Child Race: Hispanic → M Negative Parenting 24m	.16	.26	-.35	.66
Child Race: Hispanic → F Negative Parenting 24m	.02	.26	-.58	.50
Child Gender → M Negative Parenting 24m	.05	.09	-.13	.23
Child Gender → F Negative Parenting 24m	.08	.10	-.11	.28
Child Temperament → M Negative Parenting 24m	-.07	.10	-.25	.13
Child Temperament → F Negative Parenting 24m	.31**	.11	.10	.53
Maternal Risk → M Negative Parenting 24m	-.02	.10	-.21	.17
Paternal Risk → F Negative Parenting 24m	.13	.11	-.08	.37
Maternal Parenting Stress → M Negative Parenting 24m	-.04	.09	-.22	.15
Paternal Parenting Stress → F Negative Parenting 24m	.33**	.11	.10	.55
Actor Effects				
M Negative Parenting 24m → M Negative Parenting 36m	.70***	.10	.49	.87
F Negative Parenting 24m → F Negative Parenting 36m	.14	.17	-.21	.46
Partner Effects				
M Negative Parenting at 24m → F Negative Parenting at 36m	.42**	.19	.11	.96
F Negative Parenting at 24m → M Negative Parenting at 36m	-.03	.12	-.27	.20

Note . EAP, expected a posteriori.

† $p < .10$. ** $p < .01$. *** $p < .001$.

Discussion for Study 1

This study investigated stability in parenting, via the actor-partner relationship between maternal/paternal parenting (positive/negative) behaviors, from 24 months to 36 months using Bayesian Structural Equation Modeling (BSEM). The results revealed actor effects for mothers' and for fathers' positive parenting. That is, mothers' and fathers' positive parenting behaviors at 24 months predicted each parent's own positive parenting behaviors at 36 months, suggesting stability in each parent's positive parenting behaviors across time. Partner effects were also found, emphasizing the interdependent nature of parenting. Specifically, paternal positive parenting at 24 months influenced maternal positive parenting at 36 months. With regard to negative parenting, actor effects were only found for mothers' behaviors such that mothers' 24 month negative parenting predicted their subsequent negative parenting at 36 months. Partner effects were found for mothers' influence on fathers such that maternal negative parenting at 24 months positively predicted paternal negative parenting behaviors at 36 months. There were no partner effects for fathers' influence on mothers. Research findings in the current study emphasize how system dynamics between maternal and paternal parenting behaviors clearly exist in a family context and that the interdependence between mothers and fathers highlights the importance of mothers' and fathers' influences on their partner's parenting behaviors.

Actor Effects of Mothers' and Fathers' Positive/Negative Parenting Behaviors

As I hypothesized, significant actor effects were found between mothers' parenting behaviors at 24 and 36 months in both positive and negative parenting models. Consistent with prior research demonstrating stability of parenting behaviors (Dallaire & Weinraub, 2005; Else-Quest et al., 2011; Huang et al., 2009; Verhoeven et al., 2007), these findings reflect that mothers in the current study show stability in their parenting behaviors (positive and negative) for over a

year. In particular, as mothers who respond to their children with sensitivity and in positive manners at 24 months, they tend more to demonstrate positive parenting behaviors (i.e., sensitivity, positive regard, and cognitive stimulation) at 36 months. Likewise, as mothers control and manipulate behaviors of children in a negative direction (i.e., high intrusiveness and negative regard) at 24 months, a higher level of negative parenting behaviors can be observed from mothers at 36 months. In sum, maternal earlier parenting behaviors are crucial in establishing the tendencies of their own future parenting behaviors. The stability of mothers' parenting behaviors at 24 months and 36 months was shown in the current study, even though children's characteristics (i.e., child race, gender and child temperament) were controlled for. In other words, mothers' parenting behaviors stable were stable at 24 months and 36 months regardless of children's race, gender and temperament. The stability of maternal parenting behaviors support the idea that toddlerhood is a period in which parenting behaviors are settled and stable (Barlow et al., 2005; Dallaire & Weinraub, 2005; Waylen & Stewart-Brown, 2010). This result implies that providing preventive intervention for mothers at the beginning of parenthood may be recommended.

Actor effects for fathers, however, suggest stability for positive parenting only; fathers' negative parenting was not stable. These results are inconsistent with previous research findings which reported fathers' high stability in both positive and negative parenting behaviors (Verhoeven et al., 2007). Differences in child age between previous research and this study may cause these different results. Previous research measured parenting behaviors at 17, 23 and 29 months—early to mid-toddlerhood (Verhoeven et al., 2007); whereas our study measures at 24 and 36 months—late toddlerhood. Because toddlerhood is a period when a child develops its autonomy, parents may develop more variety of parenting behaviors depending on child's

developmental changes at the end of the toddlerhood compared to early to mid-toddlerhood. Thus, my study, which assesses late toddlerhood as opposed to mid-toddlerhood, may capture more variances in fathers' parenting behaviors as the assertion of toddler autonomy increases. Moreover, these differing results may be explained, in part, by the context of observations (e.g., play context vs. caregiving context) in this study. Previous research was based on self-reporting by each parent (Verhoeven et al., 2007); whereas, parenting behaviors in the current study were observed for 10 minutes during semi-structured play time of each parent-child dyad in a home. Since parents use more power assertive expressions in the caregiving context than in the play context (Lindsey et al., 2010), negative parenting behaviors may be less likely to be observed in the play context. Moreover, fathers are active physical players for their children and enjoy playing like a same-age peer in the play context (John, Halliburton & Humphrey, 2013; Kornhaber & Marcos, 2000; Schoppe-Sullivan, Kotila, Jia, Lang & Bower, 2013). For example, fathers frequently held their child in their laps to play more physically (Chiarello & Huntington, 2006). Fathers are more likely to let children play as they want and tend more to follow a child's leads than mothers do (John et al., 2013). Fathers also use polite commands more often than mothers do (Lindsey et al., 2010). These behavioral characteristics of fathers are more related to positive aspects of parenting in a play context; thus, negative responses of fathers may be rarely found during play time. In particular, 10 minutes is a relatively short time to observe a variety of parenting behaviors, and free play at home is not a situation which triggers any tension or conflict between parent and child. As a result, little variation in negative parenting behaviors may cause non-significant results for actor effect of paternal negative parenting behaviors at 24 months on negative parenting behaviors of fathers at 36 months.

Non-significant actor effects between fathers' negative parenting at 24 months and at 36 months may mean that fathers have little stability of negative parenting behaviors over time as opposed to mothers whose stability of negative parenting behaviors are strong. Contrary to the negative parenting behaviors, I found significant actor effects between fathers' positive parenting behaviors at 24 months and at 36 months, indicating strong stability in paternal positive parenting behaviors. Weak stability of fathers' negative parenting and strong stability of fathers' positive parenting present possibility that fathers are more malleable to alter and adjust their negative parenting behaviors into positive parenting behaviors; therefore, fathers may take more advantages of prevention and intervention programs which aim to promote positive aspects of parenting.

Partner Effects for Mothers' and Fathers' Positive/Negative Parenting Behaviors

Patterns of partner effects between the positive parenting model and negative parenting model were different. In the positive parenting model, paternal positive parenting behaviors at 24 months influenced maternal positive parenting behaviors at 36 months. In the negative parenting model, maternal negative parenting behaviors at 24 months affected paternal negative parenting behaviors at 36 months. Results in this study show that the role of fathers is more apparent for positive parenting behaviors, whereas mothers' role is more obvious in negative parenting behaviors.

Findings for positive parenting behaviors do not correspond to the results of Barnett et al.'s study (2008), in which they found no partner effects between maternal/paternal positive parenting and paternal/maternal positive parenting. However, when the marital relationship is considered, the interdependence (i.e., bidirectional relationships) between mothers' and fathers' positive parenting behaviors is found in Barnett et al.'s study (2008). Specifically, mothers elicit

more fathers' supportive behaviors when they are satisfied with their marriage. Accordingly, mothers' supportive parenting behaviors are increased when fathers' marital satisfaction and their supportive parenting behaviors are high. Previous studies which include marital relationship of mothers and fathers as study variables have highlighted the mothers' role in positive parenting behaviors (Allen & Hawkins, 1999; Pedro et al., 2012; Schoppe-Sullivan et al., 2008).

Specifically, a mother is often perceived as a gatekeeper who decides parenting roles in a family (Allen & Hawkins, 1999; Schoppe-Sullivan et al., 2008); therefore, mothers' opinions and beliefs about relationships in a family may determine fathers' positive parenting behaviors (Pedro et al., 2012). Our results may not correspond with the previous studies because of the absence of marital relationship in the current study. I speculate that positivity of fathers in the current study may spill over into mother-child interaction when mothers feel satisfaction with their partners as "good fathers". In this case, fathers' input to positive parenting behaviors can be perceived as encouragement and support to mothers; therefore, mothers can be more motivated to respond to their children in positive manners. Another possibility is that positivity between mothers and fathers may make mothers feel more connected to fathers and those positive vibes spill over into warmer interaction with the child.

Similar to Barnett et al.'s study (2008), I found a significant unidirectional partner-effect relationship from maternal negative parenting behaviors to paternal negative parenting behaviors, which supports our hypothesis. As mothers respond negatively to their children during early toddlerhood, fathers are more likely to treat their children in negative ways (e.g., controlling children's behaviors). The result of the current study supports the idea that mothers' high negative affect elicit fathers' harsh/negative parenting behaviors, whereas fathers' negative parenting behaviors are less susceptible to their own negative affect (Murdock et al., 2014). In

addition, fathers who perceive themselves as secondary caregivers may follow the parenting practices of mothers who are considered as primary caregivers (Cancian & Oliner, 2000); if so, they do so without judging mothers' behaviors, simply by observing their partners' parenting behaviors. In this regard, mothers' negative aspect of parenting behaviors can transfer easily to fathers' negative parenting behaviors.

Actor Effects vs. Partner Effects

Positive parenting model: stronger actor effects than partner effects on maternal positive parenting behaviors. In the current study, mothers' positive parenting behaviors at 36 months were more influenced by their own positive parenting behaviors at 24 months than by fathers' positive parenting behaviors at 24 months. This finding reflects that mothers may rely more on their own parenting experience, knowledge and beliefs than on the fathers' way of caring for children when they determine how they support their children. A possible explanation is that mothers are more likely to differentiate parent-child relationship and parent-parent relationship than fathers are. Mothers who are primary caregivers tend more to focus on their child's safety and wellbeing rather than on their marital relationship; therefore, mothers can build constructive parent-child relationships regardless of the quality of parent-parent relationship (Feldman, 2000). Indeed, less negative spillover from negative parent-parent relationship on mother-child relationship is reported in the previous studies (Davies, Sturge-Apple, Woitach & Cummings, 2009; Feldman, 2000). In addition, mothers are more dependent on their own parenting experience than are fathers because mothers have plenty of opportunities to care for their child and to accumulate more experience related to parenting than fathers do (Maroto-Navarro et al., 2013; Moon & Hoffman, 2008; Renk et al., 2003; Wang, 2013).

Negative parenting behaviors: mothers' dominant role in both actor effects and partner effects. In the negative parenting model, only mothers' negative parenting at 24 months influenced their partner's as well as their own negative parenting behaviors a year later, whereas fathers' impact was minimal. This result stresses mothers' roles as gatekeepers in that fathers' decision making regarding parenting behaviors is more based on mothers' parenting behaviors than on fathers' own parenting experience in the past. Mothers' roles in negative parenting may be more apparent because mothers more easily separate the parent-child relationship from the parent-parent relationship whereas fathers are more susceptible to the relationship with their partner for developing their own parenting behaviors (Davies et al., 2009; Feldman, 2000). In Davies et al.'s study (2009), negative mother-father relationship only affects fathers' increase of negative parenting behaviors to their child (e.g., paternal psychological control, paternal insensitivity to children's stress). In other words, negative parent-parent relationship harms the caregiving system for not mothers but fathers, which indicates that there may be less negative spill over from negative parent-parent relationship on mother-child relationship. Mothers may support their child regardless of fathers' negativity or presence of paternal negative parenting behaviors.

Another possible explanation is that mothers' gatekeeping may deprive fathers of their chance to learn parenting skills from mothers, thus fathers can be more negative toward his child. In addition, fathers may argue less against mothers' negative parenting behaviors (e.g., harsh punishment, rejection and high level of control) due to their own lack of knowledge about parenting practices and limited experience regarding child rearing, as compared to mothers (Halle et al., 2008; Radey & Randolph, 2009); therefore, fathers may agree passively with their partners' harsh parenting.

In fact, mothers who are more likely to devote attention to parenting practices are considered to exhibit the most influential family system which impacts the overall family climates and child development (Renk et al., 2003). Therefore, characteristics of mothers should be considered carefully when we think about how negative parenting behaviors exist in a family context. For example, mothers' characteristics such as personality traits (e.g., high neuroticism, low agreeableness) (Clark, Kochanska & Ready, 2000; Coplan, Reichel & Rowan, 2009) and negative developmental histories in the family-of-origin (e.g., abuse) (Conger, Schofield & Neppl, 2012) can cause the current destructive parenting behaviors of mothers (e.g., harsh parenting). In addition, mothers' cumulative harsh parenting may strongly impact the destructive family climate due to their role in families as primary caregivers who are the partners who are more responsible for child rearing practices (Pedersen, 2012; Renk et al., 2003). Because this study did not control for mothers' personality and parenting which they received from their families-of-origin, but rather, for mothers' risk factors and their parenting stress, future studies should consider mothers' characteristics in order to understand which characteristics of mothers account for mothers' strong influence on fathers' negative parenting.

The Effects of Covariates

This study found that family race and paternal parenting stress are the covariates which influenced parenting behaviors in both positive parenting model and negative parenting model. In particular, the relationship between child race and maternal/paternal parenting behaviors showed various patterns. Mothers' positive parenting behaviors in White families, mothers' negative parenting behaviors in African American families, as well as fathers' positive parenting behaviors in Hispanic families are different from those of other ethnic groups. This result suggests that race might be an important moderator for the interrelationship between maternal

and paternal parenting behaviors. The effects of parenting stress were apparent in fathers' parenting. Fathers with high parenting stress demonstrated lower level of fathers' positive parenting and higher level of negative parenting behaviors. For mothers, their own parenting stress was connected to not their negative parenting behaviors but positive parenting behaviors. Consequently, based on findings of base models in the current study, I will pursue race and maternal/paternal parenting stresses as potentially important moderators in subsequent studies.

Limitations

Several limitations must be considered when interpreting the results of the current study. Categorizing parenting behaviors into "positive" and "negative" can cause oversimplification of the ideas that positive parenting behaviors are "good" and negative parenting behaviors are "bad". This study sheds light on broad dyadic pictures of mothers' and fathers' supportive parenting and less supportive parenting behaviors; therefore, parenting behaviors were intertwined for this purpose. Because I am more focused on the two broad categories of parenting behaviors (i.e., positive parenting and negative parenting), unique patterns of dyadic relationships of each parenting behavior are overlooked. Future studies need to look at dyadic relationships between mothers and fathers for each parenting behavior (e.g., sensitivity, positive regard, cognitive stimulation, intrusiveness, negative regard and detachment individually) in order to consider distinct characteristics and roles of each parenting behavior for mothers and fathers.

As the pre-existing data set was utilized for data analysis, some possible variables (e.g., marital relationship and maternal/paternal characteristics) which may affect the result of this study could not be included. For example, marital relationship was not examined with study variables in the current study, although the quality of marital relationships has been reported as a

crucial factor which influences positive parenting behaviors as moderator (Barnett et al., 2008; Pedro et al., 2012). Characteristics of both mothers and fathers (e.g., personality, parenting history from their family of origin) were unexplained with maternal and paternal parenting behaviors in the present study. Based on the previous study regarding the relationship between the Big Five personality factors of parents and their parenting practices (Prinz, Stamps, Dekovic, Reijntjes & Belsky, 2009), personality dimensions (i.e., extraversion, agreeableness, conscientiousness, openness and neuroticism) need to be added in order to understand how each parent's personality contributes to the actor and partner effects in maternal/paternal parenting behaviors. Considering these factors may give us a chance to look at the interdependence between maternal and paternal parenting behaviors thoroughly, resulting in an increased understanding of the dynamic relationship in a family context. In sum, future studies should include or control for a variety of variables regarding determinants of parenting behaviors for both mothers and fathers.

CHAPTER 3

STUDY 2: ACTOR AND PARTNER EFFECTS IN THE RELATIONSHIP BETWEEN MATERNAL/PATERNAL PARENTING BEHAVIORS AT 36 MONTHS AND MATERNAL/PATERNAL PERCEPTIONS OF CHILD AGGRESSION AT 5 YEARS

Literature Review for Study 2

The purpose of this section is to review the existing literature on relations between maternal/paternal parenting behaviors and maternal/paternal perceptions regarding children's behavior problems, and to do so from a systematic perspective. Research is reviewed relative to relations between a parent's own parenting behaviors and the child's behavioral outcomes as well as research focusing on how one parent's behaviors may influence the other parent's perception of the child. As I discussed in Study 1, the relationships between maternal/paternal parenting behaviors and maternal/paternal perceptions of child externalizing behavior problem are theoretically explained based on the *spillover hypothesis* and *crossover hypotheses*. The spillover hypothesis, an intra-individual transmission, accounts for the maternal/paternal parenting behaviors and their own perceptions of child externalizing behaviors. The crossover hypothesis, on the other hand, supports the interdependence between maternal/paternal parenting behaviors and the paternal/maternal perceptions of child externalizing behaviors. Research studies which include both fathers and mothers of children in early childhood in the study samples were chosen to be reviewed in this section. Research questions and hypotheses for the current study are presented at the end of the section. I begin first with an examination of literature pertaining to mothers' and fathers' perceptions of children's behavior problems as a context for the study. Next, I turn to literature regarding the spillover of parenting behavior to

child behavior and I then review literature suggesting the crossover of one parent's behavior to the child's behavior, and, specifically, to the other parent's perceptions of the child's behaviors.

Mothers' and Fathers' Perceptions of Children's Externalizing Behavior Problems

Perception is the way that one person understands the world and perception plays a role in guiding our behaviors (Dijksterhuis & Bargh, 2001). In a family context, mothers' and fathers' perceptions of their children's behaviors are salient, because parental perception can be directly connected to parents' decision-making in child rearing and because this perception can influence the development of children (Glascoe & Leew, 2010). Maternal and paternal perceptions of child behaviors can be established and developed based on not only their own parenting experience with a child, but also on information or opinions from their partner. In other words, mothers and fathers get ideas about how their children behave through their own direct interactions with children. In addition, they construct perceptions about their children's behaviors by observing the partner-child interactions or having conversations about the child with their partner. Mothers' and fathers' perceptions are thus interdependent; that is, one parent's perception is, to some extent, informed by the other parent's perceptions of the child. Due to daily interactions in the home, parents may have similar and/or dissimilar perceptions toward their children's behaviors.

Studies about maternal and paternal perceptions have reported contradictory results. Some researchers (Baker & Heller, 1996; Grietens et al., 2004) have reported that mothers' and fathers' perceptions of child behavior problems are similar. Because mothers and fathers are main caregivers who coparent their children, couples are used to sharing information about children and having conversations about their children's life (Doherty & Beaton, 2004). Moreover, mothers' and fathers' perception of children's behaviors are positively interrelated

with each other (Kurdeck, 2003; Seiffge-Krenke & Kollmar, 1998). These findings imply that mothers and fathers are more likely to have similar opinions regarding their children's behaviors.

Other researchers stressed dissimilarities on maternal and paternal perceptions of child behavior problems (Calzada et al., 2004; Seiffge-Krenke & Kollmar, 1998; Webster-Stratton, 1988). They argued that mothers tend to perceive higher levels of child behavior problems than fathers (Seiffge-Krenke & Kollmar, 1998; Webster-Stratton, 1988). In addition, mothers are more worried about children's behavior problems than are fathers (Calzada et al., 2004; Webster-Stratton, 1988). Because mothers tend more to spend greater amounts of time with their children than do fathers (Maroto-Navarro et al., 2013; Wang, 2013), mothers may have more chances relative to fathers to observe children's misbehaviors in daily interactions. Furthermore, perceptions of children's behavior can vary and differ because of the effects of parents' non-shared and shared experience. Each parent may establish his/her own perception of children through experiences in dyadic interactions (i.e., non-shared experience: mother-child interaction, father-child interaction) as well as experiences in triadic interactions (i.e., shared experience: mother-father-child interactions) (Calzada et al., 2004).

The Relationship between Maternal/Paternal Parenting Behaviors and Children's Externalizing Behavior Problems: Spillover and Crossover Effects

Although there is a wealth of research evidence which supports the causal relationship between maternal/paternal parenting behaviors and children's behavior problems, studies which account for both spillover effects and crossover effects in the relationship between parenting behaviors of mothers/fathers and maternal/paternal perceptions of child externalizing behavior problems are rarely found. Research which has both mothers' and fathers' parenting data with children's behavior problem is selected and reviewed in this section. Only one study

(Gryczkowski et al., 2010) clearly focuses on both mothers' and fathers' perceptions of child externalizing problems along with mothers' and fathers' parenting behaviors, although this study explains not crossover effect, but rather, spillover effect. Otherwise, behavior problems in the selected studies were measured only from one parent (Besnard et al., 2012) or transformed into composite of maternal and paternal scores (e.g., summing or averaging mothers' and fathers' scores) (Stover et al., 2012; Verhoeven et al., 2010).

Research by Gryczkowski et al. (2010) supports spillover effects between maternal/paternal parenting behaviors and maternal/paternal perceptions of child externalizing problems. Mothers' positive parenting and inconsistent discipline are related to mothers' perception of child externalizing behavior problems, whereas fathers' parenting behaviors do not account for fathers' own perception of child externalizing behavior problems. As mothers demonstrate more positive parenting behaviors, mothers tend to perceive and believe their children has less externalizing behavior problems. In addition, mothers who inconsistently discipline their children are more likely to report higher externalizing behavior problems of their children. These results indicate that spillover effects exist from parenting behaviors (i.e., positive parenting and inconsistent discipline) to perception of children's behaviors only for mothers. Similarly, Besnard et al. (2012), which is based on one parent report on child externalizing behaviors (85% from mothers), consistently found that not fathers' but mothers' parenting behaviors influence parental perceptions of child externalizing behaviors. In particular, mothers' positive parenting practices (e.g., involvement with the child, positive reinforcement of children's appropriate behaviors) have longitudinal effects on the decrease of their perceptions of children's disruptive behaviors (e.g., physical aggression, opposition, and hyperactivity) when the children are kindergarten-aged; however, there are no significant longitudinal effects of

fathers' positive parenting behaviors on parental perceptions child behavior problems (Besnard et al., 2012). These findings suggest that mothers' impacts on parental perceptions of children's externalizing behavior problems are stronger than those of fathers. This might be evidence of spillover effects for mothers because child externalizing behavior problems in Besnard et al.'s study (2012) is mostly based on mothers' reports. In sum, spillover effects of parenting behaviors on perceptions of child externalizing problem is present for mothers, the primary caregivers, who are more involved in daily parenting and more strongly related to children's behaviors than fathers are (Moon & Hoffman, 2008; Renk et al., 2003); whereas fathers' spillover effects and crossover effects are not found in the previous research.

Studies, which used composite scores of maternal and paternal perceptions of externalizing behavior problems, could not clearly examine spillover or crossover effects between maternal/paternal parenting behaviors and maternal/paternal perceptions of child externalizing behavior problems. Based on these studies, however, we could get ideas about how maternal and paternal parenting behaviors similarly or differently influence overall parents' perceptions. Research by Stover et al. (2012) found that hostile parenting of both mothers and fathers is associated with a high level of overall parental perceptions of toddler's aggressive behaviors in families in which toddlers have been adopted (Stover et al., 2012). Unlike findings of Stover et al. (2012), Verhoeven et al. (2010) supported that the influence of maternal parenting behaviors on overall parental perceptions of child externalizing behavior problems is stronger than that of paternal parenting. Mothers' support and psychological control predict overall parental perceptions of child externalizing behaviors, whereas only fathers' psychological control influence overall parental perceptions. Specifically, mothers' support helps parents to perceive their child less aggressive. As both mothers and fathers use more psychological control, parents

perceive that their child has more externalizing behavior problems. These findings support the concept that parenting practices from mothers, primary caregivers, have a unique role for determining parents' perceptions of children's externalizing behavior problems.

Previous studies exploring the relationships between maternal and paternal parenting behaviors and parental perceptions of child behavior problems have been limited in several ways. First, previous studies have tended to use child behavior problem scores rated by only a single person (e.g., a mother in a family context, or a teacher in a school context) (Besnard et al., 2012; Green & Baker, 2011; Lunkenheimer et al., 2011) or researchers have tended to use combined scores of mothers and those of fathers (LeRoy, Mahoney, Pargament & DeMaris, 2012; Stover et al., 2012; Verhoeven et al., 2010). Therefore, perceptions of both parents regarding child behavior problems have not been clearly examined in light of maternal and paternal parenting behaviors. Bingham and his colleagues (2003) pointed out that perceptions from mothers and fathers need to be distinguished from one another and included together in a study to get a more complete picture of degree of child behavior problems (Bingham, Loukas, Fitzgerald & Zucker, 2003). Secondly, both parents' parenting behaviors and children's behavior problems were often assessed based on only parents' self-reporting (Besnard et al., 2012; Meunier, Bisceglia & Jenkins, 2012). Using only self-report measures for all study variables can produce bias in the outcomes because self-reported data can be subjective. Third, maternal parenting and paternal parenting have typically been analyzed separately from behavior problems of children (Cryczkowski et al., 2010; Lunkenheimer et al., 2011), thus indicating that dyadic relationships (i.e., spillover and crossover effects) between maternal/paternal parenting behaviors and maternal/paternal perceptions of child behavior problems are rarely discussed together in a longitudinal model. At last, a study which included both mothers and fathers as final samples

(Verhoeven et al., 2010) only considered boy's externalizing problems; therefore, the results of the study is limited in its ability to generalize into all child samples.

The current study assesses perceptions of child behavior problems from both mothers and fathers and uses observation data for maternal/paternal parenting behaviors in order to overcome the limitations of previous studies. This study has an advantage gained through taking a systematic perspective in that I include parenting of mothers and fathers (at 36 months) as predictors and mothers' and fathers' perceptions toward children's behavior problems (at 5 years) as outcomes. There is research evidence which highlights the importance of early parenting on later child outcomes. For example, Besnard et al. (2012) stressed that the influence of parents' parenting on child disruptive behaviors is strong in the early years (upon entry to kindergarten), whereas the effects of parental parenting behaviors on child disruptive behaviors decrease in later years (observed when the children were assessed in 1st grade and 2nd grade) (Besnard et al., 2012). In addition, maternal and paternal interactions in early years create family climates that are likely related to later social-emotional development (Parke et al., 2005). Therefore, this study explores dyadic relations between maternal/paternal parenting at 36 months (during toddlerhood) and maternal/paternal perceptions of children's aggressive behaviors at 5 years (during TPK: Transition from Preschool to Kindergarten) via the actor-partner interdependence model (APIM). I focus on aggressive behaviors of children because externalizing behavior problem is easily observed as compared to internalizing behavior problems. Therefore, more accurate perceptions of mothers and fathers regarding children's behavior problems can be measured by observing aggression of children, instead of observing internalizing behavior problems of children.

Characteristics Related to Maternal/Paternal Parenting Behaviors and Children's Externalizing Behavior Problems

In this section, factors which we need to consider for studying maternal/paternal parenting behaviors and child aggression are discussed. In the dissertation substudies, these characteristics were considered to be covariates. In the current study, based on Belsky's model (2005), I consider family race, child gender, and child emotion regulation to be characteristics of children, and parents' parenting stress and risk factors are considered to be characteristics of parents, as well as being social-contextual factors which occur through social interactions. Family race (Ho et al., 2008; Stormshak, Bierman, McMahon & Lengua, 2000), child gender (Chang et al., 2003; Kopala-Sibley, Zuroff & Koestner, 2011; McKee et al., 2007), child emotion regulation (Brophy-Herb, Stanbury, Bocknek & Horodyski, 2012; Chang et al., 2003; Eisenberg, Spinrad & Eggum, 2010; Frick & Morris, 2004; Hill, Degnan, Calkins & Keane, 2006; Morris, Silk, Steinberg, Myers & Robinson, 2007), parents' risk factors (Burchinal et al., 2008; Cabrera et al., 2011; Campbell, Shaw & Gilliom, 2000; Trentacosta et al., 2008; Verhoeven et al., 2007) and parents' parenting stress (Crnic et al., 2005; Deater-Deckard, 2008) have been discussed in previous research as characteristics which influence parents' parenting behaviors and children's aggression. Because this study is about relations between maternal/paternal parenting behaviors and maternal/paternal perceptions of child aggression, I controlled for individuals' characteristics in order to focus more on spillover and crossover processes. Considering these characteristics is an important first step in this line of work, which lays the foundation for more complex questions of mediators and moderators of crossover and spillover effect.

Family race/ethnicity. Each family establishes and shares different values and beliefs depending on the race/ethnicity (cultural context) of the family. A family's ethnicity is the one of the significant socio-emotional factors which influences parenting behaviors of parents and child outcomes (Ho et al., 2008; Kotchick & Forehand, 2002; Murry et al., 2001). For example, European American parents rate their children's behavior problems higher than African American parents do. In addition, parenting practices such as punitive discipline and physical aggression provoke children's behavior problems (e.g., oppositional behavior and internalizing behavior problems) in European American families rather than in African American families (Stormshak et al., 2000).

Child gender. Parenting behaviors of parents can vary depending on child gender. For example, mothers are more likely to reject (or be indifferent to) their sons than to their daughters; whereas mothers tend to control behaviors of daughters more than those of sons (Kopala-Sibley et al., 2011). Boys receive higher levels of harsh physical discipline from both mothers and fathers than girls do (McKee et al., 2007). Moreover, parenting behaviors can differ per parent-child dyads (i.e., mother-daughter dyad, mother-son dyad, father-daughter dyad and father-son dyads). The degree of physical punishment of father-son dyads is stronger than that of mother-son dyads (Chang et al., 2003; McKee et al., 2007). Fathers are more likely to provide harsh parenting to their sons, and fathers' harsh physical discipline is related to a higher level of behavior problems of sons (McKee et al., 2007).

Emotion regulation. Social influences in several contexts are essential for shaping and developing emotion regulation during childhood (Thompson & Meyer, 2007). Particularly, children develop regulatory strategies based on parental parenting behaviors they received during the parent-child interaction. Specifically, emotion-related socialization behaviors of parents

(e.g., warmth, supportiveness and emotional responsivity) contribute to children's self-regulation strategies (Brophy-Herb et al., 2012). According to "the tripartite model of the impact of the family on children's emotion regulation and adjustment" (Morris et al., 2007, pg. 362), parenting practices (e.g., parenting behaviors related to emotion socialization) influence child adjustment (e.g., internalizing, externalizing behavior problems and social competence) through emotion regulation of children. For example, both mothers' and fathers' harsh parenting make a child aged from 3 to 6 years develop and use more emotion regulation strategies. Harsh parenting of mothers contributes more to emotion regulation of children than does that of fathers; whereas fathers' harsh parenting increases aggressive behaviors of children (Chang et al., 2003).

Researchers have argued that children's ability to regulate emotions is one significant indicator which affects children's later social development and maladjustment (e.g., internalizing and externalizing behavior problems) (Eisenberg et al., 2010; Frick & Morris, 2004). For example, children's low level of emotion regulation in early childhood is related to the chronic-clinical profiles of externalizing behaviors during children's preschool years. Children who have better ability of regulating emotion at 2 years old are less likely to present behavior problems at 5 years old and this trend is apparent not for boys, but rather, for girls (Hill et al., 2006). In sum, previous research supports that children's emotion regulation is a cue to predict later social development. Therefore, without controlling for children's emotion regulation, it is hard to see the effects of maternal/paternal parenting behaviors on children's behavior problems. Specifically, in order to focus on spillover effects and crossover effects between parenting behaviors and perceptions of child behavior problems above and beyond the child's contributions to his/her later behaviors, this study controls for children's emotion regulation.

Maternal/paternal risks. As noted in Chapter 2, cumulative social risks (e.g., maternal low level of education, low family income, single parenthood, stressors, unemployment of parents, the number of children and safety of neighborhood) are strong predictors of negative parenting behaviors (Burchinal et al., 2008). For example, as a family has several risk factors (e.g., adolescent parenthood, low education, unemployment), parents are less sensitive and less supportive to their children (Cabrera et al., 2011). In addition, among characteristics of parents and children, SES was the most significant factor which explains parenting behaviors of mothers and fathers. Parents in low SES families more readily control and punish their children (Verhoeven et al., 2007).

Children in families with multiple problems tend more to develop behavior problems because these children do not have enough chances from their parents during infancy and toddlerhood to learn the way of regulating their negative affect and aggression. Parents' risk factors not only create their own problems in life, but also accelerate children's emotional and behavioral problems (Campbell et al., 2000). In Trentacosta et al.'s study (2008), cumulative family risk index includes 7 indicators such as teenage pregnancy, low education level of primary caregiver, single parenthood, household overcrowding, criminal record of house member, alcohol/drug abuse of primary caregiver and dangerous neighborhood. These risk factors at child aged 2 indirectly influence externalizing behavior problems at age 4 through positive parenting behaviors of mothers (i.e., mothers' nurturing and involved parenting behaviors); however, there is no direct effect of cumulative risk at age 2 on externalizing behavior problems at age 4. In particular, higher cumulative risk leads to a lower level of supportive parenting of mothers and less supportive parenting increases the externalizing behavior problems of children (Trentacosta et al., 2008). This finding accounts for negative

effects of cumulative family risk on the maternal positive parenting behaviors and the indirect influences of family risk on child externalizing behavior problems.

Parenting stress. Early childhood is a period when parents are continuously exposed to the daily hassles of parenting and life stresses in general. Parental stress tends to be accumulated during early childhood and the level of stress is stable or increasing when children become around 5 years old (Baker, McIntyre, Blacher, Crnic, Edelbrock & Low, 2003; Crnic et al., 2005; Neece, Green & Baker, 2012). Cumulative parenting stresses over several years have negative impacts on the parenting behaviors of parents (Crnic et al., 2005; Deater-Deckard, 2008). For example, parents with high parenting stresses are indifferent to a child's well-being and are more likely to be authoritarian parents who verbally and physically punish/control their children (Deater-Deckard, 2008). In addition, mothers' stress related to life events and parenting hassles significantly account for behavior problems of children. Specifically, children tend to have more behavior problems as mothers have high level of stress (Crnic et al., 2005).

Research Questions and Hypotheses

The primary purposes of this study are to (1) test spillover effects between maternal/paternal (positive/negative) parenting behaviors at 36 months and their own perceptions of child aggression at 5 years; (2) test crossover effects between maternal/paternal (positive/negative) parenting behaviors at 36 months and paternal/maternal perceptions of child aggression at 5 years. The present study answers the following two research questions using the actor-partner interdependence model (APIM) with dyadic data across two time points.

Hypotheses are addressed under their corresponding research questions.

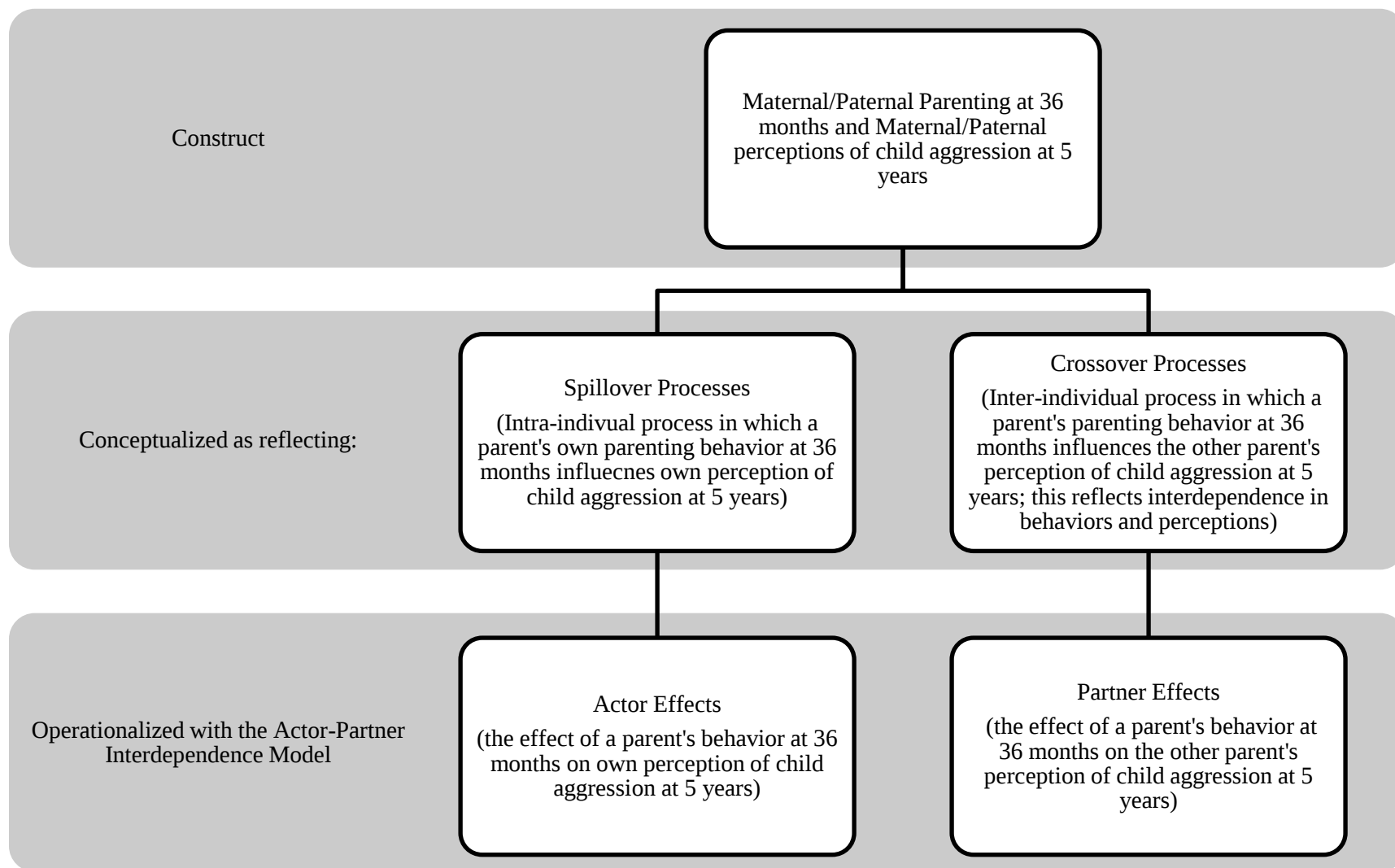


Figure 13. Construct, Conceptual and Operational Definitions of Study Foci

Research question 1. How do mothers' and fathers' positive parenting behaviors at 36 months affect their own (actor effects) and their partner's (partner effects) perceptions of child aggression at 5 years?

Hypothesis 1.a. I hypothesize that there are significant actor effects for the relationship between maternal/paternal positive parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. In particular, I expect that both maternal and paternal positive parenting behaviors at 36 months will negatively predict their own perceptions of child aggression at 5 years.

Hypothesis 1.b. I hypothesize that mothers' positive parenting behaviors at 36 months have greater effects on fathers' (partner effects) perceptions of child behavior problems at 5 years than does fathers' positive parenting at 36 months. I expect that maternal and paternal positive parenting at 36 months will negatively predict mothers' and fathers' perceptions of their children's behavior problems at 5 years.

Research question 2. How do mothers' and fathers' negative parenting behaviors at 36 months affect their own (actor effects) and their partner's (partner effects) perceptions of child aggression at 5 years?

Hypothesis 2.a. I hypothesize that there are significant actor effects between maternal/paternal negative parenting behaviors at 36 months and their own perceptions of child aggression at 5 years. In particular, I expect that mothers' and fathers' negative parenting behaviors at 36 months will positively predict their own perceptions of child aggression at 5 years.

Hypothesis 2.b. I hypothesize that mothers' negative parenting behaviors at 36 months have greater effects on their partners' (partner effects) perceptions of child aggression at 5 years

than do fathers' parenting at 36 months. I expect that maternal and paternal negative parenting behaviors at 36 months will positively predict mothers' and fathers' perceptions of child aggression at 5 years.

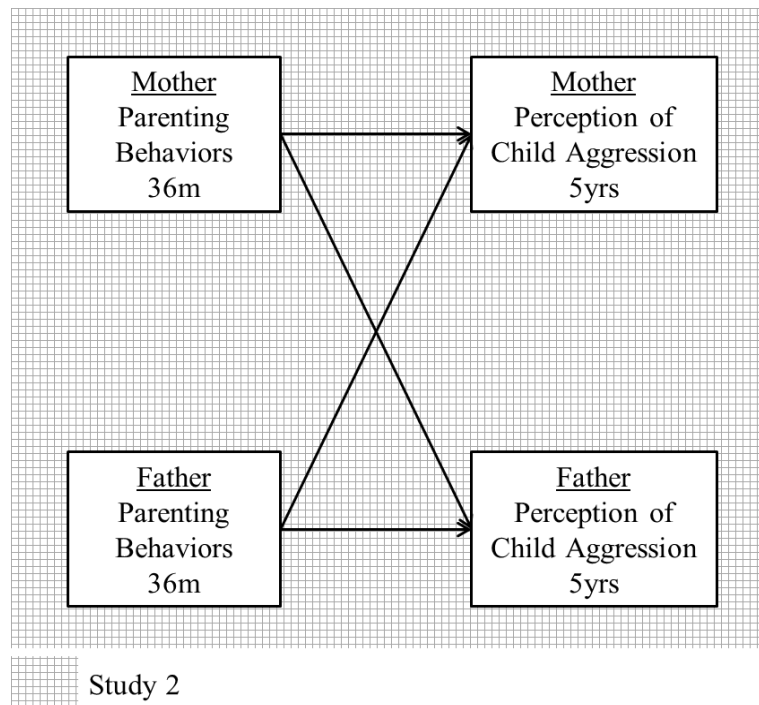


Figure 14. Conceptual Model for Study 2.

Methods for Study 2

In this section, participants, the measurements and data analysis plan of Study 2 are addressed. Because the samples of both Study 1 and Study 2 are from the Early Head Start Research and Evaluation Project (EHSREP), information about data collection procedure is identical to that addressed in Chapter 2; thus, it is omitted in Chapter 3 (see pg. 19).

Participants in the Current Study

Participants in this study are 114 mother-father dyads which are drawn from families in both the National Early Head Start Research and Evaluation Project (EHSREP) and the Father and Child Interaction during Toddlerhood Sub-study (FACITS) (details are described in Chapter 2). Families in which same mothers and fathers participated in two waves--36 months and 5 years--were selected for the current study. In addition, families whose male figures are biological fathers, adopted fathers, or mothers' romantic partners were chosen and only resident fathers/father figures were included as the final sample.

The mean age of children at Time 1 was 39.25 months ($SD = 2.72$) and at Time 2 was 69.41 months ($SD = 4.77$). The mean age of mothers was 23.87 ($SD = 5.46$) years at enrollment of EHSRE project and that of fathers was 26.96 ($SD = 7.17$) years at Time 1 (at 36 months). Half of the families were assigned to Early Head Start program. The majority of families were White ($N = 81$; 71.1%), 56.1% of families ($N = 64$) had girls and 43.9% of families ($N = 50$) had boys. 27 mothers (23.7%) and 22 fathers (19.3%) had less than a high school diploma. Most fathers were employed ($N = 109$; 95.6%) and 30.7% of mothers ($N = 35$) were employed. Father figures in this study consist of biological fathers ($N = 101$; 86.6%), adoptive fathers ($N = 7$; 6.1%) and mothers' romantic partners ($N = 6$; 5.3%) who reside with the focus child. Reports on marital status of mothers and fathers were somewhat inconsistent. 74 mothers (64.9%) reported that they are legally married; whereas, 92 fathers (80.7%) reported that they were married. 27.2% of mothers ($N = 31$) and 6.1% of fathers ($N = 7$) were teenagers when the child was born. Average yearly gross income of these families at 36 months was \$11,853 ($SD = \$8,230$).

Table 15. *Demographic Characteristics for Final Sample (N = 114)*

Demographic	Family	Mother	Father
Early Head Start Treatment Group¹	57 (50.0%)	-	-
Child Race			
White	81 (71.1%)	-	-
African American	22 (19.3%)	-	-
Hispanic	9 (7.9%)	-	-
Other	1 (0.9%)	-	-
No Response	1 (0.9%)	-	-
Child Gender			
Male	50 (43.9%)	-	-
Female	64 (56.1%)	-	-
Education			
Less than High School Diploma (<12)	-	27 (23.7%)	22 (19.3%)
High School Diploma or GED	-	42 (36.8%)	36 (31.6%)
More than High School Diploma (>12)	-	44 (38.6%)	53 (46.5%)
No Response	-	1 (0.9%)	3 (2.6%)
Employment Status			
Unemployed	-	78 (68.4%)	3 (2.6%)
Employed	-	35 (30.7%)	109 (95.6%)
No Response	-	1 (0.9%)	2 (1.8%)
Marital Status			
Single	-	24 (21.1%)	0 (0%)
Married	-	74 (64.9%)	92 (80.7%)
Separated	-	2 (1.8%)	2 (1.8%)
Divorced	-	4 (3.5%)	2 (1.8%)
Unmarried, Cohabiting	-	9 (7.9%)	18 (15.8%)
No Response	-	1 (0.9%)	0 (0%)
Adolescent Parenthood²	-	31 (27.2%)	7 (6.1%)

Note. ¹ Early Head Start Treatment Group = Families which were assigned to the Early Head Start program. ² Adolescent Parenthood = Mother or father became a parent during adolescence.

Measures

Parenting behaviors. Parenting behaviors of mothers and fathers were measured respectively through a 3-bag assessment at 36 months. Parent-child interactions were videotaped in the home during 10 minute semi-structured play with three toys. Contents of the three bags at 36 months for mothers were *The Very Hungry Caterpillar* book in Bag #1; groceries, shopping

basket and cash register in Bag #2; Duplo blocks in Bag #3. Contents of the three bags at 36 months for fathers were *The Very Busy Spider* book in Bag #1; animal toys and medical kits in Bag #2; Duplo blocks in Bag #3. Parenting behaviors of mothers and fathers were coded based on Brady-Smith et al.'s coding system (2000). Other details regarding this scale are the same with those of Study 1 and are not repeated here (see pg. 21 for more information).

To test the reliability and dimensionality of subscales for positive/negative parenting behavior construct for mothers and fathers, confirmatory factor analyses (CFA) were conducted through use of the Bayesian approach. CFA models were carried out for positive parenting behaviors and negative parenting behaviors respectively. Each CFA model had mothers' parenting variables and fathers' parenting variables at 36 months together. CFA models used the Gibbs sampler with four chains, 20,000 iterations with 10,000 burn-in and a 10 thinning interval. Estimated potential scale reduction (PSR) value for all CFA models were around 1.0, indicating that the distributions were thoroughly converged with four chains.

Confirmatory factor analysis (CFA) for maternal/paternal positive parenting behaviors. CFA model of maternal/paternal positive parenting behaviors consist of two latent constructs (i.e., maternal and paternal positive parenting behaviors) and six indicators (i.e., maternal and paternal sensitivity, maternal and paternal positive regards, and maternal and paternal cognitive stimulation). In other words, each construct (i.e., positive parenting behaviors) has three indicators (i.e., sensitivity, positive regard and cognitive stimulation) for mothers and fathers respectively (see Figure 12). This model fits the data well. The posterior predictive *p*-value was .44 and the 95% confidence interval included zero [-18.64, 21.24]. Three indicators of maternal positive parenting behaviors (i.e., maternal sensitivity, maternal positive regard and maternal cognitive stimulation) loaded significantly on the latent variable of maternal

positive parenting behaviors at 36 months. In addition, three indicators of paternal positive parenting behaviors (i.e., paternal sensitivity, paternal positive regard and paternal cognitive stimulation) loaded significantly on the latent variable of paternal positive parenting behaviors at 36 months (see Table 16 and Table 17). EAP estimates of standardized factor loadings for all indicators of the model ranged from .60 to .91. The reliability of maternal positive parenting behaviors was .82. The lower limit of the 95% credibility interval was .76 and the upper limit of the 95% credibility interval was .87. The reliability of paternal positive parenting behaviors was .84. The lower endpoint of the 95% credibility interval was .78 and the upper endpoint of the 95% of the credibility interval was .88.

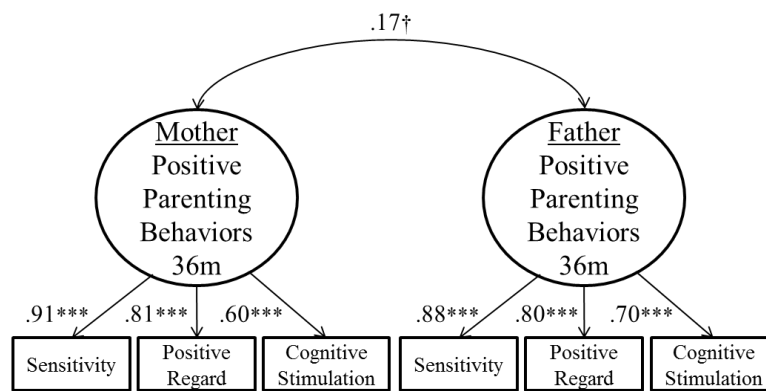


Figure 15. Confirmatory Factor Analysis (CFA) for Maternal/Paternal Positive Parenting Behaviors at 36 Months.

Note. Residuals are suppressed to simplify the figure.

† $p < .10$. *** $p < .001$.

Table 16. *Unstandardized Factor Loadings for Maternal/Paternal Positive Parenting at 36 Months*

Factor	Unstandardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Positive Parenting				
Sensitivity 36m	1.00***	.00	1.00	1.00
Positive Regard 36m	.88***	.12	.69	1.15
Cognitive Stimulation 36m	.65***	.11	.45	.88
Fathers' Positive Parenting				
Sensitivity 36m	1.00***	.00	1.00	1.00
Positive Regard 36m	.91***	.12	.70	1.16
Cognitive Stimulation 36m	.80***	.11	.60	1.04

Note . EAP, expected a posteriori.

*** $p < .001$.

Table 17. *Standardized Factor Loadings for Maternal/Paternal Positive Parenting at 36 Months*

Factor	Standardized EAP	Posterior <i>SD</i>	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Positive Parenting				
Sensitivity 36m	.91***	.05	.80	.99
Positive Regard 36m	.81***	.05	.69	.91
Cognitive Stimulation 36m	.60***	.07	.44	.72
Fathers' Positive Parenting				
Sensitivity 36m	.88***	.05	.77	.97
Positive Regard 36m	.80***	.05	.68	.89
Cognitive Stimulation 36m	.70***	.06	.57	.81

Note . EAP, expected a posteriori.

*** $p < .001$.

Confirmatory factor analysis (CFA) for maternal/paternal negative parenting

behaviors with three indicators. First, a CFA model was conducted with six indicators (i.e., maternal/paternal intrusiveness, maternal/paternal negative regard and maternal/paternal

detachment) and two latent constructs (i.e., maternal/paternal negative parenting behaviors). Each latent construct has three indicators (i.e., intrusiveness, negative regard and detachment) in this model. This model fits the data well. The posterior predictive p -value was .12 and the 95% confidence interval included zero [-8.90, 31.79]. Maternal intrusiveness and maternal negative regard loaded significantly on the latent variable of maternal negative parenting behaviors. Paternal intrusiveness and paternal negative regard loaded significantly on the latent variable of paternal negative parenting behaviors. EAP estimates of standardized factor loadings for these indicators (i.e., maternal/paternal intrusiveness, maternal/paternal negative regard) ranged from .48 to .80. However, maternal/paternal detachment did not load significantly on the latent variables of maternal/paternal negative parenting behaviors. In addition, EAP estimates of standardized factor loadings for maternal and paternal detachment were .13, which is lower than .40. As a result, detachment could not get together with intrusiveness and negative regard as indicators for the latent variables of negative parenting behaviors. Therefore, the final CFA model for maternal/paternal negative parenting behaviors was reanalyzed without maternal and paternal detachment.

Confirmatory factor analysis (CFA) for maternal/paternal negative parenting behaviors with two indicators. CFA model with two indicators (i.e., intrusiveness, negative regard) for each latent construct fit the data well (see Figure 13). The posterior predictive p -value was .48 and the 95% credibility interval included zero [-14.58, 14.85]. Maternal intrusiveness and maternal negative regard loaded significantly on the latent variable of maternal negative parenting behaviors. Paternal intrusiveness and paternal negative regard loaded significantly on the latent variable of paternal negative parenting behaviors. EAP estimates of standardized factor loadings for all indicators (i.e., maternal/paternal intrusiveness,

maternal/paternal negative regard) ranged from .51 to .78 (Tables 18 and 19). The reliability of maternal negative parenting behaviors was .72. The lower and the upper bounds of the 95% credibility interval were .57 and .81. The reliability of paternal negative parenting behaviors was .56. The lower and upper limits of the 95% credibility interval were .33 and .71.

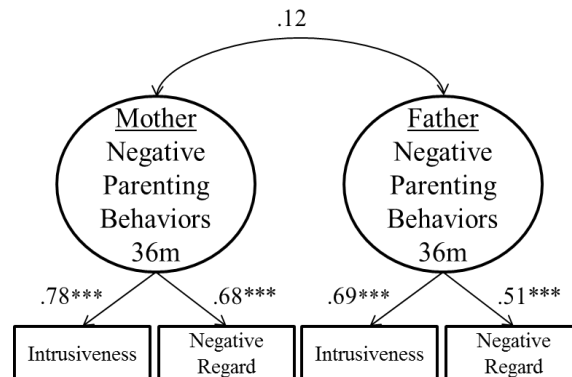


Figure 16. Confirmatory Factor Analysis (CFA) for Maternal/Paternal Negative Parenting Behaviors at 36 Months.

Note. Residuals are suppressed to simplify the figure.

*** $p < .001$.

Table 18. Unstandardized Factor Loadings for Maternal/Paternal Negative Parenting at 36 months

Factor	Unstandardized EAP	Posterior <i>SD</i>	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Negative Parenting				
Intrusiveness 36m	1.00***	.00	1.00	1.00
Negative Regard 36m	.87***	.39	.47	1.93
Fathers' Negative Parenting				
Intrusiveness 36m	1.00***	.00	1.00	1.00
Negative Regard 36m	.73***	.66	.27	2.65

Note . EAP, expected a posteriori.

*** $p < .001$.

Table 19. *Standardized Factor Loadings for Maternal/Paternal Negative Parenting at 36 months*

Factor	Standardized EAP	Posterior <i>SD</i>	95% C.I.	
			Lower 2.5%	Upper 2.5%
Mothers' Negative Parenting				
Intrusiveness 36m	.78***	.14	.49	.99
Negative Regard 36m	.68***	.14	.45	.97
Fathers' Negative Parenting				
Intrusiveness 36m	.69***	.19	.32	.98
Negative Regard 36m	.51***	.18	.24	.94

Note . EAP, expected a posteriori.

*** $p < .001$.

Behavior problems. Perceptions of child behavior problems were assessed by both mothers and fathers using the Child Behavior Checklist (CBCL/1½ - 5; Achenbach & Rescorla, 2000). In this study, I focus on the aggressive behavior of children; therefore, only CBCL items which are related to child aggression were utilized. Both mothers and fathers completed a CBCL questionnaire during their interview. CBCL items were scored on a 3-point scale (1 = not true, 2 = sometimes/somewhat true, 3 = very or often true). This checklist included questions such as “child has temper tantrums”, “child hits others”, and “child is easily frustrated”. I used 18 items for child aggression for each parent. Sum scores of 18 items for each parent were calculated and utilized for the final outcome variables--maternal perception of child aggression, paternal perception of child aggression--in the study models. Cronbach’s alpha for mothers’ CBCL aggression was .87 and for fathers’ was .88.

Covariates. Covariates are only linked to parenting behaviors (at 36 months) and not child behaviors (at 5 years) in positive and negative parenting models. Because child race and gender are background factors which are fixed at two time points, it was controlled at 36 months,

at the starting point of measurement in this study. Consistently, In order to provide enough power for overall model identification, other covariates were controlled for at 36 months but not at 5 years.

In the positive parenting model, child gender, maternal/paternal risk, maternal/paternal parenting stress and child emotion regulation at 36 months were controlled for. I excluded family race in the positive parenting model because family race did not significantly affect the model (i.e., $p > .05$) and the model with family race did not show acceptable model fit (i.e., the posterior predictive p -value = .002 and the 95% confidence interval for the model fit = [30.20, 133.23]).

In the negative parenting model, family race/ethnicity, child gender, maternal/paternal risk and child emotion regulation at 36 months were controlled for. Maternal parenting stress and paternal parenting stress were excluded because they did not significantly influence the model (i.e., $p > .05$). In addition, factor loading value of paternal negative regard was .36 (which was below .40) when I have maternal/paternal parenting stress as covariates in the model. As a result, I omitted maternal/paternal parenting stress in the final model.

Child race. Child race was a categorical variable when it was collected. For this study, three binary coded variables were created and used. They are White (1 = White, 0 = others), African American (1 = African American, 0 = others), and Hispanic (1 = Hispanic, 0 = others).

Child gender. Child gender was measured and coded as a dichotomous variable (1 = male, 0 = female).

Maternal risk. Maternal risk was binary-coded (1 = the risk factors are present, 0 = the risk factors are absent) for each risk factor and then it was summed up. For the analysis, the number signifying the risk index was counted as the maternal risk variable. It ranges from 0 to 5.

The risk index for mothers includes low education (i.e., less than a high school education), single parenthood, adolescent parenthood at the time of the child's birth, unemployment and welfare status (i.e., low income).

Paternal risk. Paternal risk indexes were parallel with maternal risk indexes except for one risk factor: welfare status. Because welfare status for fathers was not assessed, paternal risk indexes consisted of four risk factors: less than a high school education, single parenthood, unemployment and adolescent parenthood at the time of child birth. It ranges from 0 to 4.

Parenting stress. Parent-child dysfunctional interaction, which is one of subscales of Parenting Stress Index – short form (PSI-SF; Abidin, 1995) was used. Parent-child dysfunctional interaction assesses the degree of dissatisfaction for parent-child relationship. In particular, higher scores in this scale indicate the low quality of parent-child interaction, and they further indicate that parents have high stress and disappointment toward their child. Parent-child dysfunctional interaction scores of mothers and fathers were each accessed at 36 months. The final score that I used in this study is the sum of 12 items for mothers and fathers respectively. Scales on each item range from 1 (strongly agree) to 5 (strongly disagree). Cronbach's alpha for mother-child dysfunctional interaction was .77. Cronbach's alpha for father-child dysfunctional interaction was .53.

Emotion regulation. Emotion regulation was measured using the Bayley Behavioral Rating Scale (BBRS; Bayley, 1993) when children were about 36 months old. Emotion regulation refers to a child's ability to manage negative emotions (e.g., less frustrated) and be more cooperative. The average score of 7 items was used in this study. Each item was scored on a 5-point scale. The higher scores represent the higher levels of a child's emotion regulation. Cronbach's alpha for emotion regulation was .91.

Missing Data

Because parenting behaviors and parental perceptions of child behavior problems were observed or collected over two time points and from multiple individuals (i.e., mothers and fathers), missing data existed in this study. Rates of missingness ranged 0% to 5.3% (see Table 20). Because I selected the final sample based on fathers' demographical information (e.g., whether father figures reside with the child, whether same fathers participated in the study at 36 months and 5 years) and presence of father data at 36 months, there was no missing data for variables of paternal parenting behaviors at 36 months (i.e., paternal sensitivity at 36 months, paternal positive regard at 36 months, paternal cognitive stimulation at 36 months, paternal intrusiveness at 36 months and paternal negative regard at 36 months)

Little's (2014) Missing Completely at Random (MCAR) test was conducted for study variables in order to check the type of missingness. I could assume that the data of this study were MCAR, based on the non-significant value of Chi-square ($\text{Chi-Square} = 22.98; df = 29; p = .78$). In order to deal with missing data in the current study, multiple imputation (MI) was conducted through Mplus 7.3 (Muthén & Muthén, 2014). In the present study, 50 imputed data sets were created for multiple imputation using Bayesian estimation.

Table 20. *Data Missingness in the Final Sample (N = 114)*

Variable	Mother		Father	
	Missing <i>N</i>	Missing %	Missing <i>N</i>	Missing %
Covariate				
Child Race	1	0.9%	--	--
Child Gender	0	0%	--	--
Child Emotion Regulation	2	1.8%	--	--
Parental Risk	16	14%	5	4.4%
Parenting Stress	6	5.3%	5	4.4%
Positive Parenting				
Sensitivity 36m	3	2.6%	0	0%
Positive Regard 36m	3	2.6%	0	0%
Cognitive Stimulation 36m	3	2.6%	0	0%
Negative Parenting				
Intrusiveness 36m	3	2.6%	0	0%
Negative Regard 36m	3	2.6%	0	0%
Parental Perception				
Child Aggression 5 years	2	1.8%	1	0.9%

Data Analysis Plan

Actor-Partner Interdependence Model (APIM). The actor-partner interdependence model (APIM) (Kenny et al., 2006) was used to test this study's hypotheses. As discussed in Study 1, the actor-partner interdependence model (APIM) has benefits for explaining the dyadic relationship of two persons in a family. APIM simultaneously estimated the effects of an individual's predictor variable (at Time 1, 36 months) on not only that person's own outcome, but also the partner's outcome (at Time 2, 5 years). The APIM analysis in this study was to explain the relationship between parenting behaviors (Time 1, 36 months) and perceptions of child behavior problems (Time 2, 5 years) for mother-father dyads.

Bayesian Structural Equation Modeling (BSEM). As discussed in Study 1, Structural Equation Modeling (SEM) is a useful technique which is generally utilized for the actor-partner

interdependent model (APIM) (Kenny et al., 2006). The mother-father dyadic data in this study was analyzed with Bayesian Structural Equation Modeling (BSEM) in order to take advantages of Bayesian analysis. In particular, using Bayesian estimation is appropriate, rather than using the maximum likelihood estimation in this study, because of the small sample size of the current study (114 mother-father dyads) (Muthén & Asparouhov, 2010). In addition, variables of negative parenting behaviors in this study are skewed (not normally distributed), which violates one of the assumptions of maximum likelihood estimation. To solve this problem, it is proper to use Bayesian estimation with Gibbs sampling in that this method supports the analysis of data which is distributed too narrowly or broadly (Kruschke, 2011).

Data analysis of this study. The present study has dyadic data for maternal/paternal parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. Two actor-partner interdependence models were analyzed with Bayesian Structural Equation Modeling (BSEM) approach. The first APIM focuses on the relationship between maternal/paternal positive parenting behaviors at 36 months and maternal/paternal perceptions of children's aggression at 5 years (See Figure 17). The second APIM investigated the relationship between maternal/paternal negative parenting behaviors at 36 months and maternal/paternal perceptions of children's aggression at 5 years (see Figure 18).

Each analysis used the Gibbs sampler with four chains, 20,000 iterations with 10,000 burn-in and a 10 thinning interval. The estimated potential scale reduction (PSR) values were around 1.0; therefore, convergence was properly preceded. Convergence plots, posterior density plots and autocorrelations plots also showed that convergence for each model worked well (see Appendix B). For this study, non-informative prior was used for the final analysis. Priors for loadings, intercepts and thresholds are set as $N(0, \text{infinity})$ and variances are set as $IG(0, -1)$.

Prior to analyzing these APIMs, descriptive statistics and bivariate correlations were conducted. In addition, the degree of nonindependence between mother and father outcomes (i.e., nonindependence between maternal and paternal perceptions of child aggression at 5 years) was calculated using a Pearson correlation coefficient per Kenny et al.'s guidelines (Kenny et al., 2006). In particular, the degree of interdependence for distinguished dyads was measured based on Pearson product-moment correlation (i.e., the ordinary correlation coefficient). IBM SPSS statistics 21 and Mplus 7.3 were used for data analyses.

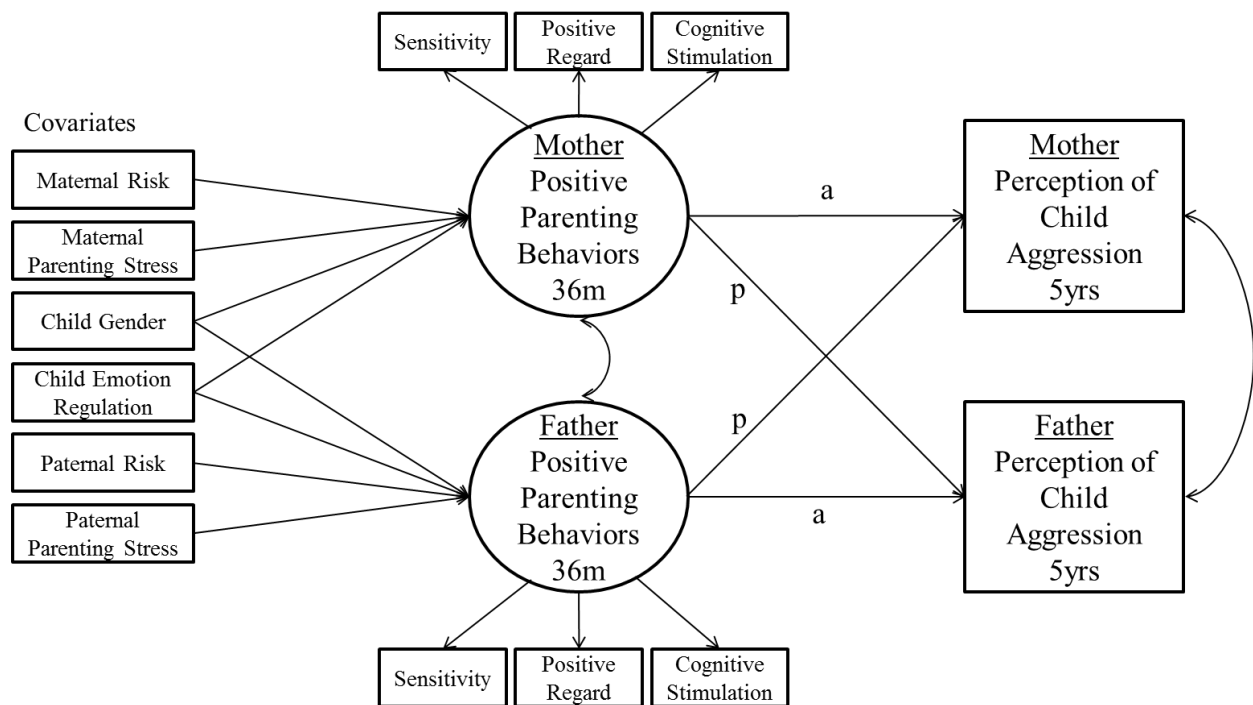


Figure 17. Model 1: The Actor-Partner Interdependence Model (APIM) for Maternal/Paternal Positive Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years.

Note. a = actor effect; p = partner effect.

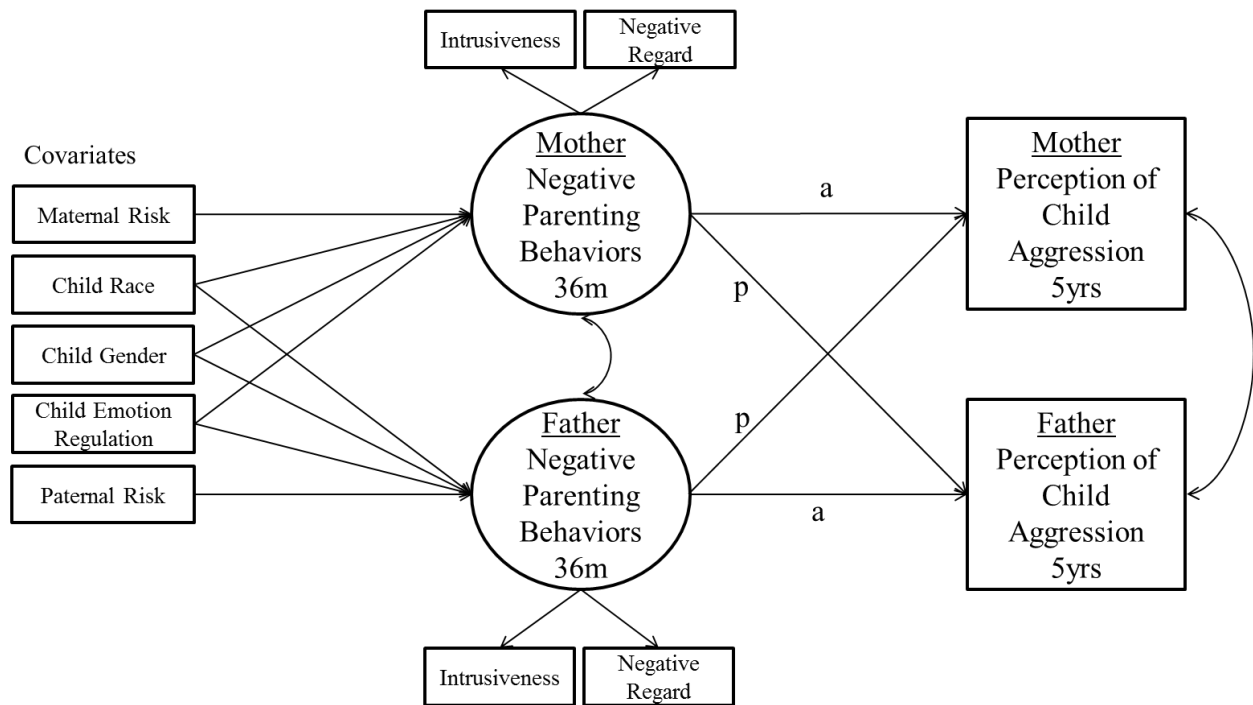


Figure 18. Model 2: The Actor-Partner Interdependence Model (APIM) for Maternal/Paternal Negative Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years.

Note. a = actor effect; p = partner effect.

Results for Study 2

Preliminary Analysis

Descriptive statistics for study variables are displayed in Table 21. Bivariate correlations were conducted to analyze the relationships among study variables and covariates for positive parenting model (see Table 22) and negative parenting model (see Table 23) respectively. Spearman correlations were used for binary-coded variables (e.g., family race, child gender) and discrete or categorical variables (e.g., maternal/paternal risk, subscales of positive/negative parenting behaviors). Pearson correlations were used for other variables which were continuous (i.e., maternal/paternal parenting stress, child emotion regulation, maternal/paternal perceptions of child aggression). The degree of nonindependence between maternal and paternal perceptions of child aggression was .41 ($p < .001$), considered to be a large correlation per Cohen (1988). The number of dyads in this study is enough to assume the nonindependence between outcome variables (114 dyads is enough dyadic numbers to have 80% power in testing the correlation between dyadic members at .05 level).

Table 21. *Demographic Statistics for Study 2*

Variable	Mother			Father		
	Mean	SD	Range	Mean	SD	Range
Covariate						
Child Emotion Regulation	4.27	.65	1.71 - 5.00	-	-	-
Parental Risk	1.80	1.27	0 - 5	.47	.82	0 - 3
Parenting Stress	17.34	5.50	12 - 42	13.32	2.54	11 - 24
Positive Parenting						
Sensitivity 36m	5.01	1.04	2 - 7	4.74	.94	2 - 7
Positive Regard 36m	3.94	1.10	1 - 6	3.85	1.01	1 - 7
Cognitive Stimulation 36m	4.00	1.17	2 - 6	3.82	.96	2 - 6
Negative Parenting						
Intrusiveness 36m	1.29	.62	1 - 5	1.27	.50	1 - 3
Negative Regard 36m	1.14	.46	1 - 4	1.07	.29	1 - 3
Parental Perception						
Child Aggression 5 years	28.55	5.81	18-47	27.07	5.88	18-49

Table 22. *Model 1: Correlation for Maternal/Paternal Positive Parenting and Maternal/Paternal Perceptions of Child Aggression*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	--																
2	-.78	--															
3	-.47	-.15	--														
4	.01	.01	.00	--													
5	-.25	.30	-.09	-.08	--												
6	-.35	.27	.12	.07	.56	--											
7	.05	-.08	-.01	-.02	.15	.08	--										
8	.04	-.02	-.20	-.02	.21	.06	.21	--									
9	.14	-.07	-.12	-.11	-.32	-.31	-.05	-.10	--								
10	.36	-.26	-.18	.11	-.30	-.18	-.11	-.12	.26	--							
11	.32	-.19	-.22	.12	-.11	-.09	-.10	-.02	.15	.76	--						
12	.03	-.05	.08	.04	-.24	-.08	-.22	-.01	.28	.56	.47	--					
13	.09	-.08	-.01	-.10	-.17	-.16	.02	-.13	.22	.09	.13	.15	--				
14	.01	-.08	.09	-.05	-.16	-.09	-.03	-.22	.04	.14	.08	.05	.70	--			
15	-.10	.00	.15	.09	-.18	-.03	-.08	-.23	.11	.15	.10	.17	.61	.58	--		
16	.25	-.33	.01	.04	.08	.21	.44	.23	-.16	-.09	.00	-.06	-.00	.07	-.10	--	
17	.29	-.26	-.06	.05	-.01	-.10	.07	.17	-.03	-.17	-.06	-.06	-.06	-.13	-.12	.41	--

Note. 1 = Race: White; 2 = Race: African American; 3 = Race: Hispanic; 4 = Child Gender; 5 = Maternal Risk; 6 = Paternal Risk; 7 = Maternal Parenting Stress; 8 = Paternal Parenting Stress; 9 = Child Emotion Regulation; 10 = Maternal Sensitivity at 36 months; 11 = Maternal Positive Regard at 36 months; 12 = Maternal Cognitive Stimulation at 36 months; 13 = Paternal Sensitivity at 36 months; 14 = Paternal Positive Regard at 36 months; 15 = Paternal Cognitive Stimulation at 36 months; 16 = Maternal Perception of Child Aggression at 5 years; 17 = Paternal Perception of Child Aggression at 5 years. $p < .05$ = bolded.

Table 23. *Model 2: Correlation for Maternal/Paternal Negative Parenting and Maternal/Paternal Perceptions of Child Aggression*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	--														
2	-.78	--													
3	-.47	-.15	--												
4	.01	.01	.00	--											
5	-.25	.30	-.09	-.08	--										
6	-.35	.27	.12	-.07	.56	--									
7	.05	-.08	-.01	-.02	.15	.08	--								
8	.04	-.02	-.20	-.02	.21	.06	.21	--							
9	.14	-.07	-.12	-.11	-.32	-.31	-.05	-.10	--						
10	-.36	.28	.14	.06	.33	.20	.06	-.02	-.32	--					
11	-.25	.22	.12	-.11	.12	.22	-.07	.00	-.13	.48	--				
12	-.18	.07	.14	.12	.13	-.09	.15	-.07	-.15	.22	-.03	--			
13	.00	.06	-.08	.14	.13	-.04	.09	.07	-.03	-.04	.06	.29	--		
14	.25	-.33	.01	.04	.08	.21	.44	.23	-.16	.08	.03	.08	.06	--	
15	.29	-.26	-.06	.05	-.01	-.10	.07	.17	-.03	-.03	.06	.13	-.05	.41	--

Note. 1 = Race: White; 2 = Race: African American; 3 = Race: Hispanic; 4 = Child Gender; 5 = Maternal Risk; 6 = Paternal Risk; 7 = Maternal Parenting Stress; 8 = Paternal Parenting Stress; 9 = Child Emotion Regulation; 10 = Maternal Intrusiveness at 36 months; 11 = Maternal Negative Regard at 36 months; 12 = Paternal intrusiveness at 36 months; 13 = Paternal Negative Regard at 36 months; 14 = Maternal Perception of Child Aggression at 5 years; 15 = Paternal Perception of Child Aggression at 5 years. $p < .05$ = bolded.

Actor-Partner Interdependence Models

Model 1: APIM for maternal/paternal positive parenting behaviors at 36 months and their perceptions of child aggression at 5 years. This model was estimated using the Bayesian Structural Equation Modeling approach (BSEM). This model showed an acceptable model fit to the data. The posterior predictive p -value was .053 and the 95% posterior probability intervals included zero [-6.69, 75.73]. Figure 19 depicts results of the actor-partner interdependence model (APIM) for maternal/paternal positive parenting at 36 months and maternal/paternal perceptions of child aggression at 5 years. Table 24 presents EAP estimates of unstandardized path loadings for the relationship between maternal/paternal positive parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. Table 25 displays EAP estimates of standardized path loadings for the relationship between maternal/paternal positive parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. Table 26 and Table 27 include EAP estimates of covariates.

Covariates. This model was analyzed with six covariates: child gender, child emotion regulation, maternal risk, paternal risk, maternal parenting stress and paternal parenting stress. These covariates were controlled for at 36 months. Child gender, child emotion regulation and maternal risk significantly affected maternal positive parenting behaviors. Child emotion regulation and paternal parenting stress significantly influenced paternal positive parenting behaviors.

The relationship between child gender and maternal positive parenting behaviors was marginally significant ($B = .24, p < .10$, a 95% of credibility interval was between $-.12$ and $.61$; $\beta = .13, p < .10$; a 95% of credibility interval was between $-.07$ and $.32$); however, there was no significant relationship between child gender and paternal positive parenting behaviors. This

result suggests that mothers provide higher level of positive parenting behaviors to their sons. Child emotion regulation positively predicted maternal positive parenting behaviors ($B = .26, p < .05$, a 95% of credibility interval was between $-.04$ and $.58$; $\beta = .18, p < .05$; a 95% of credibility interval was between $-.03$ and $.39$) and paternal positive parenting behaviors ($B = .19, p < .10$, a 95% of credibility interval was between $-.10$ and $.49$; $\beta = .14, p < .10$; a 95% of credibility interval was between $-.08$ and $.35$). As children are more able to regulate their emotions well, mothers and fathers show more positive parenting behaviors. Maternal risk was negatively predicted maternal positive parenting behaviors ($B = -.22, p < .05$, a 95% of credibility interval was between $-.43$ and $-.01$; $\beta = -.24, p < .05$; a 95% of credibility interval was between $-.44$ and $-.01$), whereas paternal risk was not related to paternal positive parenting behaviors. Lower level of maternal risk was related to a higher level of mothers' positive parenting behaviors. The relationship between maternal parenting stress and maternal positive parenting behaviors was not significant; however, the relationship between paternal parenting stress and paternal positive parenting behaviors was marginally significant ($B = -.06, p < .10$, a 95% of credibility interval was between $-.13$ and $.02$; $\beta = -.16, p < .10$; a 95% of credibility interval was between $-.36$ and $.06$). A lower level of paternal parenting stress was associated with a higher level of fathers' positive parenting behaviors.

Actor effects. No significant actor effect of maternal positive parenting behaviors was found at 36 months on mothers' perception of child aggression at 5 years. Accordingly, an actor effect of paternal positive parenting behaviors at 36 months on fathers' perception of child aggression at 5 years was not statistically significant.

Partner effects. The partner effect of maternal positive parenting behaviors at 36 months on paternal perception of child aggression at 5 years was marginally significant ($B = -.94, p$

< .10, a 95% of credibility interval was between -2.22 and .32; $\beta = -.16$, $p < .10$; a 95% of credibility interval was between -.35 and .05). Mothers' high level of positive parenting behaviors at 36 months was associated with fathers' higher report of child aggression at 5 years. However, fathers' positive parenting behaviors at 36 months did not significantly predict maternal perception of child aggression at 5 years.

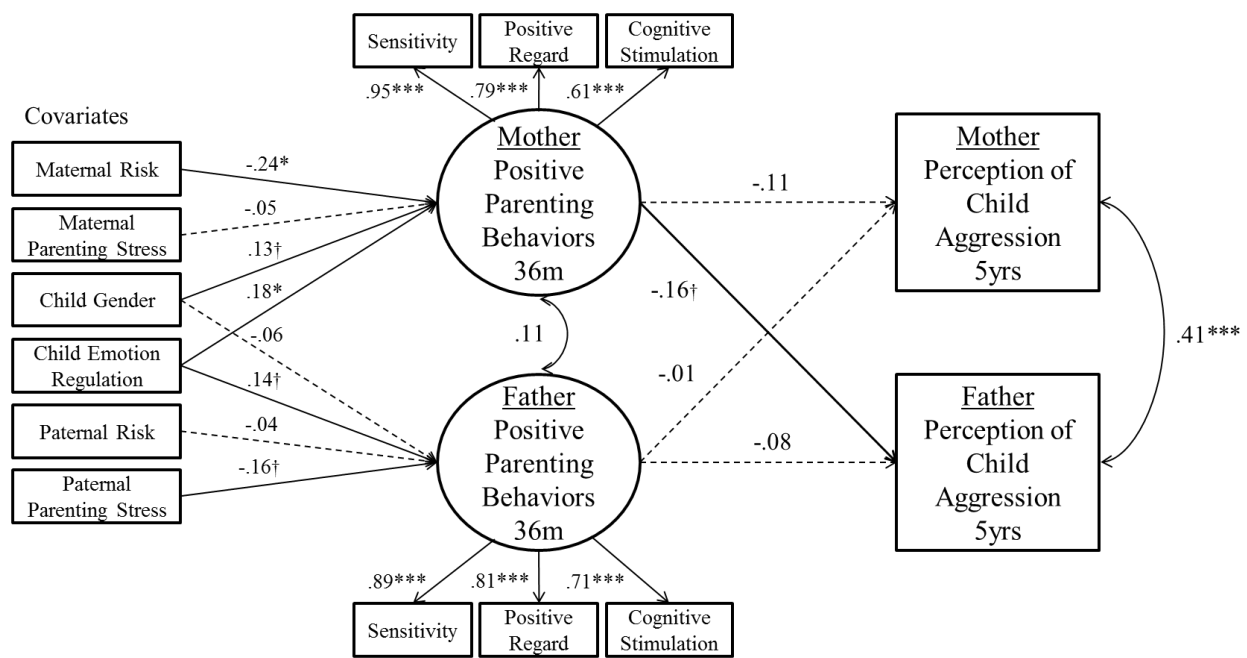


Figure 19. Model 1: EAP Estimates of Standardized Path Loadings for Maternal/Paternal Positive Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years.

Note. Only significant covariates are presented and residuals are suppressed to simplify the figure.

† $p < .10$. * $p < .05$. *** $p < .001$.

Table 24. *Model 1: Unstandardized Path Loadings between Maternal/Paternal Positive Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years*

Pathways	Unstandardized	Posterior	95% C.I.	
	EAP	SD	Lower 2.5%	Upper 2.5%
Covariates				
Child Gender → M Positive Parenting 36m	.24†	.19	-.12	.61
Child Gender → F Positive Parenting 36m	-.11	.19	-.48	.26
Child Emotion Regulation → M Positive Parenting 36m	.26*	.16	-.04	.58
Child Emotion Regulation → F Positive Parenting 36m	.19†	.15	-.10	.49
Maternal Risk → M Positive Parenting 36m	-.22*	.11	-.43	-.01
Paternal Risk → F Positive Parenting 36m	-.03	.10	-.23	.16
Maternal Parenting Stress → M Positive Parenting 36m	-.01	.02	-.04	.03
Paternal Parenting Stress → F Positive Parenting 36m	-.06†	.04	-.13	.02
Actor Effects				
M Positive Parenting 36m → M Child Aggression 5yrs	-.65	.65	-1.93	.65
F Positive Parenting 36m → F Child Aggression 5yrs	-.49	.71	-1.90	.88
Partner Effects				
M Positive Parenting 36m → F Child Aggression 5yrs	-.94†	.64	-2.22	.32
F Positive Parenting 36m → M Child Aggression 5yrs	-.04	.71	-1.44	1.34

Note . EAP, expected a posteriori.

† $p < .10$. * $p < .05$.

Table 25. *Model 1: Standardized Path Loadings between Maternal/Paternal Positive Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years*

Pathways	Standardized	Posterior	95% C.I.	
	EAP	SD	Lower 2.5%	Upper 2.5%
Covariates				
Child Gender → M Positive Parenting 36m	.13†	.10	-.07	.32
Child Gender → F Positive Parenting 36m	-.06	.11	-.26	.15
Child Emotion Regulation → M Positive Parenting 36m	.18*	.11	-.03	.39
Child Emotion Regulation → F Positive Parenting 36m	.14†	.11	-.08	.35
Maternal Risk → M Positive Parenting 36m	-.24*	.11	-.44	-.01
Paternal Risk → F Positive Parenting 36m	-.04	.11	-.25	.18
Maternal Parenting Stress → M Positive Parenting 36m	-.05	.10	-.25	.15
Paternal Parenting Stress → F Positive Parenting 36m	-.16†	.11	-.36	.06
Actor Effects				
M Positive Parenting 36m → M Child Aggression 5yrs	-.11	.11	-.31	.11
F Positive Parenting 36m → F Child Aggression 5yrs	-.08	.11	-.28	.13
Partner Effects				
M Positive Parenting 36m → F Child Aggression 5yrs	-.16†	.10	-.35	.05
F Positive Parenting 36m → M Child Aggression 5yrs	-.01	.11	-.22	.20

Note . EAP, expected a posteriori.

† $p < .10$. * $p < .05$.

Model 2: APIM for maternal/paternal negative parenting behaviors at 36 months and their perceptions of child aggression at 5 years. The model for maternal/paternal negative parenting and maternal/paternal perceptions of child aggression was estimated using the Bayesian Structural Equation Modeling approach (BSEM). The model provided an acceptable fit to the data. The posterior predictive p -value was .08 and the 95% posterior probability intervals included zero [-11.35, 68.55]. Figure 20 depicts the results of the actor-partner interdependence model (APIM) for maternal/paternal negative parenting at 36 months and maternal/paternal perceptions of child aggression at 5 years. Table 26 shows EAP estimates of unstandardized path loadings for the relationship between maternal/paternal negative parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. Table 27 displays EAP estimates of standardized path loadings for the relationship between maternal/paternal negative parenting behaviors and their perceptions of child aggression. Table 28 and Table 29 include EAP estimates of covariates.

Covariates. This model was analyzed with five covariates: child race, child gender, child emotion regulation, maternal risk and paternal risk. As discussed earlier, maternal parenting stress and paternal parenting stress were excluded in the negative model because they did not significantly influence the model (i.e., $p > .05$) as well as they violated overall model fit and the factor loadings of the study variables. Child emotion regulation was the only covariate which significantly predicted mothers' negative parenting behaviors. Child race, child emotion regulation and paternal risk significantly affected negative parenting behaviors of fathers.

Child race had marginally significant relationships with negative parenting behaviors of fathers. In particular, White and African American families had differences in fathers' negative parenting behaviors as compared to other ethnic groups. Fathers in White families showed the

lowest level of negative parenting behaviors among all ethnic groups ($B = -1.65, p < .10$, a 95% of credibility interval was between -3.56 and $.35$; $\beta = -.91, p < .10$; a 95% of credibility interval was between -1.98 and $.23$) and fathers in African American families were the second-lowest in negative parenting behaviors ($B = -1.51, p < .10$, a 95% of credibility interval was between -3.40 and $.53$; $\beta = -.73, p < .10$; a 95% of credibility interval was between -1.71 and $.28$). Child gender was not significantly related to maternal and paternal negative parenting behaviors at 36 months. The relationship between child emotion regulation and maternal negative parenting behaviors were marginally significant ($B = -.24, p < .10$, a 95% of credibility interval was between $-.56$ and $.06$; $\beta = -.18, p < .10$; a 95% of credibility interval was between $-.41$ and $.04$). Child emotion regulation significantly predicted paternal negative parenting behaviors at 36 months ($B = -.36, p < .05$, a 95% of credibility interval was between $-.65$ and $-.06$; $\beta = -.29, p < .05$; a 95% of credibility interval was between $-.55$ and $-.05$). Higher child emotion regulation was related to lower levels of negative parenting behaviors of both mothers and fathers. There was no significant relationship between maternal risk and mothers' negative parenting behaviors; whereas paternal risk negatively predicted negative parenting behaviors of fathers ($B = -.21, p < .10$, a 95% of credibility interval was between $-.48$ and $.06$; $\beta = -.21, p < .10$; a 95% of credibility interval was between $-.48$ and $.13$).

Actor effects. The actor effect of maternal negative parenting behaviors at 36 months on mothers' perception of child aggression at 5 years was not statistically significant. In addition, there was no significant actor effect of paternal negative parenting behaviors at 36 months on fathers' perceptions of child aggression at 5 years.

Partner effects. The result revealed that there was no significant partner effect of maternal negative parenting behaviors at 36 months on fathers' perception of child aggression at

5 years. Accordingly, there was found to be no significant partner effect between paternal positive parenting behaviors at 36 months and maternal perception of child aggression at 5 years.

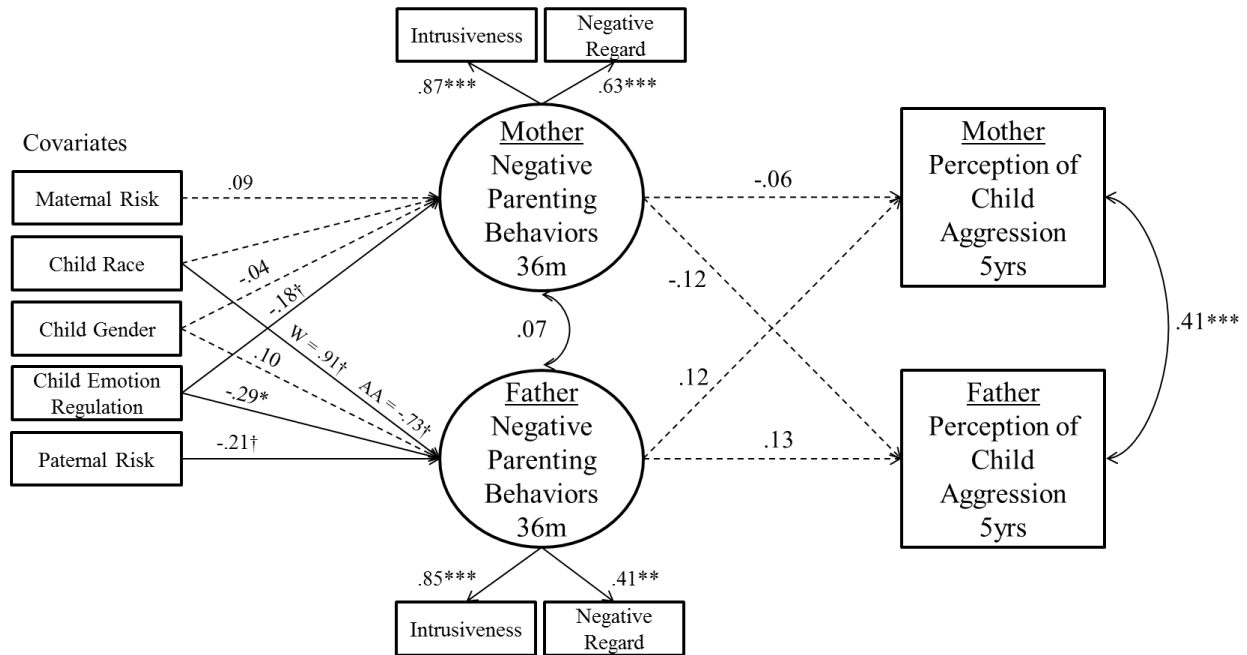


Figure 20. Model 2: EAP Estimates of Standardized Path Loadings for Maternal/Paternal Negative Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years.

Note. W = White; AA = African American; Only significant covariates are presented and residuals are suppressed to simplify the figure.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 26. *Model 2: Unstandardized Path Loadings between Maternal/Paternal Negative Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years*

Pathways	Unstandardized	Posterior	95% C.I.	
	EAP	SD	Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Negative Parenting 36m	-.74	.95	-2.72	.99
Child Race: White → F Negative Parenting 36m	-1.65†	.99	-3.56	.35
Child Race: African American → M Negative Parenting 36m	-.08	.96	-1.91	1.82
Child Race: African American → F Negative Parenting 36m	-1.51†	.99	-3.40	.53
Child Race: Hispanic → M Negative Parenting 36m	-.34	.99	-2.40	1.47
Child Race: Hispanic → F Negative Parenting 36m	-1.13	1.00	-3.05	.86
Child Gender → M Negative Parenting 36m	-.07	.18	-.42	.29
Child Gender → F Negative Parenting 36m	.16	.18	-.20	.53
Child Emotion Regulation → M Negative Parenting 36m	-.24†	.16	-.56	.06
Child Emotion Regulation → F Negative Parenting 36m	-.36*	.15	-.65	-.06
Maternal Risk → M Negative Parenting 36m	.06	.08	-.10	.22
Paternal Risk → F Negative Parenting 36m	-.21†	.14	-.48	.10
Actor Effects				
M Negative Parenting 36m → M Child Aggression 5yrs	-.40	.88	-2.24	1.21
F Negative Parenting 36m → F Child Aggression 5yrs	.91	1.06	-1.07	3.08
Partner Effects				
M Negative Parenting 36m → F Child Aggression 5yrs	-.76	.84	-2.52	.78
F Negative Parenting 36m → M Child Aggression 5yrs	.78	1.61	-1.09	4.45

Note . EAP, expected a posteriori.

† $p < .10$. * $p < .05$.

Table 27. *Model 2: Standardized Path Loadings between Maternal/Paternal Negative Parenting Behaviors at 36 Months and Maternal/Paternal Perceptions of Child Aggression at 5 Years*

Pathways	Standardized EAP	Posterior SD	95% C.I.	
			Lower 2.5%	Upper 2.5%
Covariates				
Child Race: White → M Negative Parenting 36m	-.39	.49	-1.37	.53
Child Race: White → F Negative Parenting 36m	-.91†	.56	-1.98	.23
Child Race: African American → M Negative Parenting 36m	.04	.44	-.85	.86
Child Race: African American → F Negative Parenting 36m	-.73†	.51	-1.71	.28
Child Race: Hispanic → M Negative Parenting 36m	-.11	.31	-.73	.47
Child Race: Hispanic → F Negative Parenting 36m	-.38	.35	-1.06	.31
Child Gender → M Negative Parenting 36m	-.04	.11	-.25	.16
Child Gender → F Negative Parenting 36m	.10	.11	-.13	.33
Child Emotion Regulation → M Negative Parenting 36m	-.18†	.12	-.41	.04
Child Emotion Regulation → F Negative Parenting 36m	-.29*	.13	-.55	-.05
Maternal Risk → M Negative Parenting 36m	.09	.12	-.14	.32
Paternal Risk → F Negative Parenting 36m	-.21†	.15	-.48	.13
Actor Effects				
M Negative Parenting 36m → M Child Aggression 5yrs	-.06	.13	-.31	.18
F Negative Parenting 36m → F Child Aggression 5yrs	.13	.13	-.13	.37
Partner Effects				
M Negative Parenting 36m → F Child Aggression 5yrs	-.12	.12	-.35	.12
F Negative Parenting 36m → M Child Aggression 5yrs	.12	.15	-.15	.44

Note . EAP, expected a posteriori.

† $p < .10$. * $p < .05$.

Discussion for Study 2

The goal of this study was to investigate the interdependence among maternal/paternal parenting behaviors at 36 months and maternal/paternal perceptions of children's aggression at 5 years by using Bayesian Structural Equation Modeling (BSEM). In the positive parenting model, mothers' positive parenting behaviors at 36 months negatively influenced fathers' perception of child aggression (partner effect), as I expected (although findings were only marginally significant). However, no other actor effects or a partner effect were found in the positive parenting model. In the negative parenting model, I could not find any significant actor and partner effects among maternal/paternal negative parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. Child emotion regulation—one of covariates in both models--was the strong factor which was related to both maternal and paternal positive/negative parenting behaviors at 36 months. In particular, a child's better ability of regulating emotion promoted mothers' positive parenting and was effective to reduce fathers' negative parenting behaviors. Findings of this study emphasize the role of a mother, a primary caregiver, in making and altering father's perception toward their child's aggressive behaviors. This study takes an advantage of Bayesian estimation to analyze dyadic data with small sample size and non-normal distribution. To our knowledge, this study is the first study to discuss spillover and crossover effects among maternal/paternal parenting behaviors and their perceptions of child aggression.

Positive Parenting Model: The Role of Mothers' Positive Parenting on Father's Perception of Child Aggression

The only marginally significant relationship in the positive parenting model was the relationship between maternal positive parenting behaviors at 36 months and paternal perception

of child aggression at 5 years. As mothers demonstrated more positive parenting behaviors during mother-child interaction, fathers perceived their child to be less aggressive. Unlike previous research which found spillover effects for mothers (Besnard et al., 2012; Gryczkowski et al., 2010), there were no spillover effects for both mothers and fathers in this study. The lack of actor effects (spillover effects) of fathers' positive parenting behaviors on their own perception of child aggression suggests that fathers may be more sensitive to mothers' parenting behaviors than to their own behaviors. Specifically, fathers may take their cues from mothers in framing children's negative behaviors, since observing maternal parenting behaviors is one major source from which fathers collect information about their children (Doherty & Beaton, 2004). In addition, fathers may be more dependent on mothers' behaviors because fathers believe mothers are more responsible for childcare and more knowledgeable about their child due to the greater amounts of time that mothers spend with their child (Maroto-Navarro et al., 2013; Moon & Hoffman, 2008; Renk et al., 2003; Wang, 2013).

No Actor and Partner Effects in the Relationship between Maternal/Paternal Negative Parenting Behaviors and Maternal/Paternal Perceptions of Child Aggression

In the negative parenting model, there were no significant actor and partner effects among maternal/paternal negative parenting behaviors at 36 months and maternal/paternal perceptions of child aggression at 5 years. What is the cause of these insignificant paths in this study? First, small variations in the study variables may cause insignificant results. In particular, the range of mothers' and fathers' negative parenting indicators (i.e., maternal/paternal intrusiveness and maternal/paternal negative regard) was narrow. Furthermore, scores of child aggression from both mothers and fathers were relatively low, indicating either that sample of this study does not show many aggressive behaviors or that mothers and fathers believe their

children do not have serious externalizing behavior problems. The timing when we measure the child aggressive behaviors may be one possible cause of the lack of the expected relationship. Because child aggression generally peaks at 4 years old and then decreases (Besnard et al., 2012), child age 5, when we measured maternal/paternal perceptions of child aggression, may be the period in which new competencies mean lower levels of aggressive behaviors. As a result of these developmental patterns which preschoolers become less aggressive as mature, child aggressive behaviors may naturally decline regardless of normative parenting behaviors, except the case that parents are extremely negative or harsh to their children; an outcome that might be different than potential links between parenting behaviors children's outcomes during late toddlerhood when aggressive behaviors are more typical due to very young children's limited behavioral strategies.

Another possible cause of insignificant results in the negative parenting model is the effect of unmeasured factors such as the quality of the parent-child relationship and quality of the marital relationship. First, the quality of parent-child relationship may change the relation between maternal/paternal parenting behaviors and maternal/paternal perceptions of children's externalizing behavior problems. If mothers or/and fathers have a poor relationship with their children (e.g., high negativity and conflict between mothers/fathers and their children), parents may think the children caused the conflict and the problems in the parent-child relationship (Burt, McGue, Krueger & Iacono, 2005; Rubin, Burgess, Dwyer & Hastings, 2003). Therefore, parents who have trouble with their child may report higher levels of children's externalizing behaviors since they attribute the poor parent-child relationship to their child's characteristics.

Another unmeasured factor is marital relationship between parents. When mothers and fathers are satisfied with their marriage, they tend more to trust each other and are willing to

support their partner. Strong positive mutuality and connection between parents contribute to the interdependence between maternal and paternal parenting behaviors. Consequently, parents' perception toward their child can be shaped based on the quality of interrelationship between parents (Barnett et al., 2008; Pedro et al., 2012). As a result, the relation between maternal/paternal parenting and their perceptions of behavior problems can be more explainable when I consider the parent-child relationship and marital quality.

The Effects of Covariates

Another finding of this study is that influences of children's and parents' characteristics (i.e., covariates) are different in the positive parenting model and in the negative parenting model.

Significant covariates in the positive parenting model. In the positive parenting model, three covariates (i.e., child gender, child emotion regulation and maternal risk) were related to mothers' positive parenting behaviors. Specifically, child emotion regulation and maternal risk directly affected maternal positive parenting behaviors and indirectly influenced paternal perception of child aggression.

First, mothers at higher risk in the current study were less able to demonstrate positive parenting to their children and their partners perceived their child as more aggressive. The relation among mothers' risk factors, maternal parenting behaviors and children's externalizing behavior problems in this study supports the findings of previous studies in that mothers' risk factors indirectly influence children's externalizing behavior problems through maternal positive parenting behaviors (Cabrera et al., 2011). Consistent with previous studies, mothers at risk were less sensitive and less supportive toward their child (Cabrera et al., 2011) and children's aggressive behaviors increased as mothers' parenting was less supportive (Trentacosta et al.,

2008). Because the sample of the current study is from a low-income population, families have higher possibilities of being exposed to several risk factors. Thus, the effect of maternal risk on maternal parenting behaviors may be strong due to the characteristics of the sample in the current study.

Second, emotion regulation was the last characteristic which directly influenced the relation between maternal positive parenting and indirectly affected fathers' perception of child aggression. In particular, mothers respond more sensitively to their children when children have higher emotion regulation skills. Mothers' supportive parenting with children's advanced emotion regulation skills contributes to fathers' positive perception toward child's behaviors a year later. This finding is consistent with the previous research in that early emotion regulation skills are linked to the decrease of children's anti-social behaviors and the development of prosocial behaviors (Hill et al., 2006).

In the positive parenting model, child gender marginally predicted mothers' positive parenting behaviors and two covariates (i.e., child emotion regulation and fathers' parenting stress) marginally influenced fathers' positive parenting behaviors; however, there were no indirect effects of these covariates on maternal/paternal perceptions of child aggression through fathers' positive parenting behaviors. This implies that mothers' positive parenting behaviors are more sensitive to child and family characteristics rather than fathers' positive parenting behaviors are.

Significant covariates in the negative parenting model. The relationship patterns between covariates and maternal/paternal negative parenting behaviors are different from those between covariates and maternal/paternal positive parenting behaviors in that the effects of

covariates are apparent for not mothers but fathers. Only emotion regulation significantly influenced fathers' negative parenting behaviors.

Child emotion regulation was related differently to parenting in the positive and negative models. Specifically, in the positive parenting model, the effect of children's emotion regulation was stronger to mothers' positive parenting behaviors. Whereas, for fathers, children's emotion regulation influenced more on negative parenting rather than positive parenting. Mothers may focus more on children's emotion regulation in a positive direction. In other words, mothers may interpret children's high level of emotion regulation as a good trigger for leading their positive behaviors; therefore, they may provide more positive parenting in response of children's emotion regulation. In contrast with mothers, the level of child's emotion regulation may be a cue to determine whether fathers increase or reduce their negative parenting in response of children's emotion regulation.

Limitations

Interpretation of the finding should consider the limitations of the current study. First, the mothers and fathers in this study are from low-income families; thus, there is a limitation to being able to generalize this study result to the population. Although I controlled for the number of risk factors which mothers and fathers are exposed to, other characteristics of the Early Head Start parents may influence the mothers' and fathers' parenting behaviors and their perceptions toward their child.

Second, children's observed behavior problem was not measured in this study. Therefore, I could not examine the real behavioral outcome, although I shed light on the maternal/paternal perceptions of child's behavioral outcome along with observed parenting behaviors of parents. Future studies need to include parental perceptions of child behavior problems, as well as the

observed child behavior problems, as study variables so that the relationship among maternal/paternal parenting behaviors, maternal/paternal perceptions of children's behavior problems and the real developmental outcomes of children can be thoroughly explained.

Third, future studies need to focus more on the role of emotion regulation between parenting behaviors and parental perceptions of child behavior problems. In this study, emotion regulation was a significant covariate which predicted both maternal and paternal (positive/negative) parenting behaviors at 36 months. This result implies that child's emotion regulation may mediate the effects of parenting on the parent's perception of the child, thus, as a next step, this will be explored in subsequent work.

Finally, future studies should consider factors which this study didn't measure with study variables. As mentioned earlier, the quality of parent-child relationship, marital quality and mothers' and fathers' mental health are the examples that future studies need to include, in order to investigate the mother-father dyadic relationship in parenting behaviors and perceptions of child social development.

CHAPTER 4

CONCLUSION

Summary

This dissertation set out to explore the spillover and crossover effects between mothers and fathers by using the actor-partner interdependence model. Based on family system theory, we focused on dyadic effects between mothers and fathers, who reflect the most significant caregiver dyads in a family context. In Study 1, I tested the actor and partner effects between maternal/paternal parenting behaviors (positive/negative) at 24 months and maternal/paternal parenting behaviors (positive/negative) at 36 months. I found partner effects between maternal parenting behaviors and paternal parenting behaviors while controlling for actor effects in the actor-partner interdependence model. The findings of Study 1 illustrated different roles of mothers and fathers in positive parenting behaviors vis-à-vis negative parenting behaviors. In terms of positive parenting behaviors, fathers' parenting behaviors at 24 months influenced mothers' parenting behaviors at 36 months. In terms of negative parenting behaviors, mothers' parenting behaviors at 24 months predicted fathers' parenting behaviors at 36 months. In Study 2, I investigated the actor-partner relationships between maternal/paternal parenting behaviors (positive/negative) at 36 months and maternal/paternal perceptions of child aggression at 5 years. Findings of Study 2 highlighted mothers' roles in the relationship between maternal positive parenting behaviors at 36 months and paternal perceptions of child aggression at 5 years. That is, mothers' positive parenting behaviors at 36 months are cues for fathers to understand their children's aggressive behaviors at 5 years.

Conclusions and Implications

This dissertation contributes to mothers' and fathers' parenting studies in several ways. First, to our knowledge, this research is the first study to focus on spillover and crossover effects of mothers' and fathers' parenting behaviors at two time points, as well as on associations between maternal/paternal parenting and their perceptions of child aggression utilizing a dyadic framework in early childhood. Because previous research mostly has studied either spillover effects or crossover effects between parents, the overall processes in complex family dynamics could not be thoroughly discussed. Two studies in this dissertation, however, looked into the process of family dynamics simultaneously by using the actor-partner interdependence model.

Second, this dissertation sheds light on the stability (spillover effects) of parenting behaviors, especially for mothers during toddlerhood. My study models gave us a chance to look at each parent's stability in parenting behaviors considering partner's influence on this process. Therefore, based on our results, I could understand that mothers tend more to stick to their way of parenting while fathers keep involved in parenting. Although significant spillover effects between parenting behaviors and perceptions of child aggression were not found in the second study, this dissertation made contribution to the future dyadic research in that it is empirical research evidence which explore spillover effects under the dyadic framework.

Third, findings of the dissertation reflect complexity of family dynamics between mothers and fathers, and support that not only mothers, but also fathers, could elicit and influence their partners' parenting behaviors though mothers' influence on fathers is stronger than vice-versa. Partial crossover effects (unidirectional) between mothers and fathers in parenting behaviors were supported. Mothers' negative parenting behaviors transferred to fathers' negative parenting behaviors, whereas positive parenting behaviors of fathers transferred

to mothers' positive parenting behaviors. Contrary to findings in previous research which only focuses on the mothers' role as gatekeepers (Allen & Hawkins, 1999; Pedro et al., 2012; Schoppe-Sullivan et al., 2008), this study may present the possibility that fathers can become gatekeepers who mostly encourage their partners' positive parenting practices.

The current study has several implications for prevention and intervention efforts aimed at supporting mothers' and fathers' early parenting. First, this study suggests that mothers play an important role in improving parenting practices in prevention and intervention programs. In this study, mothers showed strong stability in both positive and negative parenting behaviors. In addition, I could find the evidence that mothers' negative parenting behaviors easily transfer to fathers, thus indicating that mothers' negative parenting behaviors may be one main source to determine the overall quality of parenting and negative atmosphere of a family. As a result, providing prevention and intervention programs to promotes mothers' positive parenting behaviors and decrease mothers' negative parenting practices will be helpful for overall parenting quality of both parents. Moreover, inviting both mothers and fathers to prevention and intervention programs can be the most effective way to lead improvement of the overall parenting quality. In both studies, fathers' positive parenting behaviors has a crossover effect on mothers' outcomes, so fathers play a role as a good supporter for mothers' better performances as a caregiver. Mothers' and fathers' participation in preventive intervention as a dyad is one of the protective factors which reduce the risk of child aggressive behaviors (Cowan, Cowan, Kline-Pruett, Pruett & Wong, 2009). Prevention and intervention programs designed for both mothers and fathers would minimize the tendency toward maternal gatekeeping and effectively facilitate the overall quality of parenting in a family. Because fathers benefit from developing their own parenting skills in the course of attending prevention and intervention programs together with

mothers, fathers may feel more confident to interact with their child; thus, mothers may do less gatekeeping toward their partners.

Second, this study has implications for the timing of intervention programs. I demonstrated the stability of mothers' and fathers' parenting behaviors in toddlerhood with mothers' and fathers' parenting behaviors being stable from the 24 months through the 36 month assessments. Findings of Study 1 suggest that mothers' and fathers' participation in prevention and intervention programs when their child is younger may be optimal. Since mothers and fathers have developed supportive parenting practices over the years, intervention and support efforts early on may mean less risk that children are exposed to negative parenting from their parents as they grow (Landry, Smith, Swank & Guttentag, 2008). Parenting education in prevention and intervention programs in toddlerhood help parents better support the developmental needs of children. Furthermore, such parenting education encourages parents to build positive relationships with their children (Landry et al., 2008)

Third, the current study also has implications for the contents of prevention and intervention programs for mothers and fathers. Intervention programs which provide information regarding developmental changes of children depending on child age can promote mothers' and fathers' accurate understanding of child aggression. It is critical to have both mothers and fathers accurately evaluate child aggression so as to provide optimal support to the child in building social-emotional competencies.

Suggestions for Future Research

To interpret findings of the present studies, it must be noted that maternal and paternal parenting data in the current study were separately measured in the parent-child dyadic interaction setting. Actor and partner effects reflect interconnected agreement. For example,

parents have an agreed on their parenting practices and those agreements are fluid and change based on mega contingencies over a year. Based on these dynamics, I could infer that spillover and crossover effects are present in dyadic interactions. In this study, however, the triadic interaction among both parents and a child was not observed and measured. In a triadic setting, fathers are more distant from their child and less involved in interactions (de Mendonça et al., 2011) and mother-child interactions still show strong closeness in triadic interactions (de Mendonça et al., 2011; Lindsey & Caldera, 2006); Whereas both mothers and fathers interact more closely with their child in a dyadic setting (de Mendonça, Cossette, Strayer & Gravel, 2011). In triadic interactions, maternal gatekeeping behaviors which discourage fathers' engagements with their child may often occur. Thus, future studies should observe and measure mothers' and fathers' parenting behaviors in dyadic, as well as triadic, interaction settings in order to investigate the different patterns in interdependence between mothers and fathers across contexts.

In addition, future studies need to investigate the actor-partner effects in the relationships between maternal/paternal parenting behaviors and maternal/paternal perceptions of child internalizing behavior problems. Since I only focused on externalizing behavior problems (i.e., aggressive behaviors), parental perceptions of child internalizing behavior problems remain unexplained in the actor-partner interdependence model. Effects of maternal/paternal perceptions on internalizing behavior problems are different from those of maternal/paternal perceptions on externalizing behavior problems. This is because internalizing behavior problems are ambiguous to capture as compared to externalizing behavior problems (e.g., internalizing behavior problems are less expressive and related to inner psychological distress) (Reiz, Dekovic & Meijer, 2006). Therefore, future studies can expand on this research for internalizing

behavior problems by using the same actor-partner interdependence model that I designed in the current study.

Finally, future research should measure and include both mothers and fathers' perception data as well as children's behavioral outcomes as observed by a third source, such as a teacher. This study included maternal/paternal parenting behaviors and their perceptions of child aggression as study variables; however, observed aggressive behaviors of children were not available for inclusion. Since it is possible that parental perception of child aggression does not correspond to observed behaviors, future research needs to make it clear how maternal/paternal perceptions of child aggression impacts child's aggressive behaviors.

Two studies in this dissertation contribute to parenting studies of mothers and fathers by adding dyadic perspectives. The use of actor-partner interdependence models effectively supports exploration of the dyadic relationships between mothers and fathers. In addition, focusing on both maternal and paternal perceptions along with their parenting behaviors expands on this angle to understand how mothers or fathers similarly or differently interpret behavioral cues from their partner as well as their child. It will be meaningful for future researchers to continuously explore the interdependence between mothers and fathers across contexts through use of a longitudinal study design.

APPENDICES

Appendix A

Study 1. Trace, Posterior Densities and Autocorrelation Plots for Select Parameters

1. Study 1: Positive parenting model

- 1) Trace, posterior densities and autocorrelation plots for the path from maternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

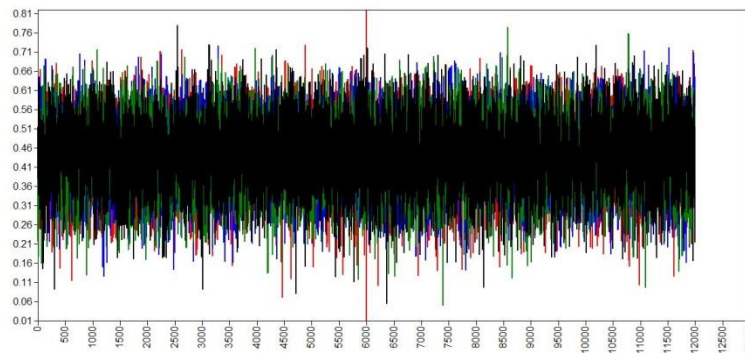


Figure 21. Trace plot for the path from maternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

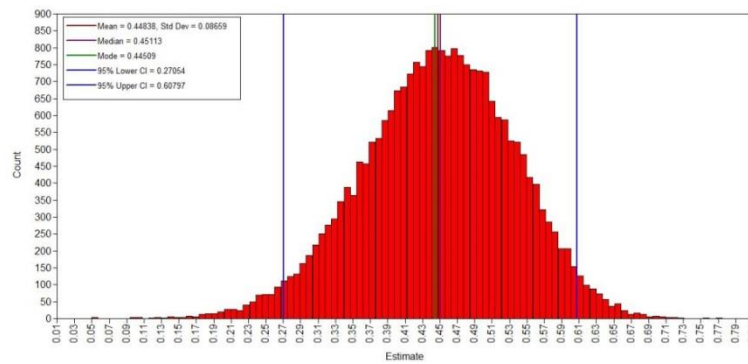


Figure 22. Posterior density plot for the path from maternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

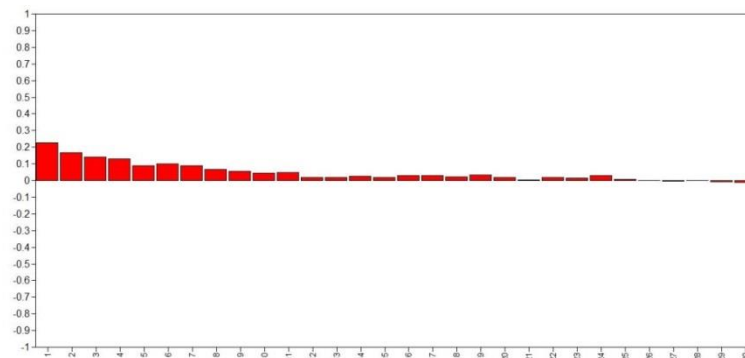


Figure 23. Autocorrelation plot for the path from maternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

- 2) Trace, posterior densities and autocorrelation plots for the path from paternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

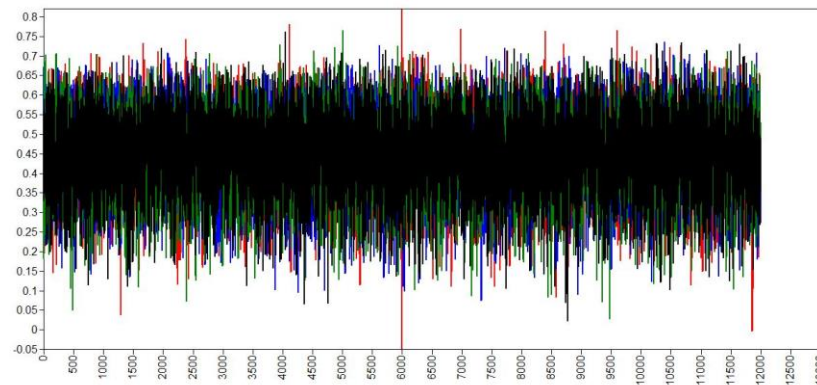


Figure 24. Trace plot for the path from paternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

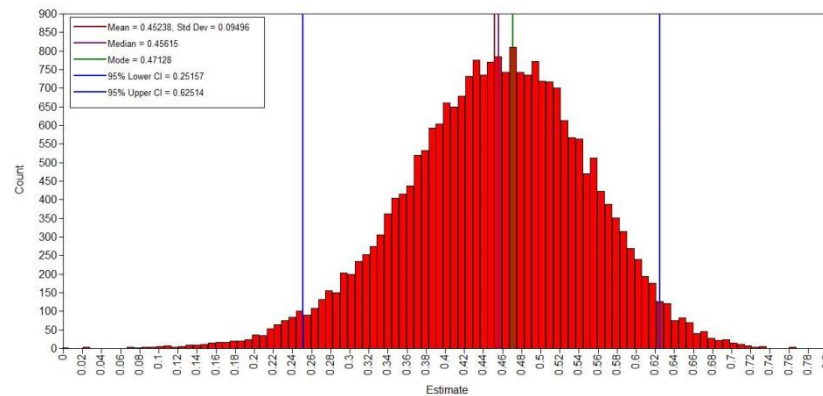


Figure 25. Posterior density plot for the path from paternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

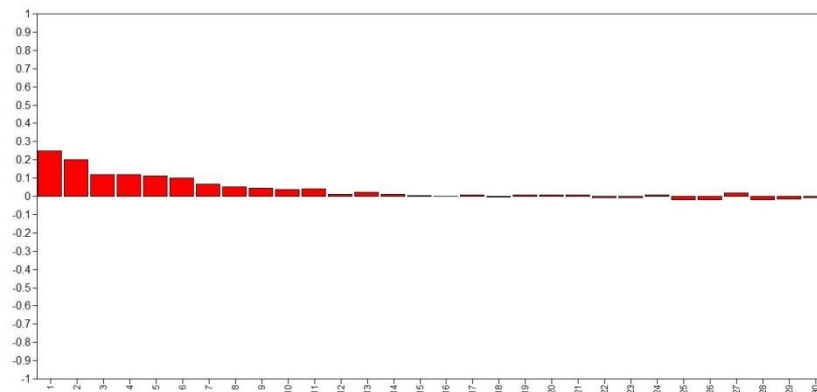


Figure 26. Autocorrelation plot for the path from paternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

- 3) Trace, posterior densities and autocorrelation plots for the path from maternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

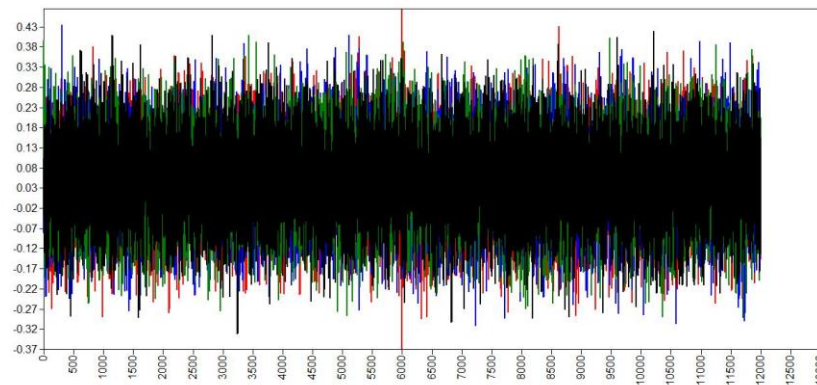


Figure 27. Trace plot for the path from maternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

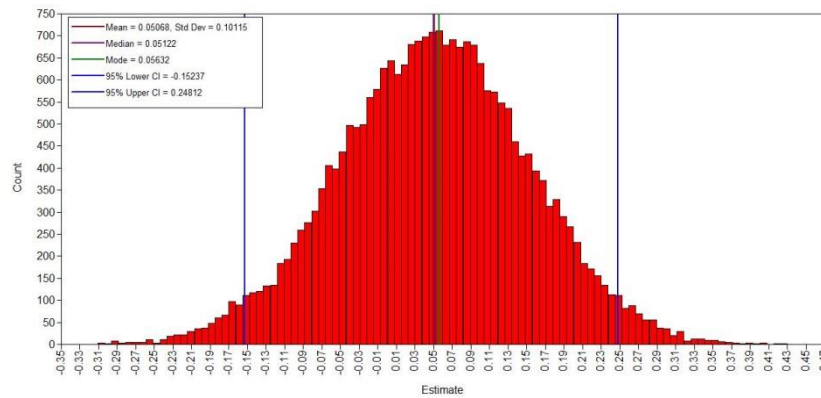


Figure 28. Posterior density plot for the path from maternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

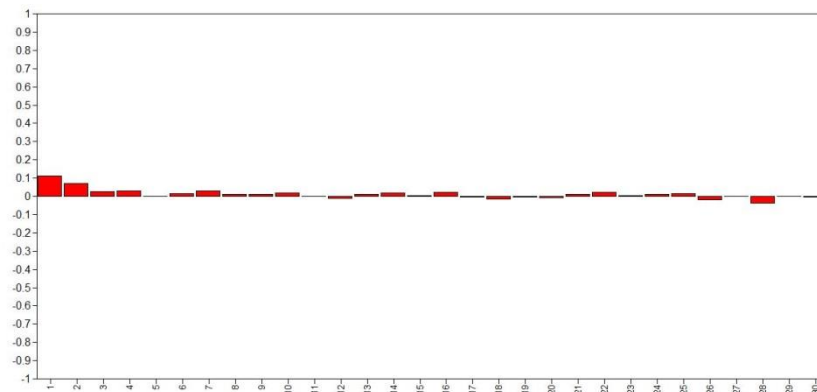


Figure 29. Autocorrelation plot for the path from maternal positive parenting behaviors at 24 months to paternal positive parenting behaviors 36 months

- 4) Trace, posterior densities and autocorrelation plots for the path from paternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

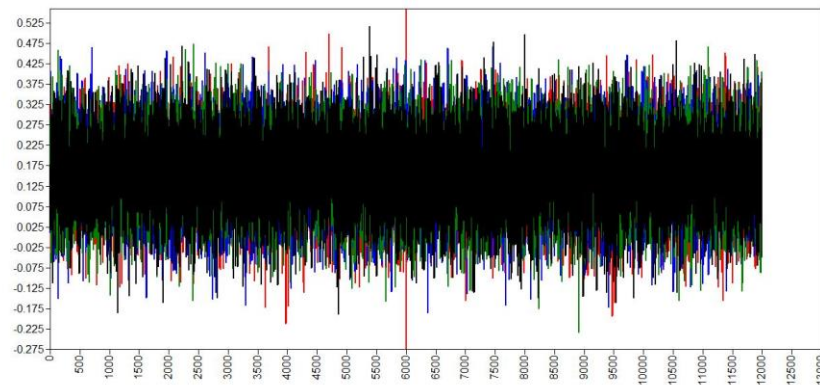


Figure 30. Trace plot for the path from paternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

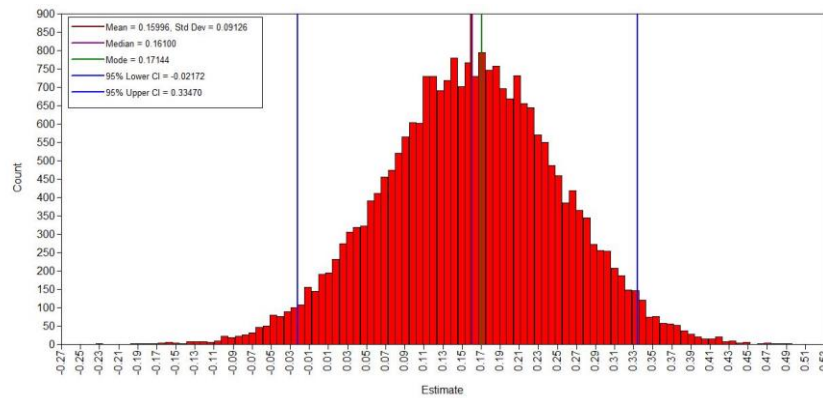


Figure 31. Posterior density plot for the path from paternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

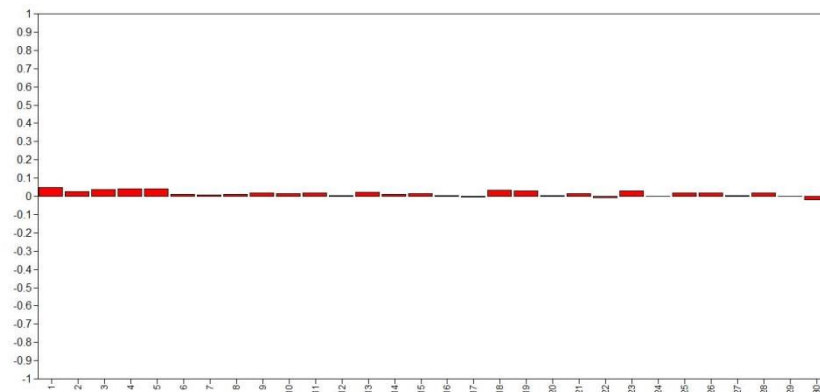


Figure 32. Autocorrelation plot for the path from paternal positive parenting behaviors at 24 months to maternal positive parenting behaviors 36 months

2. Study 1: Negative parenting model

- 1) Trace, posterior densities and autocorrelation plots for the path from maternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

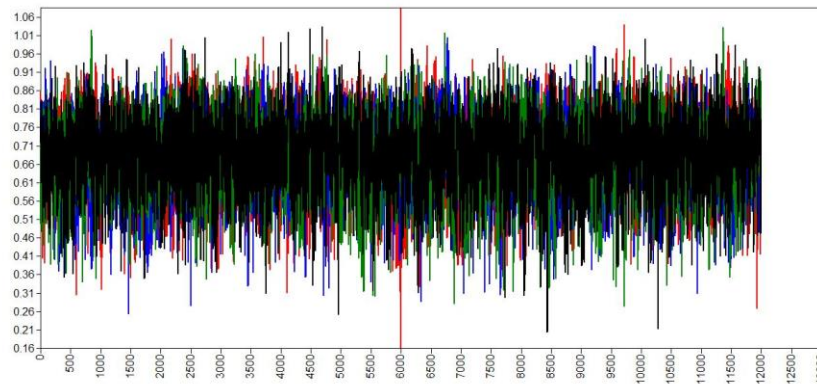


Figure 33. Trace plot for the path from maternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

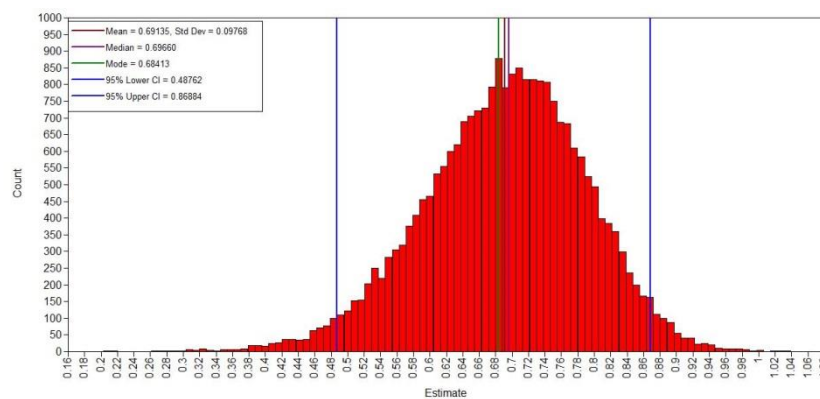


Figure 34. Posterior density plot for the path from maternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

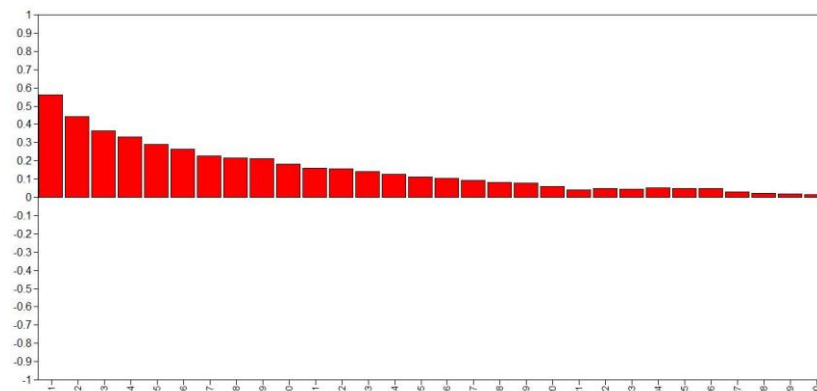


Figure 35. Autocorrelation plot for the path from maternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

- 2) Trace, posterior densities and autocorrelation plots for the path from paternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

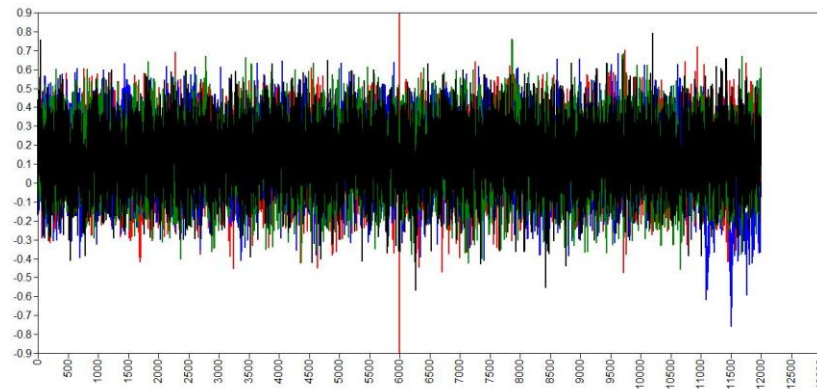


Figure 36. Trace plot for the path from paternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

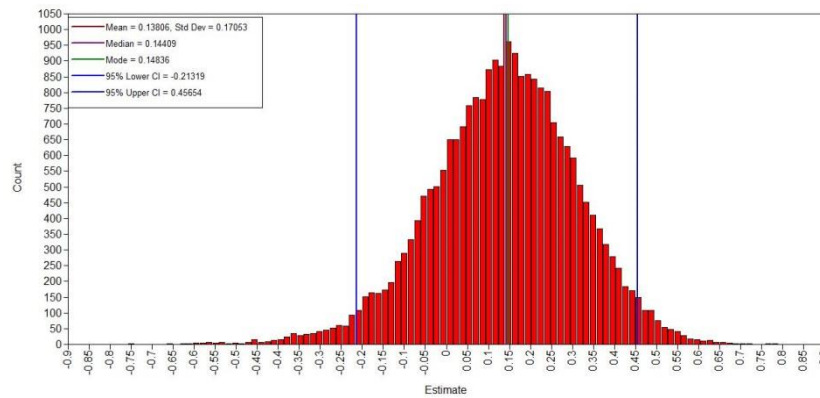


Figure 37. Posterior density plot for the path from paternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

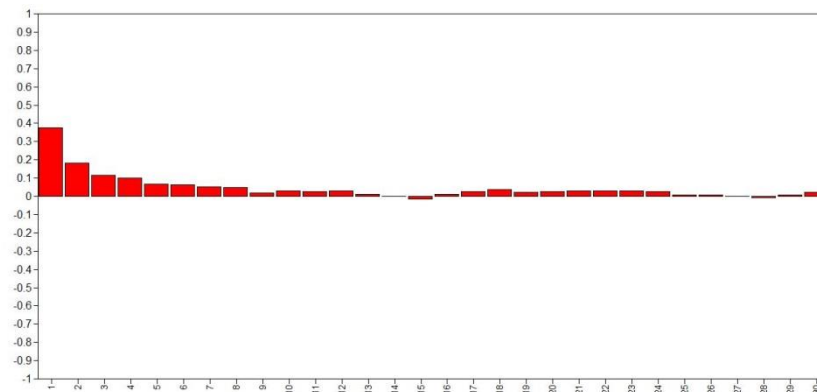


Figure 38. Autocorrelation plot for the path from paternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

- 3) Trace, posterior densities and autocorrelation plots for the path from maternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

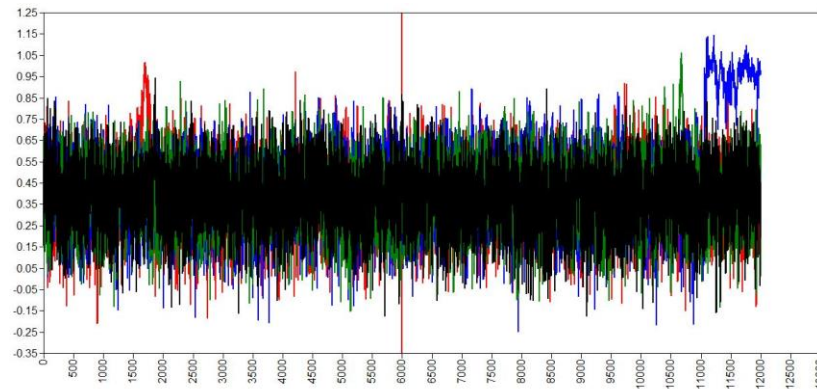


Figure 39. Trace plot for the path from maternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

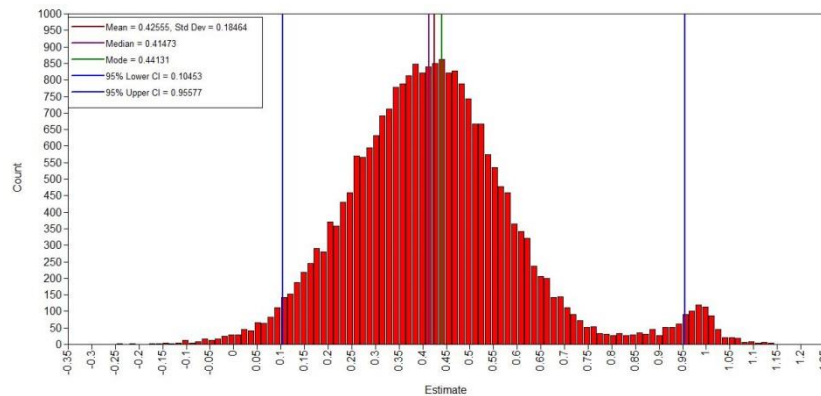


Figure 40. Posterior density plot for the path from maternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

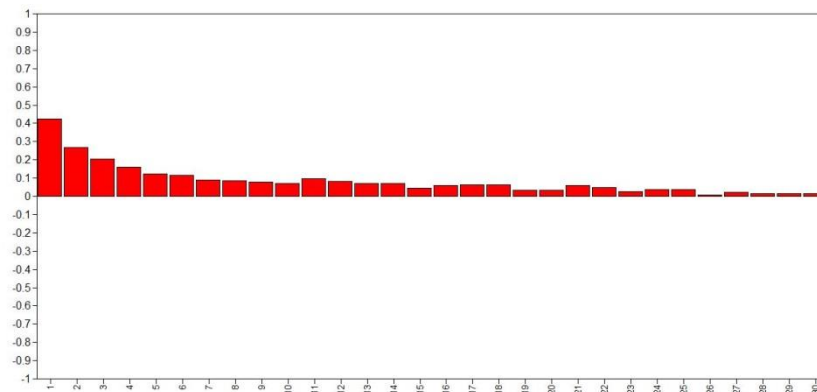


Figure 41. Autocorrelation plot for the path from maternal negative parenting behaviors at 24 months to paternal negative parenting behaviors 36 months

- 4) Trace, posterior densities and autocorrelation plots for the path from paternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

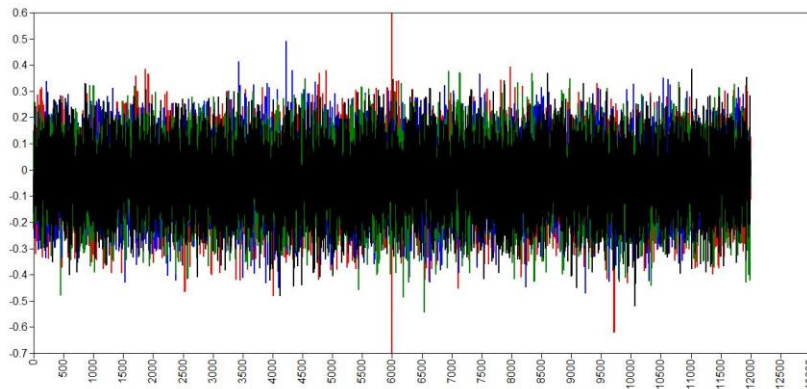


Figure 42. Trace plot for the path from paternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

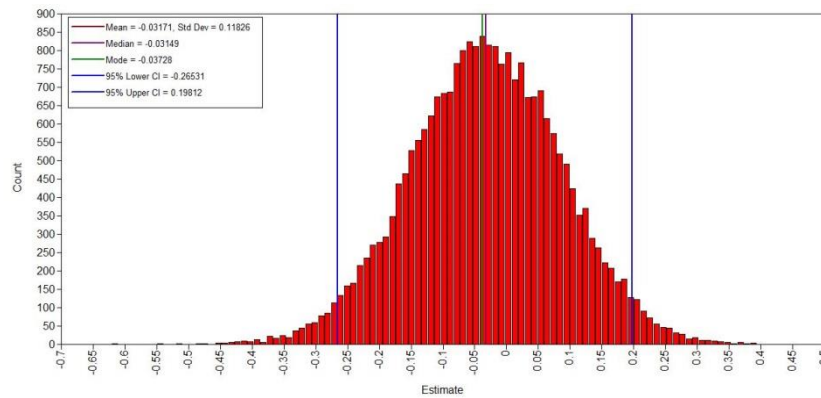


Figure 43. Posterior density plot for the path from paternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

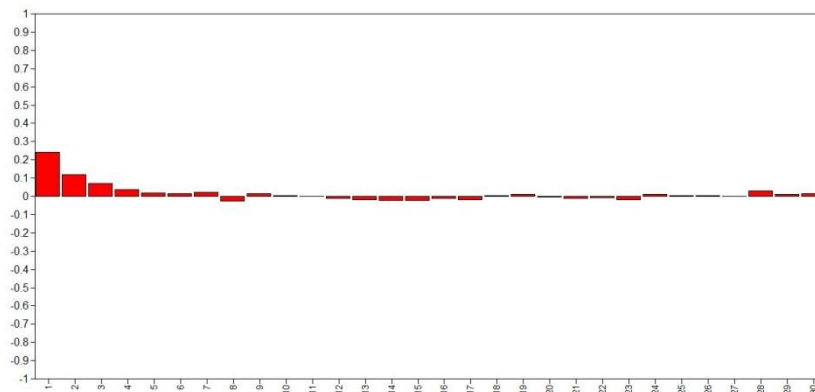


Figure 44. Autocorrelation plot for the path from paternal negative parenting behaviors at 24 months to maternal negative parenting behaviors 36 months

Appendix B

Study 2. Trace, Posterior Densities and Autocorrelation Plots for Select Parameters

1. Study 2: Positive parenting model

- 1) Trace, posterior densities and autocorrelation plots for the path from maternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

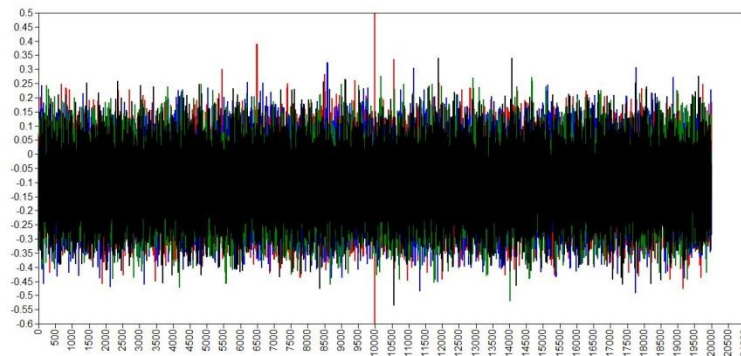


Figure 45. Trace plot for the path from maternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

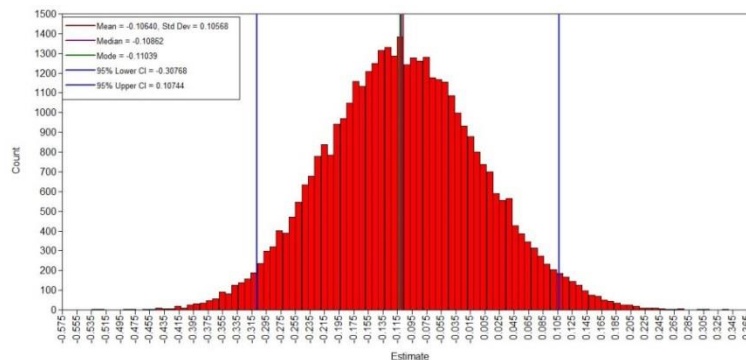


Figure 46. Posterior density plot for the path from maternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

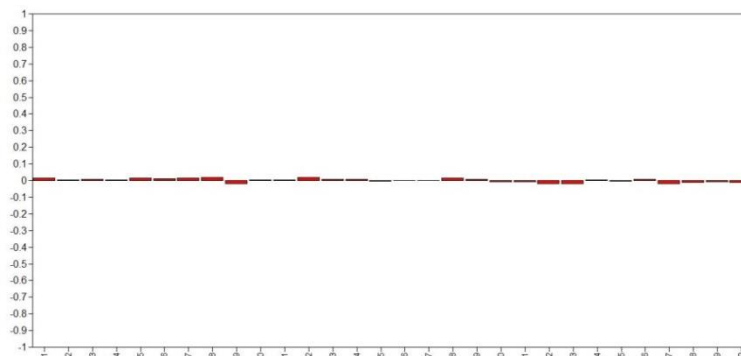


Figure 47. Autocorrelation plot for the path from maternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

- 2) Trace, posterior densities and autocorrelation plots for the path from paternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

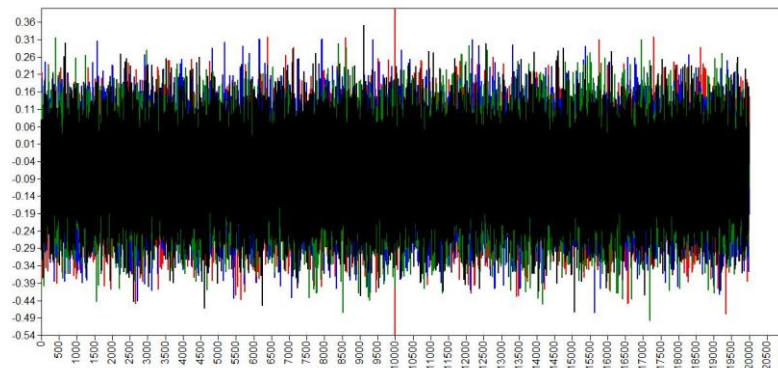


Figure 48. Trace plot for the path from paternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

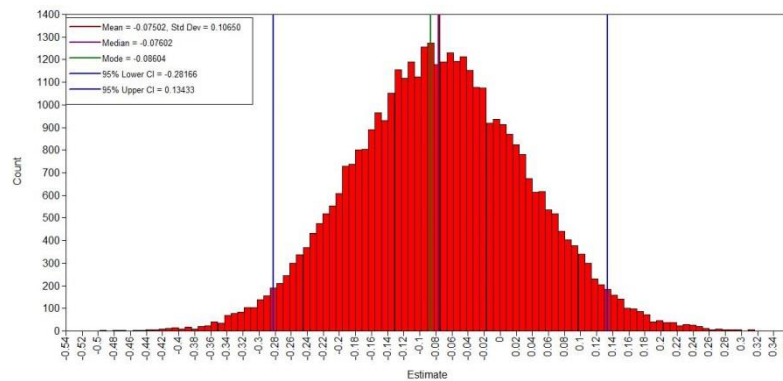


Figure 49. Posterior density plot for the path from paternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

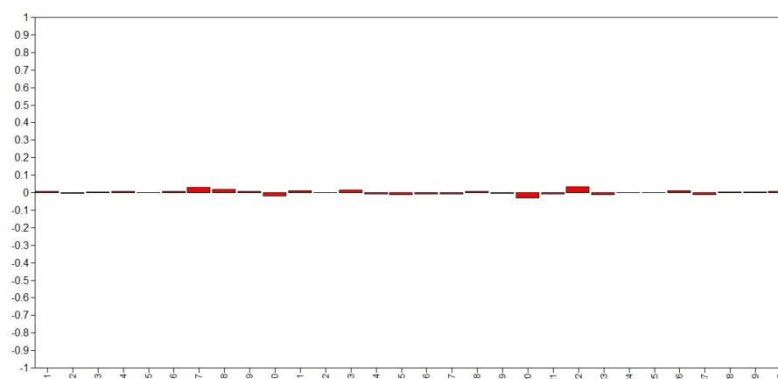


Figure 50. Autocorrelation plot for the path from paternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

- 3) Trace, posterior densities and autocorrelation plots for the path from maternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

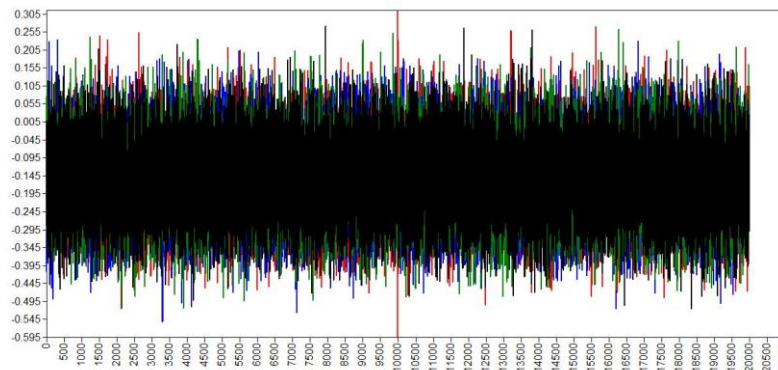


Figure 51. Trace plot for the path from maternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

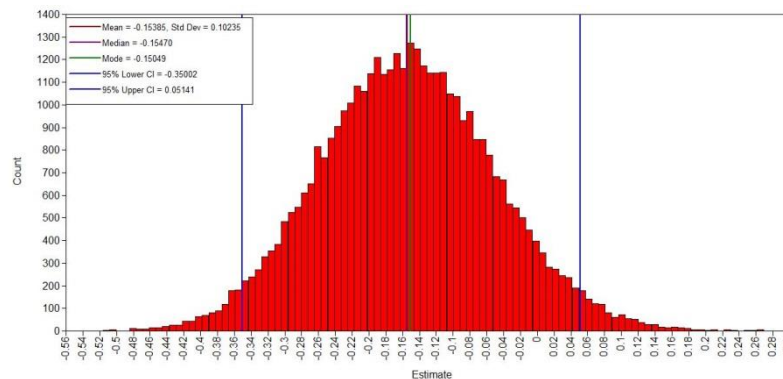


Figure 52. Posterior density plot for the path from maternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

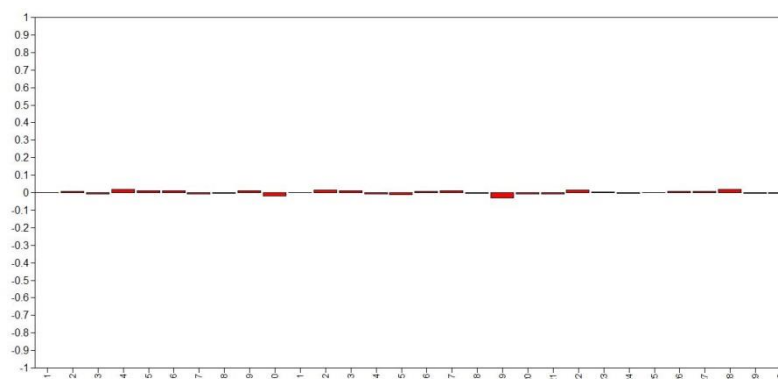


Figure 53. Autocorrelation plot for the path from maternal positive parenting behaviors at 36 months to paternal perception of child aggression at 5 years

- 4) Trace, posterior densities and autocorrelation plots for the path from paternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

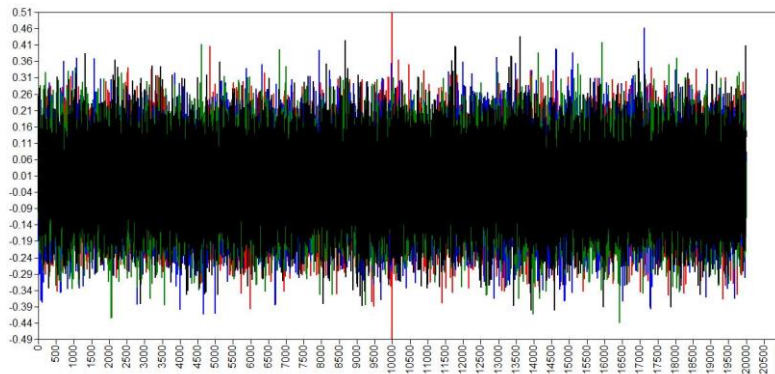


Figure 54. Trace plot for the path from paternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

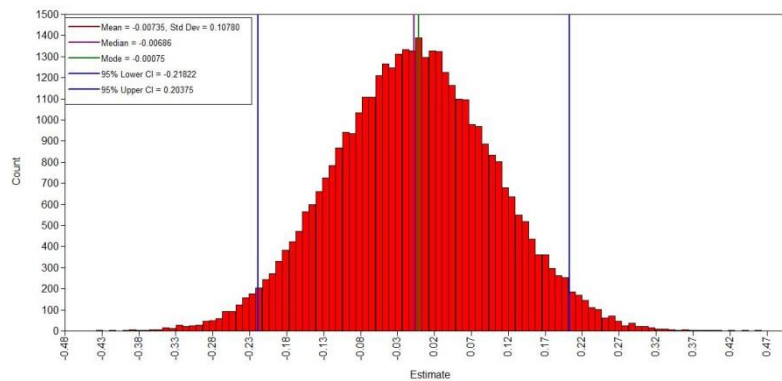


Figure 55. Posterior density plot for the path from paternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

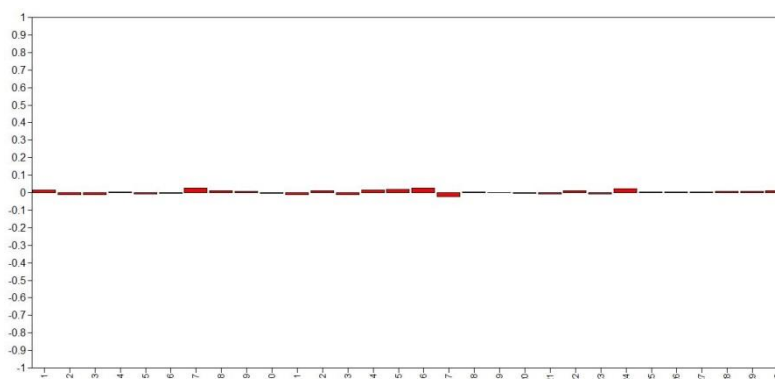


Figure 56. Autocorrelation plot for the path from paternal positive parenting behaviors at 36 months to maternal perception of child aggression at 5 years

2. Negative parenting model

- 1) Trace, posterior densities and autocorrelation plots for the path from maternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

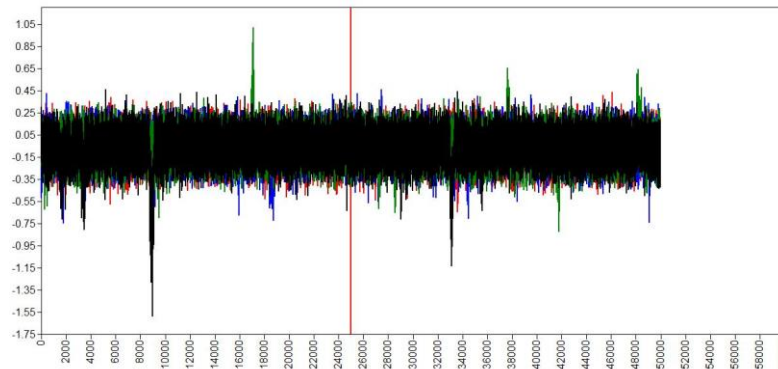


Figure 57. Trace plot for the path from maternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

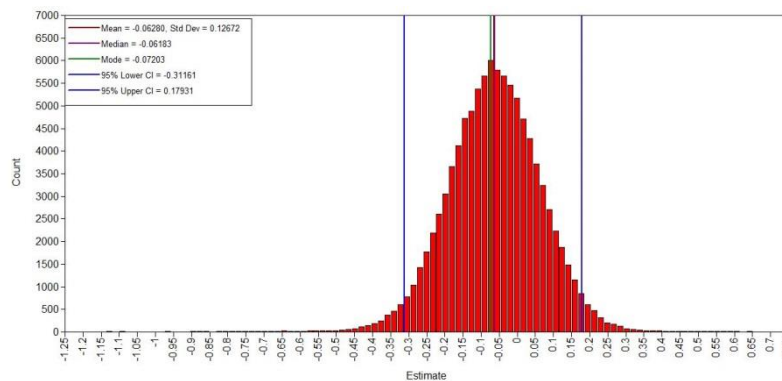


Figure 58. Posterior density plot for the path from maternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

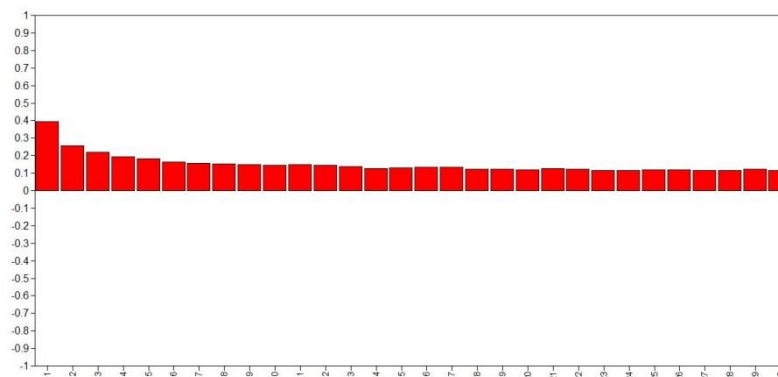


Figure 59. Autocorrelation plot for the path from maternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

- 2) Trace, posterior densities and autocorrelation plots for the path from paternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

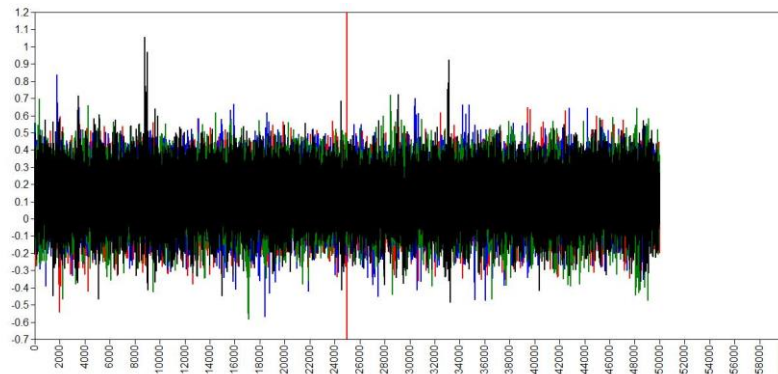


Figure 60. Trace plot for the path from paternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

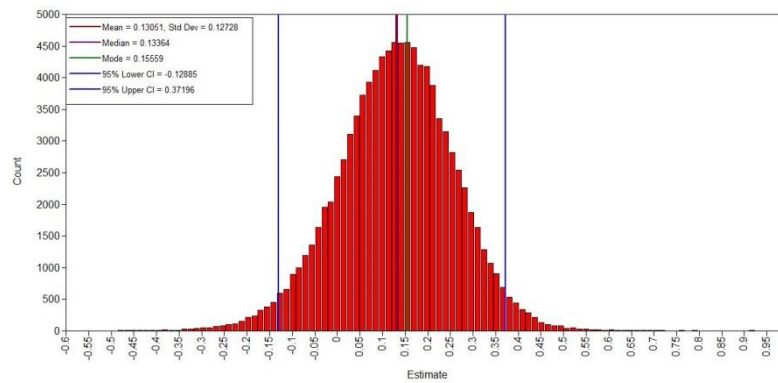


Figure 61. Posterior density plot for the path from paternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

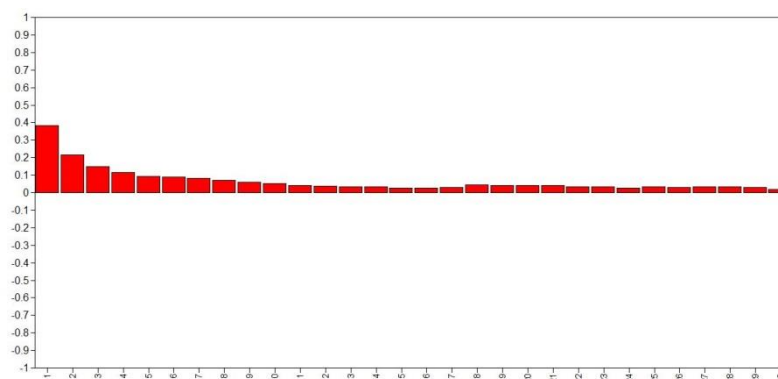


Figure 62. Autocorrelation plot for the path from paternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

- 3) Trace, posterior densities and autocorrelation plots for the path from maternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

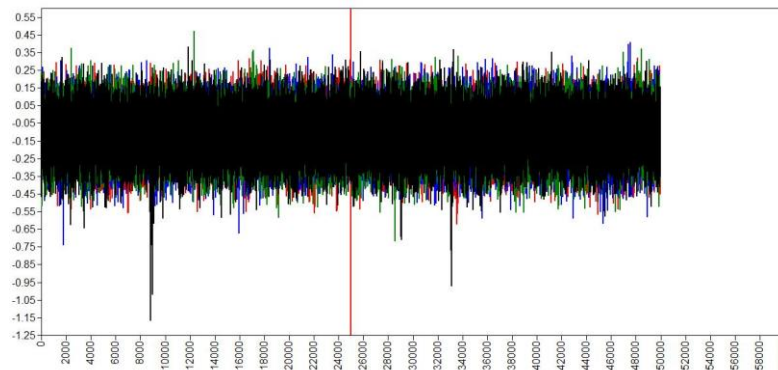


Figure 63. Trace plot for the path from maternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

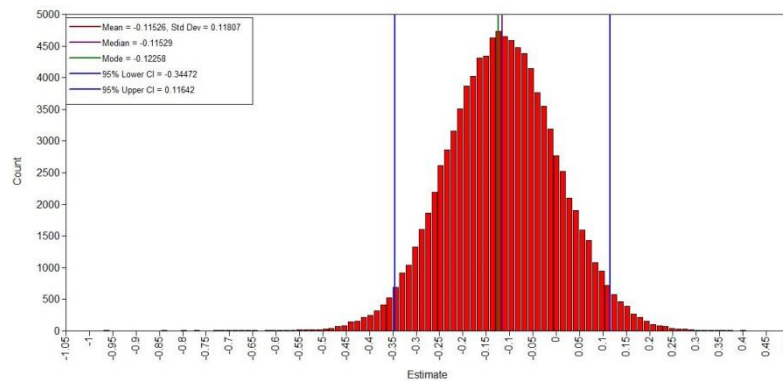


Figure 64. Posterior density plot for the path from maternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

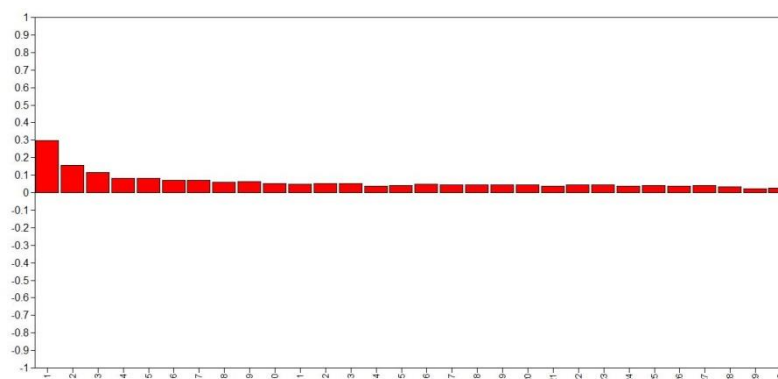


Figure 65. Autocorrelation plot for the path from maternal negative parenting behaviors at 36 months to paternal perception of child aggression at 5 years

- 4) Trace, posterior densities and autocorrelation plots for the path from paternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

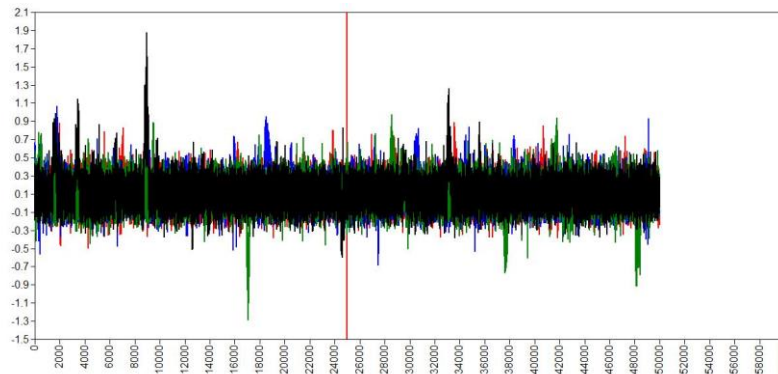


Figure 66. Trace plot for the path from paternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

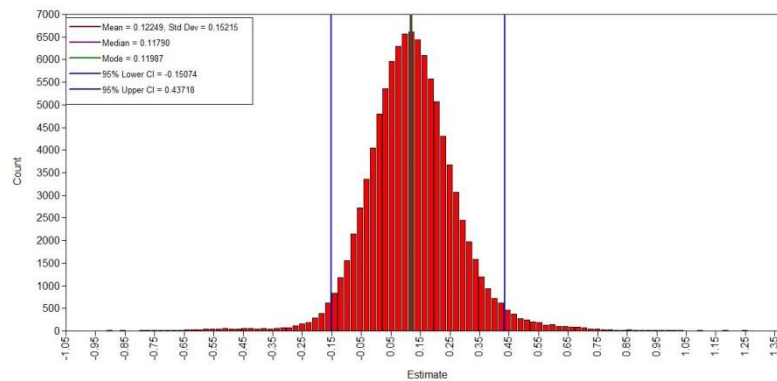


Figure 67. Posterior density plot for the path from paternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

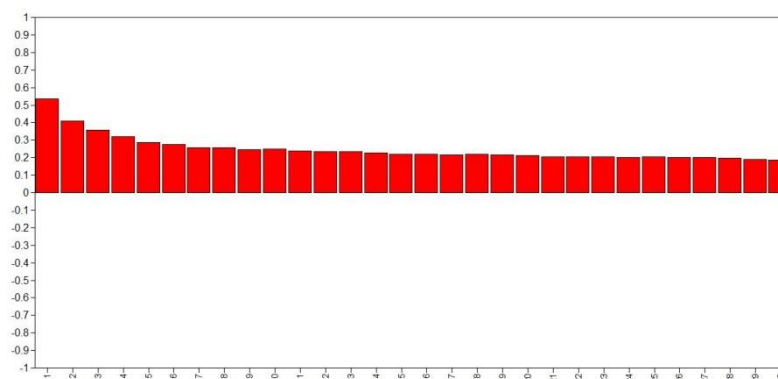


Figure 68. Autocorrelation plot for the path from paternal negative parenting behaviors at 36 months to maternal perception of child aggression at 5 years

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