

The Pennsylvania State University

The Graduate School

College of the Liberal Arts

**MATERNAL DEPRESSION, NEGATIVE PARENTING PRACTICES, AND CHILD
OPPOSITIONAL-AGGRESSION: BIDIRECTIONAL INFLUENCES OVER TIME**

A Dissertation in

Psychology

by

Erin T. B. Mathis

© 2016 Erin T. B. Mathis

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctorate of Philosophy

August 2016

The dissertation of Erin T. B. Mathis was reviewed and approved* by the following:

Karen L. Bierman

Distinguished Professor of Clinical Psychology

Dissertation Adviser

Chair of Committee

Ginger A. Moore

Associate Professor of Clinical Psychology

Kristin A. Buss

Associate Professor of Developmental Psychology

Janet Welsh

Research Assistant Professor of Health and Human Development

Senior Research Associate, Prevention Research Center for the Promotion of Human
Development

Melvin M. Mark

Professor of Psychology

Head of the Department of Psychology

*Signatures are on file in the Graduate School.

ABSTRACT

Maternal depression is elevated in adverse family contexts, particularly when children exhibit challenging oppositional and aggressive behaviors, perhaps because depressive symptoms can undermine effective parenting and increase harsh and critical parental responding. However, reverse effects are rarely studied longitudinally. This study sought to better understand bidirectional child and parenting influences on maternal depression, using rigorous longitudinal methods.

Participants were children and their mothers from the normative sample of the Fast Track Project ($n = 388$). Data was collected annually over three years when children were in kindergarten, first grade, and second grade, providing three time-points used for this study. The bidirectional influences between the three constructs (maternal depression, negative parenting practices, and child oppositional-aggression) were tested with a three-level cross-lagged path model exploring bi-directional influences among the constructs over three time points. A cross-lagged path model and bootstrapping procedure was used, to determine whether parenting practices mediated the association between maternal depression (in kindergarten and first grade) and subsequent child oppositional-aggression (in first grade and second grade). Analyses were also conducted to test for invariance across gender.

Consistent with prior research, maternal depression led to increases over time in negative parenting practices and child oppositional-aggression. Importantly, bidirectional effects also emerged, as negative parenting practices and child oppositional-aggression both exacerbated maternal depression over time. In addition, although some of the impact of maternal depression on child oppositional-aggression was mediated through negative parenting, maternal depression also retained a direct influence on child behavior. These findings add to the existing literature by demonstrating the complex transactions that occur in high-risk families, with child behavior and parenting experiences affecting maternal depression, as well as the reverse. Attending to the affective experiences of mothers, particularly feelings of helplessness and hopelessness, may be critical to fully characterize the developmental course of child oppositional-aggressive behaviors, and to inform the design of effective interventions.

TABLE OF CONTENTS

List of Tables	vi
List of Figures	vii
Acknowledgements	viii
Chapter 1. INTRODUCTION	1
Maternal Depression, Negative Parenting Practices and Child Oppositional-Aggression	2
Direct Pathways Linking Maternal Depression and Child Oppositional-Aggression	3
Bidirectional Processes Linking Child Oppositional-Aggression with Maternal Depression..	6
Negative Parenting Practices and Child Oppositional-Aggression	8
Bidirectional Processes Linking Maternal Depression and Negative Parenting Practices	11
Indirect Pathways: Depression to Oppositional-Aggression via Negative Parenting	13
Maternal Depression, Negative Parenting, and Child Aggression: The Role of Gender	14
The Present Study	19
Chapter 2. METHODS	20
Participants	20
Measures	22
Maternal depression.	22
Negative parenting practices.	22
Child oppositional-aggression.	24
Data Collection Procedures	24

Chapter 3. RESULTS	24
Plan of Analysis	24
Descriptive Analyses	26
Three-level Cross-lag Structural Equation Model	28
Multi-Group Three-level Cross-lagged Structural Equation Models	30
Mediation Models	30
Multi-Group Mediation Models.....	34
Chapter 4. DISCUSSION.....	35
Bidirectional Associations between Maternal Depression and Negative Parenting Practices	36
Bidirectional Associations between Parent Factors and Child Oppositional-Aggression	39
Mediation: Associations between Maternal Depression and Child Oppositional-aggression	42
Gender Moderation: Maternal Depression, Negative Parenting, Oppositional-aggression....	45
Clinical Implications	47
Limitations and Future Directions	48
References	53

List of Tables

Table 1. <i>Descriptive Statistics for Maternal Depression, Parent Practices and Child Oppositional-Aggression</i>	26
Table 2. <i>Correlations among Study Variables</i>	27

List of Figures

<i>Figure 1. Cross-lagged Model Examining Maternal Depression, Negative Parenting Practices and Child Oppositional-Aggression</i>	29
<i>Figure 2. Three-Time-Pointn Model Examining Mediation by Negative Parenting Practices</i>	31
<i>Figure 3. Mediation by Negative Parenting Practices from Kindergarten to First Grade</i>	32
<i>Figure 4. Mediation by Negative Parenting Practices from First to Second Grade</i>	33

Acknowledgements

Completion of this doctoral dissertation was only possible with the support and encouragement from a great number of individuals. I would like to thank my advisor Karen Bierman whose guidance has made this a thoughtful and rewarding journey. I would also like to thank my dissertation committee of Ginger Moore, Kristin Buss and Janet Welsh for the friendly guidance, thought provoking suggestions, and the general collegiality that each of them offered to me over the years. I also want to thank my committee for letting my defense be an enjoyable moment, and for their brilliant comments and recommendations. I gratefully acknowledge the funding I received from the Institute of Education Sciences (IES) Training Interdisciplinary Education Scientists (TIES) fellowship. I would like to thank Brenda Heinrichs and Robert Nix for helping me with the study datasets and statistics questions. I would also like to express my gratitude to my post-baccalaureate mentor, Alison Parker, for the guidance and council she provided to me, all the way from when I was first considering applying to PhD programs, through to completion of this degree.

I would like to thank my fellow doctoral students—those who have moved on, those in the trenches, and those just beginning—for their support, feedback, and friendship. I would like to thank those students who reached the other side for sharing their dissertation woes, and glimmers of hope for post-dissertation normalcy. I would like to thank my family and friends for their support, guidance, encouragement and much-needed laughter and joyful escapes from this project. In particular, my mom, Janet, deserves my deepest gratitude and love for her dedication and the many years of support during my undergraduate studies that provided the foundation for this work. Finally, I'd be remiss if I didn't acknowledge the innumerable sacrifices made by my husband, Josh, in shouldering far more than his fair share of the cooking and cleaning while I pursued this degree. His understanding, love, support and encouragement throughout the past many years was, in the end, what made this dissertation possible.

Chapter 1. INTRODUCTION

Depression is a prevalent mental health illness that affects 10-20 percent of women at any given time (Kringlen, Torgersen & Cramer, 2001). Research suggests that 1 in 5 women will suffer from a depressive episode over the course of their lifetime (Goodman & Gotlib, 2002). In addition, depression is elevated among mothers whose children have emotional or behavioral problems (Barkley, Anastopoulos, Guevremont, Fletcher, 1992; Fergusson, Lynskey & Horwood, 1993). For example, Civic and Holt (2000) found that mothers with elevated symptoms of depression were 3.6 times more likely to report elevated child behavior problems than non-depressed mothers. Conversely, children are more likely to experience behavior problems, including aggressive-oppositional behaviors, when they have depressed mothers (Fihrer, McMahon & Taylor, 2009; for a review see: Goodman et al., 2011).

The frequent co-occurrence of maternal depression and child aggressive-oppositional behavior problems has led researchers to suggest a direct link whereby maternal depression affects child behavior by increasing oppositional-aggression (Middleton, Scott & Renk, 2009; Park et al., 2005; Romano, Tremblay, Boulerice & Swisher, 2005). Specifically, the stress associated with having a depressed mother elicits or activates emotion dysregulation and reactive oppositional-aggressive behavior in children (Cummings & Davies, 1994). However, much less research has explored the converse direction of influence, in which having an oppositional-aggressive child might increase symptoms of depression in mothers.

Other researchers have focused on indirect pathways, examining the impact of maternal depression on negative parenting behaviors, particularly increased harshness, which in turn, can contribute to increased oppositional and aggressive responding in young children (Romano et al., 2005; Turney, 2012). For example, prevalent developmental models suggest that oppositional-aggressive behaviors often reflect a dynamic system of parent-child coercive exchanges, in

which negative parenting reinforces child aggression, and conversely, child oppositional-aggressive behavior demoralizes parents (potentially exacerbating maternal depression) and evokes negative parenting (Dishion & Patterson, 2006; Granic & Patterson, 2006). Further characterization of the bidirectional process using longitudinal data and testing negative parenting practices as a mediator of the link between maternal depression and child oppositional-aggression would add significantly to the existing literature.

Lastly, the role of gender as a potential moderator of the associations among maternal depression, negative parenting practices, and child oppositional-aggression is not well understood. However, notable gender differences in rates of child oppositional-aggressive behaviors (Putallaz & Bierman, 2004), and the possibility that gender affects child response to maternal depression (Blatt-Eisengart, Drabick, Monahan & Steinberg, 2009) indicate that gender may play a unique role.

This study addresses several critical gaps in the research by using structural equation modeling to examine bidirectional influences between maternal depression, negative parenting practices, and child oppositional-aggression over the course of three years, from kindergarten to second grade. In addition, structural equation modeling was used to test the indirect pathway to determine if negative parenting practices mediate the association between maternal depression and child oppositional-aggression over time. In addition, analyses tested invariance to determine if child gender moderated the developmental associations linking maternal depression, negative parenting, and child oppositional-aggression.

Maternal Depression, Negative Parenting Practices and Child Oppositional-Aggression

Symptoms of maternal depression include irritability, negative affect, increased fatigue, loss of interest in daily activities, difficulty concentrating, and withdrawal from social contact

(American Psychiatric Association, 2013). These symptoms can have a profound effect on the family members of the depressed individual (Downey & Coyne, 1990; Goodman & Gotlib, 1999; Goodman et al., 2011). In particular, depressive symptoms have the potential to affect a mother's ability to provide for her child's social and emotional needs (Lovejoy, Graczyk, O'Hare & Neuman, 2000).

Negative parenting practices include the use of disparaging comments toward the child, sarcasm, and verbal threats in order to gain compliance, such as telling the child the parent is going to leave them, or telling the child they are bad, or not as good as others. In addition, overtly aggressive behaviors toward the child, including yelling, spanking, hitting, and other forms of physical punishment constitute negative parenting. While many parents use these negative parenting practices on occasion, these behaviors can become detrimental to the child and the parent-child relationship when they are used frequently (Hipwell et al., 2008; Patterson et al., 1982).

Children who are oppositional are characterized by emotion dysregulation including temper tantrums, negative affect and irritability, as well as defiant and non-compliant behavior (American Psychiatric Association, 2013). Aggression is typified by physical and verbal behaviors designed to harm others, such as hitting or kicking, as well as threatening harm (American Psychiatric Association, 2013). In young children, patterns of oppositional and aggressive behavior often co-vary, reflecting both emotion dysregulation as well as hostile behaviors (Timmermans, van Lier, Pol & Koot, 2009).

Direct Pathways Linking Maternal Depression and Child Oppositional-Aggression

A plethora of research documents an association between maternal depression and child oppositional-aggressive behavior (Connell & Goodman, 2002; Barry, Dunlap, Cotten, Lochman

& Wells, 2005; Fihrer et al., 2009), raising questions about the mechanisms that account for the frequent co-occurrence. One possibility is a direct pathway, in which the distress, moodiness, irritability, and withdrawal expressed by depressed mothers elicits elevated levels of child oppositional and aggressive behavior (Turney, 2012; Goodman et al., 2011). The emotional security theory (Cummings & Davies, 1996) suggests that children have a need to feel secure in their family, and that unpredictable and distressing parental behavior threatens their feelings of emotional security. Feelings of emotional insecurity in the parent-child relationship, in turn, may increase the likelihood of irritable and emotionally dysregulated child behavior (Kouros, Merrilees & Cummings, 2008). For example, children may act in oppositional or aggressive ways in order to distract their mothers from their source of stress in an attempt to regain their mother's attention (Davies, Cummings & Winter, 2004).

Another possibility, suggested by Denham, Mitchell-Copeland, Strandberg, Auerbach & Blair (1997), is that living in a household with a depressed mother directly increases oppositional-aggressive child behavior through a process described as affect contagion. It is theorized that children observe their depressed mothers expressing negative affect and irritability in response to stress. Through processes of sympathetic mimicry and modeling, children feel irritable and distressed as well, and mirror the emotionally-dysregulated behaviors of their mothers. For example, Field, Healy, Goldstein and Guthertz (1990) found that during an experimental task where mothers were asked to play with their infants like they would at home, infants of depressed mothers matched mother's negative affective states more often and displayed positive affective states less often than children of non-depressed mothers. Similarly, Hops and colleagues (1987) found that during home observations, the affect of depressed mothers in maritally-distressed families tended to be matched by the irritability of her children.

Yet a third possibility is that maternal depression places a strain on the stress-response system of young children, reducing their capacity for effective emotional and behavioral regulation (Gunnar & Quevedo, 2007). Symptoms of maternal depression are often associated with stressful life circumstances, including financial stress, high marital conflict, lack of social support, and unemployment (Downey & Coyne, 1990; Turney, 2012). For example, rates of maternal depression tend to be higher among low-income families, as well as among single mothers. In addition, depression can increase the likelihood of financial instability by increasing the probability of low productivity as well as earning and employment losses (Marcotte & Wilcox-Gok, 2001). Depression is also known to foster withdrawn or negative interactions with romantic partners (Cicchetti, Rogosch & Toth, 1998; Kim & McKenry, 2002) leading to increased marital conflict. Furthermore, the symptoms of depression may cause mother's social support networks, including family and friends to limit their efforts of instrumental and emotional support and make it less likely that they will utilize their social support networks (Lin, Ye & Ensel, 1999; Meadows, 2009). Exposure to these high levels of stress and low levels of social support can activate the child's stress response system (e.g. hypothalamic-pituitary-adrenal axis) overwhelming the child's regulatory capacities (Gunnar & Quevedo, 2007) and thereby increasing aggressive-oppositional behaviors (Curtis, Dooley, Lipman & Feeny, 2001; Dadds & Powell, 1991; Offord, Boyle & Jones, 1987; O'Leary & Vidair, 2005; Ryan, Kalil & Leinenger, 2009).

In summary, maternal depression may directly contribute to increases in child oppositional-aggressive behavior over time in several ways. Increases in emotional insecurity, processes of affective contagion, and increased exposure to the stress of marital conflict and social isolation have each been identified as possible sources of direct influence. Although rarely

studied, bi-directional influences are also possible, in which child oppositional-aggressive behavior serves as a stressor that amplifies maternal depression.

Bidirectional Processes Linking Child Oppositional-Aggression with Maternal Depression

Only a few studies have considered the ways in which child oppositional-aggressive behaviors might contribute to and exacerbate maternal depressive symptoms. There is evidence of child effects on other adult behaviors including marital quality (Cui, Donnellan & Conger, 2007), parenting self-efficacy (Lipscomb et al., 2011), and stress (Feske et al 2001). In addition, a few studies have directly assessed the impact of child oppositional-aggressive behavior on maternal depression over time. For example, Harvey and Metcalfe (2012) examined cross-lagged associations between maternal depression and children's oppositional behaviors, as rated by parents, from ages 3 to 6. Evidence of bidirectional influence emerged, as maternal depression symptoms significantly predicted increases in child oppositional behaviors over time and child oppositional behaviors significantly predicted increases in maternal depression symptoms over time. In another study, Gross, Shaw, Burwell and Nagin (2009) investigated bidirectional associations between maternal depression and child oppositional-aggression from early to middle childhood, following a sample of boys from 18 months to 12 years. Specifically, the authors modeled trajectories for maternal depressive symptoms across all time points resulting in four profile classes: low, moderate low, moderate high and chronic high. They found that child oppositional behavior (e.g. noncompliance) and aggression during toddlerhood were significant predictors of chronic and elevated maternal depression trajectory group membership. In addition, maternal depression trajectory group membership was a significant predictor of later child oppositional-aggression when controlling for oppositional behavior at 18 months with mothers in

the moderate high group having children with significantly more externalizing symptoms than children with mothers in the low and moderate low trajectory groups.

The potential for negative child behavior to increase maternal depressive symptoms is in line with Coyne's interpersonal model of depression which suggests a cycle in which depressive symptoms provoke negative reactions from others, and those negative reactions, in turn, serve to intensify the depressed person's negative affect and distress (Coyne, Kahan, & Gotlib, 1987). For example, Coyne and colleagues suggest that depressed mothers express more negative attitudes toward their children than do non-depressed mothers, which elicit oppositional-aggressive responding. Managing these noxious oppositional and aggressive behaviors, in turn, is frustrating and demoralizing, contributing to heightened stress levels and decreased efficacy, thereby intensifying depressive symptoms (Downey & Coyne, 1990). However, not all studies have found clear support for bidirectional effects, in which child misbehavior affects maternal depression. For example, Elgar, Curtis, McGrath, Waschbusch and Stewart (2003) applied cross-lagged models to test for bidirectional influences between maternal depression and child aggression in male and female children, age 4 – 11 years. In their model, maternal depression predicted increases in child aggression over time, but child aggression did not contribute to elevated maternal depression over time. Instead, child anxiety and depression led to increase maternal depression. This leaves open the question as to whether the association between maternal depression and child aggression is bidirectional or unidirectional. However, the study by Elgar and colleagues (2003) used two-year lags in between time points which is a long time between assessments when examining reciprocal effects between parents and children, which may have reduced the capacity to detect child behavioral effects on maternal depression. Also, in the Elgar study, participants had a large age range at time 1, 4-11 years. The association between

maternal depression and child aggression may vary across this broad developmental range, perhaps also making the design less effective at detecting child effects on parents.

In addition, it is clear that the association between maternal depression and child oppositional-aggression is complex. Although available evidence suggests that maternal depression and child oppositional-aggressive behaviors may directly influence each other over time, indirect pathways that operate via the impact of maternal depression on the quality of parenting behaviors also seem plausible.

Negative Parenting Practices and Child Oppositional-Aggression

Negative parenting practices characterized by high levels of harsh, inconsistent, and punitive discipline, along with low warmth have been linked consistently with the development of aggressive-oppositional behavior in young children (e.g. Brotman et al., 2009; Hanisch, Hautmann, Plück, Eichelberger & Döpfner, 2014; Hipwell et al., 2008). For example, Miller, Loeber and Hipwell (2009) examined the associations between negative parenting practices and child oppositional-aggressive behavior among seven- and eight year-old girls and found that both negative parenting and low parental warmth were associated with elevated oppositional-aggressive behavior. In addition, Lansford et al. (2014) examined the association between negative parenting, parenting warmth, and child aggression with seven- to ten-year-old children living in eight different countries. Across these eight samples, the results showed that elevated negative parenting and low levels of maternal warmth were related to increases in child aggression providing strong evidence that negative parenting practices and child oppositional-aggression are linked even across cultures.

There is also a considerable body of research on the reciprocal effects, in which child oppositional-aggression leads to increases in negative parenting (Drabick, Beauchaine, Gadow,

Carlson and Bromet, 2006; Hipwell et al., 2008). The possibility of bidirectional influences was first suggested by Bell (1968) who reinterpreted research focused on the impact of negative parenting practices on child development, and suggested instead that child behaviors may evoke and reinforce negative parenting responses as well, thus shaping parenting behavior over time.

Bell's work spurred further research which sought to elucidate a more nuanced account of child development and parent-child interactions. For example, Anderson, Lytton and Romney (1986) sought to disentangle child and parent effects by comparing the way parents and children behaved with different partners. They found that mothers of conduct disordered children and mothers of normal children both engaged in more directive, negative parenting practices when they were paired with conduct disordered children, suggesting that the child's behavior was evoking negative parenting practices from the parent. However, mothers of conduct disordered children were more harsh and negative toward their own children than when they were paired with other conduct disordered children, suggesting that parental use of negative parenting practices was not determined solely by the child's behavior (Anderson et al., 1986). Currently, one of the most well-substantiated models of bidirectional processes linking parenting behaviors and child oppositional-aggression is Patterson's (1982) coercive family process model. The coercion model suggests that parents model negative, aggressive behavior (criticism, threats, yelling) which elicit oppositional-aggressive behavior from their children. Parents escalate negative, aggressive tactics in order to gain child compliance, but when faced with aggressive opposition from their child, they sometimes withdraw their demands. In such situations, children are negatively reinforced for escalating their aggressive-oppositional responding. At other times, escalated parental threats or aggression allow parents to gain child compliance, thereby reinforcing their aggression. In these interactions, parents and children essentially place each

other on varying schedules of reinforcement that contribute over time to increases in the levels of oppositional-aggressive behavior from children and increases in negative, aggressive parenting practices.

A few studies have directly explored transactional processes over time linking negative and low warmth parenting with child oppositional-aggressive behavior in longitudinal studies (Combs-Ronto, Olson, Lunkenheimer & Sameroff, 2009). For example, Hipwell et al., (2008) examined the bidirectional effects of low warmth and harsh parenting and child oppositional-aggression in girls aged seven- to twelve over six years and found that both negative parenting and low warmth were predictive of increases over time in girl's oppositional-aggressive behaviors, even when controlling for the effects of race and poverty. Furthermore, girl's oppositional-aggressive behaviors predicted increases in negative parenting and low warmth over time, documenting bidirectional influences between negative parenting and child oppositional-aggression over time.

Similarly, Burke, Pardini and Loeber (2008) found that evidence for bidirectional effects between negative parenting practices and child oppositional-aggression in a longitudinal study that followed children annually from age 7 – 12 through age 17. Interestingly, a stronger association emerged for child oppositional-aggression influencing later negative parenting practices than for negative parenting influencing later child oppositional-aggression. The relative strength of the bi-directional parent-child influences may vary at different developmental points in time. For example, Scaramella, Neppl, Ontai and Conger (2008) found that negative parenting predicted increases in child oppositional-aggression from age two to three, whereas child oppositional-aggression at age three predicted increases in negative parenting from age three to four. Likewise, Pearl, French, Dumas, Moreland and Prinz (2014) investigated the bidirectional

associations between parenting quality and child oppositional-aggressive behavior in six-year-old children over four years. Structural equation modeling showed support for bidirectional effects, as child oppositional-aggression predicted negative parenting quality and negative parenting quality predicted child oppositional-aggressive behavior. However, the strength of the association changed over time, with the impact of child oppositional-aggression on negative parenting quality decreasing as children moved through middle childhood and the influence of negative parenting quality on child oppositional-aggression increasing over the same time period. Therefore, although there is evidence for bidirectional associations between negative parenting quality and child-oppositional aggressive behavior, it is less clear how these bidirectional associations change over time.

One aspect of bidirectional effects that has not been well-studied in the context of the coercive process model is the potential transactional impact of maternal depression on negative parenting behaviors. The potential for bi-directional transactions between negative parenting behaviors and maternal depression thus also warrants exploration.

Bidirectional Processes Linking Maternal Depression and Negative Parenting Practices

One possible explanation for the association between maternal depression and child oppositional-aggression is that maternal depression may affect how parents interact with their children and their parenting behaviors in particular. Depressive symptoms may impair a mother's ability to parent effectively and thereby contribute to the development of oppositional-aggression in young children (see Downey & Coyne, 1990; Lovejoy et al., 2000 for reviews). Indeed, relative to non-depressed mothers, depressed mothers pay less attention to their children, provide less consistency and structure, and exhibit harsher judgments of their children (Caughy, Haugh & Lima, 2009; Gelfand & Teti, 1990). For example, Zahn-Waxler, Iannotti, Cummings, and

Denham (1990) found that depressed mothers were more likely to be negative, critical and unresponsive to others, including their children. These non-optimal parenting behaviors (rather than the mother's depression itself) may place children at increased risk for developing oppositional-aggressive behavior problems in the future (Downey & Coyne, 1990; Lovejoy et al., 2000). For example, in a meta-analysis, Lovejoy and colleagues (2000) found a strong association between maternal depression and the use of negative or coercive parenting behaviors (e.g. expressing anger, insults, negative control tactics) and to a lesser extent disengagement (e.g. ignoring their child, lack of nurturing). In addition, Dix and Yan (2014) found that higher levels of depressive symptoms was related to more frequent use of negative parenting practices and expressions of negativity toward children, especially when the children themselves were high in negative emotionality.

Although many studies provide evidence for an association between maternal depression and negative parenting practices, most of these studies rely on cross-sectional data. Only a few studies have examined associations between maternal depression and negative parenting over time. In one such study, Waylen and Stewart-Brown (2010) found that changes in maternal depression predicted changes in parenting practices, as children grew from 8 to 33 months. Specifically, less depression was associated with better parenting scores and more depression was associated with poorer parenting scores. In another longitudinal study, Errazuriz Arellano, Harvey and Thakar (2012) found that depression and negative parenting practices covaried over time, such that mothers were more negative with their children when they experience greater symptoms of depression compared to when their depressive symptoms were lower. These longitudinal studies suggest a causal link between maternal depression and negative parenting practices.

Whereas the predominant theory and evidence focuses on the negative impact of depressive symptoms (irritability, fatigue, and negative affect) on parenting practices (Lovejoy et al., 2000), it is possible that there are also bidirectional influences such that the use of negative parenting practices increases symptoms of depression in mothers. Although not studied previously, it is possible that using negative parenting practices and expressing angry outbursts against children is demoralizing for mothers, leading to feelings of guilt and self-recrimination and thereby fueling feelings of depression in ways that are independent of the child's misbehavior. Although this reciprocal influence has not been tested, a study by Wong, Gonzales, Montaña, Dumka and Millsap (2014) provides some support for this hypothesis. Wong et al. (2014) found that a parenting intervention that reduced negative parenting practices also had an indirect effect on mother's depressive symptoms, controlling for child oppositional-aggressive behaviors. Hence, associations between negative parenting practices and maternal depressive symptoms may be bidirectional, with the irritability and moodiness of depression increasing reliance on negative parenting practices and, conversely, the use of negative parenting practices and associated guilt and distress increasing the symptoms of maternal depression.

Indirect Pathways: Depression to Oppositional-Aggression via Negative Parenting

Given the established links between maternal depression and negative parenting practices (Lovejoy et al., 2000), and between negative parenting and child oppositional-aggression (Hipwell et al., 2008), it is possible that negative parenting practices mediate the association between maternal depression and child oppositional-aggression. That is, maternal depression may increase negative parenting practices, which in turn, promote child oppositional-aggressive behaviors. In support of this hypothesis, some studies have documented concurrent associations among maternal depression, negative parenting practices, and child oppositional-aggression. For

example, in a cross-sectional study of eleven-year-old children, Romano and colleagues (2005) found that higher levels of child aggression covaried with higher levels of maternal depressive symptoms and more negative parenting practices. In addition, in a longitudinal study, Harvey, Metcalfe, Herbert and Fanton (2011) studied the role of the family environment in the development of oppositional-aggressive behavior in three-year-old children with a follow-up three years later. Their results showed that both maternal depression and negative parenting practices were associated with child oppositional-aggressive symptoms three years later.

Further evidence of potential mediation emerged in a study by Turney (2012) in which regression analyses suggested that negative parenting practices explained some of the association between maternal depression and child oppositional-aggression; that is, adjusting for negative parenting significantly reduced the association between maternal depression and child oppositional-aggression. However, stronger evidence regarding the degree to which negative parenting practices mediate the association between maternal depression and child oppositional-aggression would involve longitudinal data and explicit tests of mediations.

Maternal Depression, Negative Parenting, and Child Aggression: The Role of Gender

Child gender may be an important moderator of the association between maternal depression, negative parenting practices and child oppositional-aggression. Many studies have shown that boys are at higher risk for oppositional-aggressive behavior than girls (Keenan & Shaw, 1997; Silverthorn & Frick, 1999). In addition, when boys exhibit elevated oppositional-aggressive behavior, physical aggression is more likely to play a prominent role, whereas for girls, rates of physical aggression are typically lower and oppositional behaviors play a more prominent role (Bierman et al., 2004). This difference in child behavior has the potential to evoke a different level of perceived threat by parents and thus affect their use of negative

parenting practices. Furthermore, a small number of studies suggest that girls and boys may be differentially sensitive to their environment, potentially leading to differential reactions to parental moods and behaviors (Shaw, Vondra, Hommerding, Keenan & Dunn, 1994). For example, it may be that there is a stronger association between maternal depression and child oppositional-aggression for one gender versus another.

Bandura's (1977) social learning theory suggests that children are more strongly influenced by models that most closely resemble themselves, including models of the same gender. There could also be bidirectional influences as parents may be more likely to identify with same gender children. In this way, girls whose mothers have elevated symptoms of depression and/or higher levels of negative parenting practices may be at an increased risk for modeling negative affect and dysregulation, potentially increasing oppositional-aggressive behavior (Hops, 1992). In addition, being oppositional and aggressive elicits more extreme social censure for girls (relative to boys), so when girls are more aggressive and oppositional, it may cause more distress and negative reactions for mothers (Pettit, Laird, Dodge, Bates & Criss, 2001). It is also a possibility that maternal depression affects boys and girls in different ways, such as girls of depressed mothers having more symptoms of depression and boys of depressed mothers having more symptoms of oppositional-aggressive behavior (Cummings & Davies, 1994).

However, few studies have tested whether gender moderates the associations among maternal depression, negative parenting practices and child oppositional-aggression, and the evidence is mixed. For example, some studies suggest stronger links between negative parenting and oppositional-aggression among boys. In their meta-analysis, Rothbaum and Weisz (1994) found stronger associations between negative parenting practices and oppositional-aggressive

behaviors for boys than for girls, and also found associations between positive parenting practices (e.g., warmth and involvement) and fewer oppositional-aggressive behaviors for boys, but not for girls. Likewise, examining a population of African American preschool children, Barnett and Scaramella (2013) found that boys and girls were equally likely to be exposed to negative parenting practices, but high levels of negative parenting practices predicted more oppositional-aggressive behaviors in boys, but not girls. Similarly, in a population of Chinese children, Chang, Schwartz, Dodge and McBride-Chang (2003) found that negative parenting was related to aggression for boys, but not for girls. In contrast, several studies found no gender differences in the association between negative parenting and child oppositional-aggression. For example, Olson, Lopez-Duran, Lukenheimer, Chang and Sameroff (2011) followed children from preschool into the transition to kindergarten and found that negative parenting practices in preschool predicted child oppositional-aggressive behavior in kindergarten; however, gender did not moderate this association. Brotman and colleagues (2009) found that an intervention that improved parenting practices partially explained improvement in child oppositional-aggressive behaviors, and gender did not significantly moderate this association. Lastly, in a study of preschool children in the United States, China and Japan, Olson, Tardif and colleagues (2011) found that negative parenting practices predicted child oppositional-aggression in families from all three countries; however they found no gender differences in the association between negative parenting and child oppositional-aggression for any of the three countries.

Concerning the association between depression and child oppositional-aggression, mixed evidence of moderation by gender has also emerged. For example, Tichovolsky, Arnold and Baker (2013) found moderation, with the association between maternal depression and child oppositional-aggression significantly stronger for girls than for boys. On the other hand, other

studies have found that moderation by gender might vary by child age. For example, Blatt-Eisengart and colleagues (2009) found that the association between maternal depression and child oppositional-aggression was stronger for boys at 24 months, but it was stronger for girls in the first grade. These results suggest that boys and girls may be differentially affected at different ages. However, other studies have found no evidence for gender differences in the association between maternal depression and child oppositional-aggression. In a longitudinal study, McCarty, McMahon and the Conduct Problems Prevention Research Group (2003) assessed maternal depression and child oppositional-aggression from kindergarten through second grade. This study used the same sample that is discussed in this study and found that gender did not moderate the association between maternal depression and child oppositional-aggression. However, the McCarty assessed child oppositional-aggression using the parent report on the Child Behavior Checklist (CBCL; Achenbach, 1991) and, as described below, the current study uses teacher ratings on the Teacher observation of classroom adaptation—Revised (TOCA-R; Werthamer-Larsson, Kellam & Ovesen-McGregor, 1990). Since parent ratings of depression on the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) are used in both studies, using teacher ratings to assess child oppositional-aggression avoids rater bias in the measurement. This is especially important when studying maternal depression and child behavior because previous studies have found that parents with elevated depressive symptoms rate their children as more negatively compared to other observers (for review see Goodman et al., 2011).

These mixed findings leave open the question as to what extent child gender plays a role in the association between maternal depression and child oppositional-aggression. In order to gain a clearer picture of these results across studies, Goodman and Colleagues (2011) conducted a meta-analytic review of the association between maternal depression and child

psychopathology, including child oppositional-aggressive behavior. They looked at potential for gender differences in the association between maternal depression and child oppositional-aggression and found that there were no significant gender differences in the association suggesting that there may be stronger evidence against gender differences than for gender differences in this association.

Lastly, concerning the association between maternal depression and negative parenting practice, the authors are only aware of one study to-date that has examined the potential for gender moderation in the association between these two variables. Errazuriz Alrellano and colleagues (2012) conducted a longitudinal study on the association between maternal depression and parenting practices from age 3 to age 6. They found strong evidence for an association between maternal depression and negative parenting practices over time; however their results showed that there were no gender differences in the association between maternal depression and negative parenting practices.

The findings for gender moderation in the association between maternal depression, negative parenting practices and child oppositional-aggression are thus mixed with some studies finding significant gender moderation (Blatt-Eisengart et al., 2009; Rothbaum & Weisz, 1994; Tichovolsky et al., 2013) and other studies finding no significant gender moderation (Chang et al., 2003; Errazuriz Alrellano et al 2012). However, one meta-analytic review looked at the potential for gender moderation between maternal depression and child oppositional-aggression and did not find a significant effect for gender moderation (Goodman et al., 2011). Since the role of gender in the association between negative parenting practices, maternal depression and child oppositional-aggression is still not well understood, the current study explores gender as a potential moderator in the hypothesized associations.

The Present Study

This study examined longitudinal associations among maternal depression, negative parenting practices, and child oppositional-aggressive behavior from kindergarten to second grade. In light of the bidirectional conceptualizations of development (Bell, 1968; Patterson, 1982), the study's first aim was to evaluate three sets of potential bidirectional influences, between: 1) maternal depression and child oppositional-aggression, 2) maternal depression and negative parenting practices, and 3) negative parenting practices and child oppositional-aggression. It was hypothesized that bi-directional influences would emerge in each case. That is, maternal depression was expected to predict increases in child oppositional-aggression over time, and child oppositional-aggression was expected to predict increases in maternal depression over time. Similarly, maternal depression and negative parenting practices were expected to predict each other over time, as were negative parenting practices and child oppositional-aggressive behaviors.

The study's second aim to determine whether the association between maternal depression and child oppositional-aggression was mediated by negative parenting practices in the context of a longitudinal study with the influence of prior parent and child behaviors controlled. As suggested by Little (2013), a mediation model that uses multiple time-points and controls for the mediator and the outcome at previous time-points was used in this study. This approach improves upon other approaches to mediation in several ways. It is an expectation of mediation that one variable causes change in another variable which, in turn, causes change in an outcome variable. However, mediation models that use cross-sectional data do not allow for the separation of time between variables needed to support a time-sequenced relationship that is hypothesized in mediation analyses. Given that mediation theorizes change, change needs to be a part of the

model. Using a longitudinal model to test for mediation allows for time separation between hypothesized variables which provides support for time-sequences causation that mediation theorizes (Cole & Maxwell, 2003; Little, 2013). In addition, some mediation models do not attempt to control for prior levels of the mediator variable or the outcome variable. However, a longitudinal mediation model allows for modeling the prior levels of the mediator and outcome variable. This allows the model to isolate the change variance attributed to the variables at the specific time-point of interest and it also prevents inflated estimates of the causal pathways (Cole & Maxwell, 2003; Little, 2013). This approach to testing mediation was used in this study and it was hypothesized that evidence of mediation by negative parenting practices would emerge on cross-lagged longitudinal models that controlled for stability in each type of behavior over time and the direct effect of maternal depression on later child oppositional-aggression.

The third and final aim of this study was to explore whether gender moderates the bidirectional associations among maternal depression, negative parenting practices, and child oppositional-aggression. Since little has been published in this area and the present findings are mixed, these analyses are exploratory and no hypotheses were offered.

Chapter 2. METHODS

Participants

Participants were children and their mothers from the normative sample of the Fast Track Project ($n = 388$; 52 percent European American, 44 percent African American, 51 percent male), a multisite study of the development and prevention of conduct problems (CPPRG, 1992). Caregivers who participated in this study were 97 percent biological mothers, 1 percent adoptive mothers, 1 percent foster mothers and 1 percent other (e.g. family friend). Married mothers made up 55 percent of the sample, while single mothers made up 45 percent of the sample. Slightly less than half of mothers (46 percent) completed high school, 26 percent never completed high

school and 29 percent had at least some college. Participants resided in four geographically diverse regions of the United States: Durham, North Carolina; Nashville, Tennessee; Seattle, Washington; and rural central Pennsylvania. Data was collected annually over three years when children were in kindergarten, first grade, and second grade, providing three time-points used for this study.

To select the sample, a multiple-gating screening procedure was used that combined kindergarten teachers and parent-ratings of disruptive behavior (Lochman & CPPRG, 1995). Kindergarten teachers rated each of the children in their classroom on their aggressive-disruptive behaviors using the 10-item Authority Acceptance scale of the Teacher Observation of Classroom Adaptation-Revised (Werthamer-Larsson et al., 1990) resulting in ratings for 9,594 kindergarteners across three cohorts (1991-1993) in 54 schools. Children scoring in the top 40 percent for aggressive-disruptive behaviors within cohort as well as site were then solicited for the next stage of screening which included parent-ratings for home behavior problems using items from the Child Behavior Checklist (Achenbach, 1991) and similar scales (Lochman & CPPRG, 1995). Of those solicited for this stage of screening, 91 percent agreed to participate ($n = 3,274$). The teacher and parent screening scores were then standardized and combined into a sum score, based on screening a representative sample of approximately 100 children within each site (which also served as a normative comparison) and then summed to yield a total severity-of-risk screen score. Children were selected for inclusion in the study based on this screen score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school ($n = 59$) or refused to participate ($n = 75$). A total of 95 percent of the selected sample scored in the top 20 percent on both the parent and teacher screening

measures. The outcome was that 891 children ($n = 445$ for intervention and $n = 446$ for control) participated. In addition to the high-risk sample, a stratified normative sample of 388 children was identified from the control schools to represent the population-normative range of risk scores (based on teacher-ratings only) and was followed over time. The normative sample was used in this study.

Measures

Maternal depression. Maternal depression was assessed using mother's ratings on the Center for Epidemiological Studies – Depression Scale (CES-D scale; Radloff, 1977). Mothers were asked to report the frequency of 20 symptoms occurring during the week prior to the interview using a four-point scale ranging from *rarely/none of the time* to *most or all of the time*. An overall depression symptom rating score was derived by summing the 20 items with a range of 0 to 60 ($\alpha = .88$). A score of 16 or higher indicates that the depressive symptoms are clinically significant. At time 1, 35 percent of mothers had clinically significant depressive symptoms, at time 2, 33 percent of mothers had clinically significant depressive symptoms and at time 3, 28 percent of mothers had clinically significant depressive symptoms.

Negative parenting practices. A composite of negative parenting practices was created that included observer ratings (weighted 50 percent) and parent ratings (weighted 50 percent). The measures were composited in this way so that equal weight would be given to parent-rated measures and observer ratings.

Negative parenting practices were assessed by observers using the Post-Visit Inventory (PVI; Dodge, Bates & Pettit, 1990). Within 24 hours after completing the home interview visit, interviewers completed this measure which included 5 items describing negative parenting practices, each rated with a 3-point scale ranging from *didn't occur* to *occurred more than once*.

The scale included items such as seeing the mother: shout at the child, express anger toward the child.

Negative parenting practices were also assessed using maternal ratings on three different scales: the Conflict Tactic Scale (Straus, 1979), the Life Changes scale (Dodge et al., 1990) and the Parent Questionnaire (Strayhorn & Weidman, 1988). The Conflict Tactics Scale asked parents to describe the frequency with which they used different discipline strategies with the target child during the past year, rating their practices with a seven-point scale ranging from *never* to *almost every day*. Two subscales were included in the composite: Physical Aggression (e.g. pushed, grabbed or shoved child, threw something at your child) which has 4 items ($\alpha = .64$) and Spanking (e.g. spank, spank with an object) which has 2 items ($\alpha = .80$). The physical aggression scale and the spanking scale were moderately correlated ($r = .49$).

As part of the Life Changes measure (Dodge et al., 1990), parents were presented with a series of vignettes describing child misbehaviors, and asked to describe how they would respond to each scenario. Interviewers noted the number of times that parents listed physical punishment as a response. Instances of physical punishment were summed and averaged across the 6 vignettes ($\alpha = .60$).

Finally the Negative/Physical Punishment of the Parent Questionnaire (Strayhorn & Weidman, 1988) asked parents to rate the frequency with which they used the following parenting strategies with the target child: tell your child you may leave him/her if he/she doesn't behave better, tell your child that he/she is bad or that he/she is not as good as others, talk to your child about his or her behavior, show disapproval and get angry when you punish your child. Items were rated using a 5-point scale ranging from *never* to *all the time/many times a day* ($\alpha = .60$).

The subscales from each of the three questionnaires described above were moderately correlated (r ranged from .26 -.52) and were standardized and averaged to create a composite score of *negative parenting practices*.

Child oppositional-aggression. Teachers completed the 10-item Authority Acceptance scale of the Teacher Observation of Classroom Adaptation-Revised (TOCA-R; Werthamer-Larsson et al., 1990) using a 6-point scale ranging from *almost never (0)* to *almost always (5)* to describe child behavior at school over the past year. The Authority Acceptance scale includes items describing both oppositional and aggressive behaviors including: harms others, fights, yells, breaks rules, stubborn, lies and takes property ($\alpha = .93$).

Data Collection Procedures

Parent-ratings of maternal depression, and negative parenting practices were collected during a summer home interview following the child's kindergarten year and annually for the following two summers resulting in three time-points (kindergarten, first grade and second grade) each spaced one year apart. Teachers completed measures of child aggressive-oppositional behavior during the spring of the kindergarten year and for the following two springs, resulting in three time-points each spaced one year apart collected in kindergarten, first grade and second grade. Interviewer ratings of negative parenting practices were collected following the summer parent interview at each of the three time-points spaced a year apart, again in kindergarten, first grade and second grade.

Chapter 3. RESULTS

Plan of Analysis

First, preliminary analyses were conducted. These included correlations documenting basic associations among measures of maternal depression, parenting practices, and child oppositional-aggression collected at each time point. Then, the first aim of the study to examine

the bidirectional influences between maternal depression, negative parenting practices, and child oppositional-aggression was tested with a three-level cross-lagged path model exploring bidirectional influences among the three constructs (maternal depression, parenting practices, child oppositional-aggression) over three time points (kindergarten, first grade, second grade). Next, the third aim of the study to determine if gender moderated these associations was explored by testing this longitudinal cross-lagged model for invariance across gender. The second aim of the study was tested with a cross-lagged path model and bootstrapping procedure, to determine whether parenting practices mediated the association between maternal depression (in kindergarten and first grade) and subsequent child oppositional-aggression (in first grade and second grade). Finally, again in order to address the third aim of the study and determine whether gender moderated the associations in the mediation models, analyses were conducted to test for invariance across gender. In addition, in order to confirm that child race/ethnicity does not moderate the longitudinal models, an analysis of invariance by race was conducted for both the three level cross-lagged model and the mediation model.

All of the analyses in this study were performed using SPSS 21 and AMOS 21. Only small amounts of data were missing. The median percentage of missing data for each measure was 6.4 percent with a range from 0 percent to 14.7 percent. Model testing in AMOS 21 allowed maximum likelihood estimation of individual parameters and model fit statistics based on every participant in the sample, even if the participant was missing data on some of the measures. However, maximum likelihood estimation was not an option when testing for mediation in AMOS 21 and using the bootstrapping procedure to assess the indirect effect. Therefore, for the mediation analyses, missing data was imputed using the regression imputation function in AMOS 21 which sets the model parameters equal to their maximum likelihood estimates.

Table 1.

Descriptive Statistics for Maternal Depression, Parent Practices and Child Oppositional-Aggression

Parent and Child Variables	Time 1			Time 2			Time 3		
	Kindergarten			First Grade			Second Grade		
	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N
Maternal Depression	13.40	(9.48)	388	13.30	(10.07)	363	12.03	(8.90)	359
Parenting Practices *	-.13	(.58)	365	-.08	(.57)	349	-.01	(.64)	331
Child Aggression	1.04	(.91)	388	1.18	(1.13)	379	1.20	(1.04)	359

Note. * Standardized score

Descriptive Analyses

Descriptive statistics, including means and standard deviations for all measures included in this study are presented in Table 1. The average score on the CES-D for this study was below the cutoff indicating risk for clinical depression (i.e. 16 or greater), but slightly higher than the average scores reported in the general population, 8.5 (Radloff, 1977). The measurement of negative parenting practices was created by compositing standardized scores. However, as would be expected, the frequency of observing the parents express negativity toward their child by shouting or expressing anger, or the parents reporting the use of negative discipline was a low frequency event, with most observations and parent reports indicating mild to moderate aggression toward their child. Thus, the distributions for these items were negatively skewed as would be expected in the general population. The mean score on the TOCA-R Authority Acceptance scale indicated that, on average, participants rarely displayed oppositional-

aggressive behaviors as rated by their teachers. This is to be expected since the current study is using the normative sample and in normative populations these behaviors tend to be low frequency events except for a small number children who display these behaviors with high frequency. In general, the means on the measures used in this study are similar to what would be expected in the normative population.

Table 2.

Correlations among Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.
Maternal Depression (T1)	--							
Maternal Depression (T2)	.60**	--						
3. Maternal Depression (T3)	.50**	.57**	--					
4. Parenting Practices (T1)	.51**	.40**	.30**	--				
5. Parenting Practices (T2)	.34**	.33**	.28**	.49**	--			
6. Parenting Practices (T3)	.20**	.26**	.22**	.32**	.37**	--		
7. Oppositional-Aggression (T1)	.21**	.12*	.15**	.27**	.16**	.16**	--	
8. Oppositional-Aggression (T2)	.24**	.22**	.24**	.29**	.21**	.20**	.55**	--
9. Oppositional-Aggression (T3)	.26**	.28**	.21**	.32**	.18**	.14**	.50**	.64**

Note. T1=Time 1, T2=Time 2, T3=Time 3; ** $p < .01$ * $p < .05$

Correlations are presented in Table 2. Each of the measures showed a moderate to high level of stability over time, with year-to-year correlations ranging from $r = .50$ to $r = .60$ for maternal depression, $r = .32$ to $r = .49$ for parenting practices, and $r = .50$ to $r = .64$ for child

oppositional-aggression. Correlations between maternal depression and parenting practices were moderately high in kindergarten ($r = .51$) but declined over time, becoming moderately low by second grade ($r = .22$). Correlations between maternal depression and child oppositional-aggression were moderately low at each time point, $r = .20$ to $r = .21$, and correlations between parenting practices and child oppositional-aggression were moderate in kindergarten ($r = .27$) and declined to small (but still statistically significant) by second grade ($r = .14$).

Three-level Cross-lag Structural Equation Model

The first aim of the study was to explore bidirectional influences and longitudinal associations among three core constructs -- maternal depression, parenting practices, and child oppositional-aggression -- from kindergarten to second grade. To do so, a three-level cross-lagged structural equation model was estimated. It was hypothesized that significant bidirectional links would emerge between maternal depression and child oppositional-aggression, between maternal depression and negative parenting practices, and between negative parenting practices and child oppositional-aggression.

The structural equation cross-lagged model testing this hypothesized model is presented in Figure 1. The three constructs (i.e. maternal depression, negative parenting practices, child oppositional-aggression) were relatively stable over time. However, it should be noted that parenting practices was the least stable of all the constructs over time particularly from time 2 to time 3. Controlling for this within-construct stability, 7 of the 12 hypothesized cross-lagged pathways were statistically significant. Specifically, from kindergarten to first grade, and again from first grade to second grade, maternal depression predicted increases in negative parenting practices over time. Conversely, negative parenting practices in kindergarten contributed to increases in maternal depression in first grade (although this bidirectional association did not

emerge again between first and second grade). Bi-directional influences also emerged between negative parenting practices and child-oppositional aggression. From kindergarten to first grade, negative parenting practices predicted increases in subsequent child oppositional-aggression. Conversely, from first grade to second grade, child oppositional-aggression predicted subsequent increases in negative parenting practices.

Finally, although no direct bi-directional influences emerged between maternal depression and child oppositional-aggression between kindergarten and first grade, bi-directional effects were evident from first to second grade. Specifically, maternal depression in first grade predicted increased levels of child oppositional-aggression in second grade, and conversely, child opposition-aggression in first grade predicted increased levels of maternal depression in second grade.

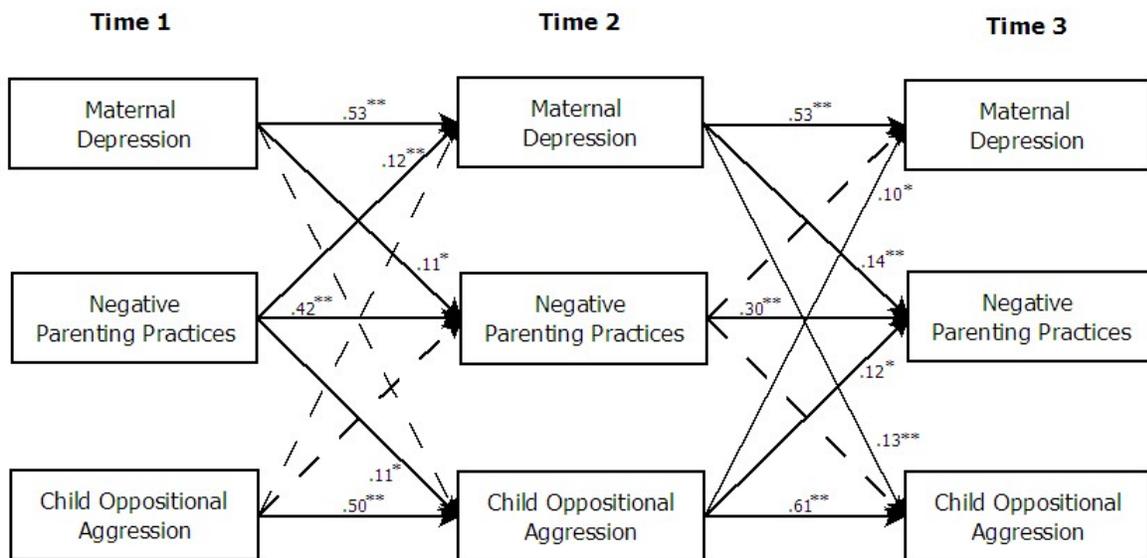


Figure 1. Cross-lagged Model Examining Maternal Depression, Negative Parenting Practices and Child Oppositional-Aggression. Solid pathways are significant. Dotted pathways are not significant. Comparative Fit Index=0.95. Root Mean Square Error of Approximation=0.12. Covariance pathways within time-points are not displayed for simplicity. * $p < .05$. ** $p < .01$.

Multi-Group Three-level Cross-lagged Structural Equation Models

To determine whether the associations in the above model were significantly different for male versus female children, a multi-group structural equation model was computed following Byrne (2001). A model that constrained path values across groups was compared systematically with a model that allowed path values to vary across groups. Chi-square difference tests showed that the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2$ (df = 21, N= 190) = 32.09, $p < 0.05$. These results indicated that associations between maternal depression, negative parenting practices, and child oppositional-aggression were similar for male and female children.

In addition, a multi-group structural equation model was conducted to determine if the associations in the above model were significantly different for African American versus European American children. A model that constrained path values across groups was compared systematically with a model that allowed path values to vary across groups. Chi-square difference tests showed that the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2$ (df = 21, N= 200) = 20.73, $p < 0.05$. These results indicated that the associations between maternal depression, negative parenting practices, and child oppositional-aggression were similar for African American and European American children.

Mediation Models

It was hypothesized that negative parenting practices would mediate the association between maternal depression and child oppositional-aggression over time. As suggested by Little (2013), a mediation model that uses multiple time-points and controls for the mediator and the outcome at previous time-points was used because it allows for the separation of time between variables needed to support a time-sequenced association. It also controls for prior levels of the

mediator variable and the outcome variable which allows the model to isolate the change variance attributed to the variables at the specific time-point of interest and it prevents inflated estimates of the causal pathways (Cole & Maxwell, 2003; Little, 2013).

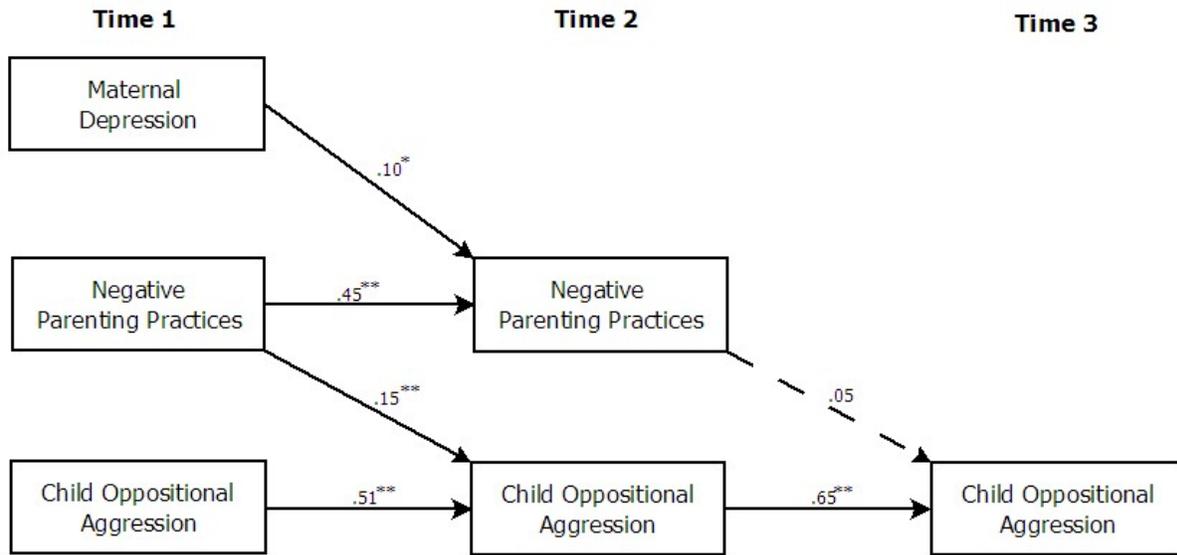


Figure 2. Three-Time-Point Model Examining Mediation by Negative Parenting Practices. Solid pathways are significant. Dotted pathways are not significant. Comparative Fit Index=0.95. Root Mean Square Error of Approximation=0.12. Covariance pathways within time-points are not displayed for simplicity. * $p < .05$. ** $p < .01$.

Using the approach suggested by Little (2013) a model testing negative parenting practices as the mediator linking maternal depression with child oppositional-aggression was estimated, see Figure 2. In this model, the standardized path coefficient between maternal depression at time 1 and negative parenting practices at time 2 was statistically significant, $\beta = 0.10$, $p < .05$, but the standardized path coefficient between negative parenting practices at time 2 and child oppositional-aggression at time 3 was not statistically significant, $\beta = 0.05$, $p > .05$. However, this mediation model assumes that the unit of time between the three measurements (1 year) is optimal for revealing both the predictor to mediator association (controlling for prior

levels of the mediator) as well as the mediator to outcome association (controlling for prior levels of the outcome). In the present study, it seems unlikely that the effect of maternal depression on parenting practices and of parenting practices on child oppositional-aggression would take three years to develop. Thus, the third measurement (child oppositional-aggression at time 3) might fall outside of the “window” of change (Little, 2013).

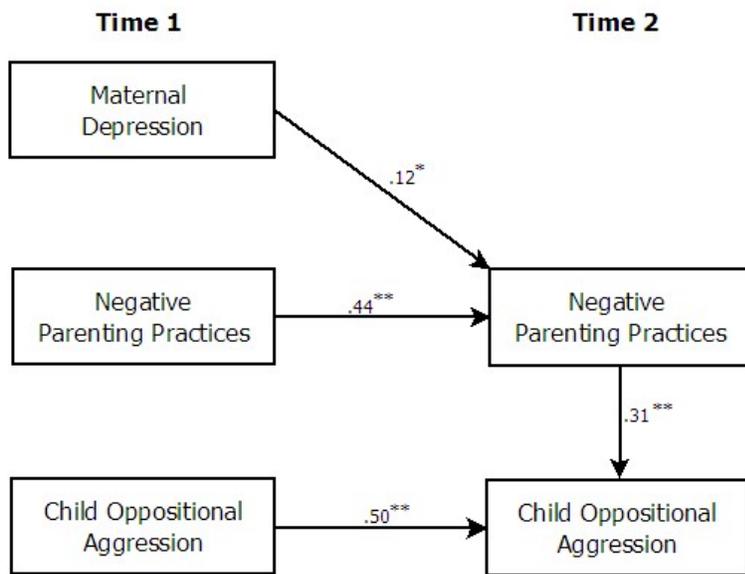


Figure 3. Mediation by Negative Parenting Practices from Kindergarten to First Grade. Solid pathways are significant. Dotted pathways are not significant. Comparative Fit Index=1.00. Root Mean Square Error of Approximation=0.00. Covariance pathways within time-points are not displayed for simplicity. * $p < .05$. ** $p < .01$.

Therefore, a modified mediation model that assessed the evidence of mediation over a shorter period of time (between kindergarten and first grade) was estimated, see Figure 3. In this model, the standardized path coefficient between maternal depression in kindergarten and negative parenting practices in first grade was statistically significant, $\beta = 0.12$, $p < .05$, as was the standardized path coefficient between negative parenting practices and child oppositional-aggression in first grade, $\beta = 0.31$, $p < .01$. We tested the significance of the indirect effect using

the bootstrapping procedure. Standardized indirect effects were computed for each of 2,000 bootstrapped samples, and the 95 percent confidence interval was computed. The standardized indirect effect was $(.12)(.31) = .04$, 95 percent CIs $[-.001, .10]$. Thus, the indirect effect was statistically significant, $p < .05$. These findings support the hypothesis that negative parenting practices partially mediate the association between maternal depression and child oppositional-aggression between kindergarten and first grade.

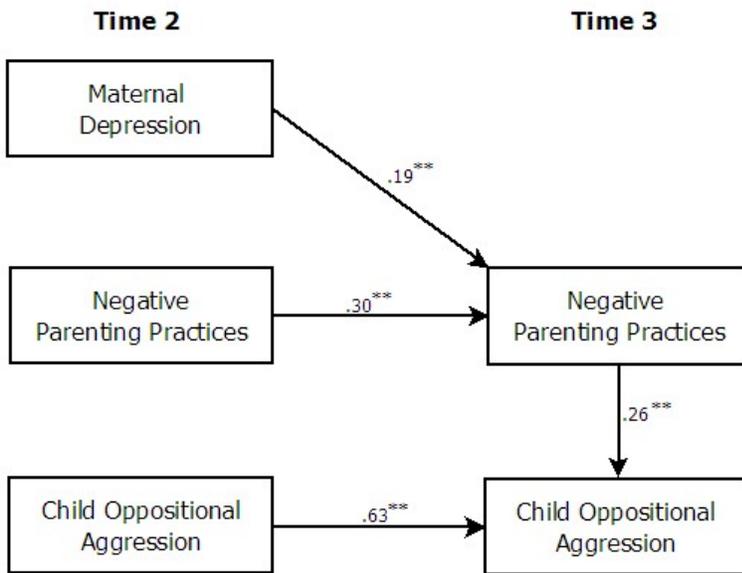


Figure 4. Mediation by Negative Parenting Practices from First to Second Grade. Solid pathways are significant. Dotted pathways are not significant. Comparative Fit Index=0.98. Root Mean Square Error of Approximation=0.09. Covariance pathways within time-points are not displayed for simplicity. * $p < .05$. ** $p < .01$

Since this model only used two time-points, we tested for the rigorousness of the associations by replicating this model again between first and second grade, see Figure 4. In this model, the standardized path coefficient between maternal depression in first grade and negative parenting practices in second grade was statistically significant, $\beta = 0.19$, $p < .01$, as was the standardized path coefficient between negative parenting practices and child oppositional-

aggression in second grade, $\beta = 0.26, p < .01$. We tested the significance of the indirect effect using the bootstrapping procedures. Standardized indirect effects were computed for each of 2,000 bootstrapped samples, and the 95 percent confidence interval was computed. The standardized indirect effect was $(.19)(.26) = .05$, 95 percent CI [.01, .13]. Thus, the indirect effect was statistically significant, $p < .05$, providing additional support that negative parenting practices partially mediate the association between maternal depression and child oppositional-aggression.

Multi-Group Mediation Models

To determine whether the associations in the two mediation models above were significantly different for male versus female children, a multi-group structural equation model was computed. For each mediation model, path values were constrained across groups and were compared systematically with a model that allowed path values to vary across groups. Chi-square difference tests showed that for the model that tested mediation between time 1 and time 2, the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2 (df = 2, N = 198) = .53, p > 0.05$. In addition, chi-square difference tests showed that for the model that tested mediation between first and second grade, the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2 (df = 2, N = 198) = .40, p > 0.05$. These results indicated that the mediation models described above were similar for male and female children.

In addition, analyses were conducted to determine if the associations in these two mediation models were significantly different for African American versus European American children. For each mediation model, path values were constrained across groups and were compared systematically with a model that allowed path values to vary across groups. Chi-square

difference tests showed that for the model testing mediation in kindergarten and first grade, the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2$ (df = 2, N= 200) = .36, $p > 0.05$. In addition, chi-square difference tests showed that for the model that tested mediation between first and second grades, the fully constrained model was not significantly different from the unconstrained model, $\Delta\chi^2$ (df = 2, N= 200) = 3.16, $p > 0.05$. These results indicated similar mediation models linking maternal depression with child oppositional-aggression via negative parenting practices for European American and African American children at both time points tested.

Chapter 4. DISCUSSION

Maternal depression is elevated in adverse family contexts, particularly when children exhibit challenging oppositional and aggressive behaviors (Civic & Holt, 2000; Fihrer et al., 2009), perhaps because depressive symptoms can undermine effective parenting and increase harsh and critical parental responding (Caughy et al., 2009; Zahn-Waxler et al., 1990). However, reverse effects are rarely studied longitudinally, although it is possible that child oppositional-aggression and negative parenting practices may each exacerbate depressive symptoms, contributing to maternal stress and demoralization. This study sought to better understand bidirectional child and parenting influences on maternal depression, using rigorous longitudinal methods. Consistent with prior research, maternal depression led to increases over time in negative parenting practices and child oppositional-aggression. Importantly, bidirectional effects also emerged, as negative parenting practices and child oppositional-aggression both exacerbated maternal depression over time. In addition, although some of the impact of maternal depression on child oppositional-aggression was mediated through negative parenting, maternal depression also retained a direct influence on child behavior. These findings add to the existing literature by demonstrating the complex transactions that occur in high-risk families, with child behavior and

parenting experiences affecting maternal depression, as well as the reverse. Attending to the affective experiences of mothers, particularly feelings of helplessness and hopelessness, may be critical to fully characterize the developmental course of child oppositional-aggressive behaviors, and to inform the design of effective interventions.

Bidirectional Associations between Maternal Depression and Negative Parenting Practices

Prior research has documented links between maternal depression and negative parenting practices (Downey & Coyne, 1990; Lovejoy et al., 2000). Researchers have speculated that depressive symptoms impair effective parenting, noting that depressed mothers exhibit more negative, critical, and nonresponsive behaviors toward their children than do non-depressed mothers (Caughy et al., 2009; Zahn-Waxler et al., 1990). Indeed, the cross-lagged model examining change in this high-risk sample revealed a negative influence over time, in which maternal depression led to an increase in negative parenting practices, with controls for child behavior included in the model.

In addition, the cross-lagged model revealed a bidirectional effect, in which the use of negative parenting practices led to an increase over time in maternal depressive symptoms. This detrimental influence of negative parenting practices on maternal depression is not necessarily intuitive. For example, one can imagine the opposite effect whereby relinquishing self-control and allowing oneself to vent anger at a child might have a cathartic effect for a parent, or at least reduce the stress involved in the effortful self-control associated with effective parenting (Baumeister, Muraven, & Tice, 2000). Instead, however, the use of harsh and negative parenting practices, and associated engagement in conflictual exchanges with their children, seems to be demoralizing for mothers and fuels feelings of depression. The exact mechanisms underlying this association are not clear. However, it is possible that using harsh, negative parenting practices

and expressing anger by yelling and criticizing their children is distressing to parents and potentially leads to feelings of guilt and self-recrimination, or increased feelings of helplessness and low worth as a parent. We know that depression is associated with increased interpersonal problems (Youngren & Lewinsohn, 1980) and an intensified critical focus on oneself (Ingram, 1990). Thus, repeated negative interactions with their children and subsequent rumination and self-blame may fuel self-criticism – a particular area of vulnerability among depressed individuals. This is in-line with Beck’s theory of depression (Beck, 1967) in which having negative thoughts about oneself (e.g. “I am a bad parent”), the world (e.g. “I don’t enjoy parenting”) and the future (e.g. “My kids won’t turn out well”) are the antecedents to depressive symptoms. In this way, these negative self-evaluations fuel feelings of depression that are independent of the child’s misbehavior. Although prior research has not explored this association directly, an intervention study by Wong et al., (2014) found that decreasing negative parenting in order to reduce oppositional-aggressive behavior in children also had the indirect effect of reducing maternal depressive symptoms, controlling for child oppositional-aggressive behavior. This lends further support to the hypothesis that the use of negative parenting practices contributes directly to maternal depressive symptoms.

In the present study, maternal depression predicted increases in negative parenting practices at both time points studied (e.g., from kindergarten to first grade and again from first grade to second grade). The bidirectional effect, in which maternal depression predicted increases in negative parenting practices was significant only between kindergarten and first grade. These results suggest that the initial influence of negative parenting practices on maternal depression is accounted for from kindergarten to first grade, but that negative parenting practices

do not *continue* to exert influence, or said another way, they do not continue to affect change in maternal depressive symptoms over time.

It is possible that the effects of negative parenting may have a heightened psychological impact on the mother when they occur at this important transition point of children entering school. Research suggests that a child's transition into elementary school increases feelings of parenting stress and elevates biological markers of stress responding, such as cortisol (DeCaro & Worthman, 2008). Parents who report more stress associated with negative parent-child interactions also show a higher level of stress responding (elevated cortisol) when their children enter school (DeCaro & Worthman, 2008). Maintaining established family routines can act as a buffer and help to alleviate or cope with parenting stress associated with disruptive transitions (Wolin & Bennett, 1984). Family routines play an important role in family well-being, as they maintain a sense of stability and belonging and support behavioral development in children (DeCaro & Worthman, 2008; Fiese et al., 2002). However, in the transition to kindergarten, a significant proportion of parents say that their daily routine will change significantly including what time children will wake up, eat meals, and go to bed (Wildenger, Lee McIntyre, Fiese & Eckert, 2008) potentially leaving parents more vulnerable to a stressful transition experience. Indeed, DeCaro and Worthman (2011) found that, during the kindergarten transition, higher ratings of parenting stress prior to the transition predicted a steeper decline over time on a family routines scale which, in turn, was associated with elevated stress biomarkers (cortisol levels) in parents. These findings suggest that the decline in positive parenting practices may be one factor that exacerbates the stress parents feel as their child navigates the kindergarten transition. Correspondingly, this kindergarten transition period with increases in stress, and decreases in protective factors such as routines, may make parents more vulnerable to the feelings of guilt,

shame and self-recrimination when they behave poorly as a parent. This elevated risk due to heightened stress levels and negative thoughts associated with negative parenting can thus fuel depression symptoms in parents.

It is also possible that parents are more emotionally responsive (or reactive) to their child during the period of kindergarten transition because they have heightened emotions themselves (hopes and fears) about how the child will do in the new school context. If their child exhibits challenging behaviors, they may experience particular concerns about the way that peers or teachers in the new school context will react to their child. More research is needed to better understand the particular ways that kindergarten entry may influence the dynamics between maternal depression, negative parenting, and child oppositional-aggression, and the mechanisms that may account for transition-specific effects.

Bidirectional Associations between Parent Factors and Child Oppositional-Aggression

Kindergarten entry may be a time of stress for children too, particularly children who are emotionally distressed or at-risk for school difficulties as a function of their aggressive behaviors. This mutually stressful transition for parents and children may be a time when parent and child behavior are particularly prone to transactional influences. This study focused specifically on the course of child oppositional-aggression as children entered school, testing for the influence of parenting factors (maternal depression and negative parenting practices) on child behaviors in this new context. This is significant because school entry is the beginning of a long-term developmental path that lays the foundation for later success in school (Entwisle & Alexander, 1989; Jimmerson, Egeland, & Teo, 1999; Luster & McAdoo, 1996). Children who enter school with elevated levels of oppositional-aggression are unprepared to take advantage of their school experience, which affects children's later academic achievement as well as their

social-emotional development (Raver & Knitzer, 2002; Shonkoff & Phillips, 2000; Stipek & Ryan, 1997). In addition, significant future risks are associated with elevated aggression at school entry, especially if aggression continues over the first few years of school. Children who exhibit elevated oppositional-aggression at school entry have an increased risk of substance use, school failure and participation in crime later in life (Hill, Lochman, Coie, Greenburg, & CPPRG, 2004).

Therefore, this study's finding that maternal depression affects child oppositional-aggression *in school* is an important one as it provides insight into how parents influence children's school adjustment and vice versa. This study found that as children moved from kindergarten to first grade, adjusting to the demands of formal schooling, negative parenting practices intensify child oppositional-aggression in school. In the subsequent school years, between first and second grade, child oppositional-aggression begins to reciprocally affect maternal depression and negative parenting practices. It is also at this later point in time that maternal depression amplifies child oppositional-aggression.

The pattern of effects observed here, with parenting influencing child behavior first, and then child behavior influencing parenting subsequently are consistent with Coyne and colleague's (1987) interpersonal model of depression. In their model, maternal depression emerges first and leads to negative responses toward children, along with elevated harsh and punitive parenting practices. These negative parenting practices, in turn, elicit increased oppositional-aggressive behavior in their children (Downey & Coyne, 1990). Although Downey and Coyne (1990) focus primarily on interactions within the family, it is anticipated that, when children enter school, they transfer strategies or behavioral habits learned in the home to the new school context (Stein, Malmberg, Leach, Barnes & Sylva, 2013). So, at the time of initial school

entry, one might expect parenting behaviors to be a key factor influencing children's escalation in oppositional-aggressive behavior and generalization to the school context. As the child becomes more settled in the school context, changes in the child's aggression are less likely to occur in response to parenting behaviors, but more likely to come under the control of teachers and peers who interact with the child in the school context. On the other hand, teacher reports of problematic child behavior may be frustrating and demoralizing for mothers over time, thus acting to maintain feelings of depression and self-blame (Coyne et al., 1987). Although mothers have limited capacity to affect child aggression at school via their direct contingency management, they may still affect the child's behavior via affective channels, as their depression and distress may increase the child's emotion dysregulation via mechanisms of affect contagion (Denham et al., 1997) and increased emotional insecurity (Cummings & Davies, 1996). These interactions may contribute to a continuous cycle which serves to maintain mother's depressive symptoms as well as the negative behaviors of their children.

In addition, this study was also able to replicate the widely accepted findings that negative parenting and child oppositional-aggressive behavior reciprocally influence each other over time (Drabick, et al., 2006; Hipwell et al., 2008; Patterson, 1982), so that negative parenting practices increases the expression of oppositional-aggressive behaviors in young children and, conversely, these negative child behaviors elicit more negative parenting practices from their parents (Bell, 1968; Patterson, 1982). However, the timing of the study starting at school entry and the context of using teacher ratings to assess oppositional-aggression in the school are important factors affecting the interpretation of the findings. These findings suggest that the dynamic system of parent-child coercive exchanges, in which negative parenting reinforces child aggression, and conversely, child oppositional-aggressive behavior demoralizes parents and

evokes negative parenting influences children's behavior in the school setting. Children who have elevated levels of oppositional-aggression in the school setting often experience challenges with school adjustment and delays in reading skills compared to peers whose parents use supportive, sensitive parenting practices (Campbell & von Stauffenberg, 2008). This lends support to the idea that parenting practices play an important role in the development of children's oppositional-aggressive behavior and thus their readiness for school (Hill, 2001; Martin, Ryan & Brooks-Gunn, 2010; McGroder, 2000).

Mediation: Associations between Maternal Depression and Child Oppositional-aggression

A second study aim was to determine the degree to which negative parenting practices mediated the influence of maternal depression on child oppositional-aggression. Modified mediation models demonstrated significant mediation between kindergarten and first grade, and between first grade and second grade, with maternal depression increasing negative parenting practices, which in turn, mediated the impact of maternal depression on child oppositional-aggression. This finding replicates and extends prior studies documenting concurrent associations between maternal depression, negative parenting practices and child oppositional-aggression (Hipwell et al., 2008; Lovejoy et al., 2000). The results are consistent with Turney (2012), who used regression analyses and found that negative parenting practices explained some of the association between maternal depression and child oppositional-aggression such that adjusting for negative parenting significantly reduced the association between maternal depression and child oppositional-aggression. In the Turney (2012) study, maternal depression was assessed when the child was one, three, and five years old. However, child oppositional-aggression and parenting behaviors were assessed only at age five. In addition, oppositional-aggression was rated by mothers and so reflected behavior in the home and was potentially

confounded with mother's ratings of depressive symptoms. The current study replicated and extended these findings by using multiple time points for all three variables and using teacher ratings of oppositional-aggression rather than using parent ratings.

Thus, these findings suggest that when parents are depressed, they feel irritable, fatigued, and lack patience for their child's misbehavior (Downey & Coyne, 1990; Goodman & Gotlib, 1999; Goodman et al., 2011). So when their child does misbehave, depressed mothers are more likely to act out in harsh, and negative ways toward their child (Lovejoy et al., 2000). These harsh, negative parenting practices, in turn, elicit negative, aggressive and oppositional behaviors from their children (Hipwell et al., 2008; Patterson et al., 1982). This finding is important because it suggests that the association between maternal depression and child oppositional-aggression is not simply a direct link whereby affect contagion or the threat of emotional security causes an increase in child oppositional-aggression. These partial mediation findings suggest instead that while these direct effects may explain part of the association between maternal depression and child oppositional-aggression, some of the association is also explained by the association of these variables with parenting practices.

Mediation analyses were also tested in the opposite direction. In these reverse models, negative parenting practices did not mediate the association between kindergarten oppositional-aggression and maternal depression in first grade. However, negative parenting practices in second grade mediated the association between first grade oppositional-aggression and maternal depression in second grade. Although these findings were not anticipated, they are consistent with the bidirectional processes under study. Theoretically, and as documented in this longitudinal study, oppositional-aggressive children elicit more negative and controlling parenting practices (Dishion & Patterson, 2006; Granic & Patterson, 2006); and engaging in

negative parenting, in turn, appears to amplify maternal depression (Coyne et al., 1987). These findings suggest that future research should explore this “reverse” mediation to determine whether the effects replicate, with negative parenting practices mediating the link between child oppositional-aggressive behavior and maternal depression.

However, it is not likely that negative parenting practices are the only mechanism at work linking maternal depression with child oppositional-aggression. For example, maternal depression has also been linked to higher levels of emotion dysregulation in young children (Kam et al., 2001; Maughan, Cicchetti, Toth & Rogosch, 2007). From a theoretical standpoint, it has been postulated that exposure to high levels of stress associated with having a depressed parent (e.g. unavailability, irritability) may impede the development of child emotion regulation in early childhood by over-stimulating the child’s stress receptors (Blair, 2002). Chronic stress stimulation due to exposure to extreme stress may affect brain development and may alter the body’s ability to regulate behavioral and emotional impulses (Cicchetti, 2002). For example, Ashman, Dawson and Panagiotides (2008) followed children from age 14 months through age 6.5 years and found that children of chronically depressed mothers had elevated oppositional-aggressive behaviors, and higher respiratory sinus arrhythmia reactivity (a physiological measurement of emotion dysregulation). In turn, a child’s difficulty managing emotions, including frustration, anger, and even loneliness and worries may fuel impulsive and oppositional-aggressive actions (Olson et al., 2011b). For example, Olson et al. (2011a) examined longitudinal relations between self-regulation and child aggression through the transition to kindergarten and found that children who had elevated levels of oppositional-aggression also had lower levels of self-regulation suggesting that children who have poor self-regulation maybe at increased risk for having oppositional-aggressive behaviors. Therefore,

future research may consider emotion regulation as an additional factor in the association between maternal depression and child oppositional-aggression.

In addition, other contextual factors may affect the strength of the associations among maternal depression, negative parenting practices, and child oppositional aggression. For example, marital conflict, co-parenting support, social support network, financial stress and unemployment should be considered as additional risk factors for future research (Shaw et al., 1994). Turney (2012) found that financial stress may play a particularly important role; it reduced the association between maternal depression and child oppositional-aggression by 25 percent when entered into a regression model. However, co-parenting support and small social support network only played small roles in the association. The association between financial stress and maternal depression is well documented (Downey & Coyne, 1990; Marcotte & Wilcox-Gok, 2001) and children who grow up in families with financial stress are more likely to have behaviors problems than their more advantaged peers (Duncan & Brooks-Gunn, 1997). In this way, it may be that parents who are multiply stressed (e.g. depressive symptoms, financial stress and low social support) may have higher rates of negative parenting practices as well as child oppositional-aggressive behavior. Future research is still needed to better understand the extent to which covarying stressors may account for the associations observed between maternal depression and child oppositional-aggression.

Gender Moderation: Maternal Depression, Negative Parenting, Oppositional-aggression

Although some studies have reported significant differences by gender in the associations among maternal depression, negative parenting, and child oppositional-aggression (Blatt-Eisengart et al., 2009; Rothbaum & Weisz, 1994; Tichovolsky et al., 2013), others have found no evidence of significant difference by gender (Chang et al., 2003; Errazuriz Alrellano et al 2012;

Goodman et al., 2011). This study tested for gender as a moderator in both the longitudinal cross-lagged model as well as the mediation models. The longitudinal cross-lagged model proved to be invariant across gender. In addition, neither mediation model was significantly different for male and female children. These results suggest a lack of gender differences in the associations among maternal depression, negative parenting practices, and child oppositional-aggression.

On the other hand, it is possible that sensitivity by gender varies in more nuanced ways, depending upon child age or parent gender. For example, when conducting a study to test for the potential for gender effects, it may be particularly important to include both mothers and fathers in the analysis. It may be that male and female children are differentially sensitive to father's parenting behaviors and mental health. For example, Chang and colleagues (2003) found that negative parenting by fathers was more strongly related to son's aggressive behaviors than to daughter's aggressive behaviors, but no gender differences were found for mother's negative parenting. In addition, child age may play an important role in gender influences. For example, Bandura's (1977) social learning theory suggests that children are more likely to model behavior after people who are more similar to them which would indicate that boys would be more likely to model behavior after fathers and girls would be more likely to model behavior after mothers. However, there may be a stronger gender association when children are younger and their exposure to other adult models are more limited. As children transition into school, they are exposed to many more peer and adult models which could reduce or diminish an interaction effect between parent and child gender (Rimm-Kaufman & Pianta, 2000). Future research should consider a more nuanced and fine-grained analysis of the effects of gender.

Clinical Implications

From a clinical perspective, acknowledging the bidirectional influences that link parent behavior, parent mental health, and child behavior may improve the efficacy of interventions (Burke et al., 2008; Pardini, Fite & Burke, 2008). The present study findings suggest that interventions aimed at improving child oppositional-aggression may be most effective when they focus on both the parent's influence as well as the child's influence within the context of a broad developmental framework, and when they attend to the parent's affect as well as parenting behaviors. Interventions focused on improving parenting practices as a strategy for reducing child behavior problems have demonstrated efficacy (Michelson, Davenport, Dretzke, Barlow & Day, 2013). However, including intervention components that aim to improve child self-regulation skills along with components that target parenting practices have potential to outperform interventions with a parent-only focus (Foster, Olchowski, & Webster-Stratton, 2007; Lochman & Wells, 2004). These studies suggest that interventions aimed at addressing both parent and child behaviors may be more effective at changing the dynamic developmental system in which parents and children operate than a focus on parent behaviors alone.

On a theoretical level, the findings are consistent with developmental psychopathology and the ecological systems approach to treat parent and child mental health such that a change in environment, whether parenting behavior/well-being or child behavior/well-being may affect multiple aspects of the family system and parent-child dynamic (Cummings et al., 2000). In addition, the present study findings suggest that greater attention to maternal affect is warranted in interventions for children with oppositional-aggression. Practically, these results suggest that clinicians working with depressed mothers may consider the potential impact that child behavior problems may have on the mother's well-being. Likewise, clinicians working with children who

exhibit oppositional and aggressive behaviors may also want to consider mother's mood and mental health status. Thus, when working with families to improve symptoms of oppositional-aggression, usually by doing parenting management training which requires a significant commitment on the parent's part, it may be important to attend to the parent's feelings and depressive symptoms. Doing this may enrich and increase the impact of a parent management training approach on children's symptoms of oppositional-aggression. Indeed, van Loon, Granic and Engles (2011) implemented a parenting intervention aimed at improving child oppositional-aggression and found that the treatment was less effective for children of depressed mothers compared to non-depressed mothers. In addition, they also found that improvements in maternal depression were associated with improvement in children's oppositional-aggressive behavior, lending evidence to the parent-child behavior dynamic that plays out when trying to treat mental health as part of a multifaceted system.

Limitations and Future Directions

These findings should be considered within the context of the limitations of this study and ideas for future directions are offered. The initial test of mediation used data from across all three time points. However, the selected unit of time of one year between the three measurements was likely not optimal for testing the processes of interest as it seem unlikely that the effect of maternal depression on negative parenting practices and of parenting practices on child oppositional-aggression would take three years to develop. Because of this, the measurement of child oppositional-aggression at time 3 may have been outside the window of change. That is why the current study switched to using two time points to test for mediation and when we did this, we found evidence of mediation lending more support to the importance of the timing between measurements when testing for mediation. Future studies should consider these

findings when determining the amount of time in between each measurement. In addition, future studies may consider doing a more fine grained analysis of the amount of time it takes between measurements to see evidence of mediation effects.

The current study only examined one potential mechanism in the association between maternal depression and child oppositional-aggression. Certainly future research using bidirectional models could benefit from exploring and incorporating other potential mechanisms into the model including parent factors, such as social support and financial stress as they may affect both maternal depression and child oppositional-aggression. Mothers with symptoms of maternal depression are more likely to have low levels of social support. The symptoms of depression (e.g. fatigue, irritability, depressed mood) make the depressed person unpleasant to be around and thus family and friends may begin to withdraw and limit their efforts to lend emotional and instrumental support (Lin et al., 1999; Meadows, 2009). In addition, rates of maternal depression tend to be higher among low income families. Depressed persons are more likely to have low productivity at work and a higher incidence of earning losses and unemployment, which increases the likelihood of financial instability (Marcotte & Wilcox-Gok, 2001). Exposure to these high levels of stress in the home combined with low levels of social support has the potential to activate the child's stress response system, overwhelming the child's regulatory capacities and thus leading to increases in aggressive-oppositional behaviors (Curtis, et al., 2001; Gunnar & Quevedo, 2007). Future studies should consider this added contextual factor in future designs.

The current study only looked at the bidirectional nature of mother-child interactions, but paternal contributions to children's behavior as well as children's contributions to paternal behavior should be examined in future research. There is a paucity of research on the

bidirectional influences between children and fathers. However, we know that depression symptoms in fathers are also associated with more oppositional-aggressive behaviors in young children (Connell & Goodman, 2002; Kane & Garber, 2004), but the bidirectional effects may differ for mothers and fathers. For example, mothers may be distressed by oppositional-aggressive behaviors in young children, whereas fathers may be more sensitive to oppositional-aggressive behaviors in older children (Gross, Shaw, Moilanen, Dishion & Wilson, 2008). However, there is little research on the bidirectional effects of children and fathers at any age. In addition, it is possible that children may be more affected by father's harsh and negative parenting compared to mothers and thus it may have a stronger association with child oppositional-aggressive behaviors (Chang et al., 2003). In addition, there are a handful of studies that have looked at the association between father's depressive symptoms and parenting practices and have found that, unlike depressed mothers, depression in fathers may not influence parenting behaviors (Middleton et al., 2009; Wong et al., 2014). The study of fathers may be particularly important when considering child gender effects as well. It may be that male and female children are differentially sensitive to father's parenting behaviors and mental health compared to mother's parenting behavior and mental health (Chang et al., 2003). Future research should explore the potential bidirectional influences between fathers and children.

It may also be that having a mentally healthy father who uses positive parenting practices is a protective factor when children have a depressed mother. In that family context, when you have one healthy parent and one parent with symptoms of depression, the healthy parent may serve as a source of emotional expression, and a positive parent-child relationship so that the child receives positive learning opportunities from at least one parent. In this way, it may be that some children of depressed parents have protective factors by having a healthy parent in the

home as they have at least one parent that can provide consistent emotional support and structure. Additionally, it may be that having a family with two depressed parents places children at additional risk as they do not have access to a positive role model and to positive social-emotional learning experiences in the home. Future research should consider the number of family members in the home who have symptoms of depression and the potential cumulative effect this may have on child outcomes.

Lastly, one interesting direction for future studies to consider is that the models tested in this study start when the child is in kindergarten. It is likely that prior to kindergarten, patterns of interaction between parents and children including negative parenting as well as maternal depressive symptoms were present and could have affected children's kindergarten oppositional-aggressive behavior. Likewise, children's oppositional-aggressive behavior was likely present prior to their entrance into kindergarten and these behaviors could have affected parenting behaviors and depressive symptoms when their children entered kindergarten. Parent-child interaction and thus their influence on each other begin at birth and they each have effects of parent's and children's behavior over time. Therefore, future studies that examine these parent-child interactions earlier in the child's development and consider developmentally relevant mechanisms would be informative. Consideration of these processes earlier in development could inform our understanding of the factors and processes that increase the risk for oppositional and aggressive behaviors in children as well as the factors that influence parent behavior and well-being.

Despite the limitations, the results of this study illustrate important associations between maternal depression, negative parenting practices and child oppositional-aggression. Of primary importance is the evidence for bidirectional influences between maternal depression, negative

parenting practices and child oppositional-aggression as well as evidence of negative parenting practices as a potential mediating mechanism in the associations between maternal depression and child oppositional-aggression.

References

- Achenbach, T.M. (1991). *Manual for the Child Behavior Checklist / 4 – 18 and 1991 Profile*.
Burlington, VT: University of Vermont Department of Psychiatry.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Anderson, K. E., Lytton, H., & Romney, D. M. (1986). Mothers' interactions with normal and conduct-disordered boys: Who affects whom?. *Developmental Psychology*, 22(5), 604.
- Ashman, S. B., Dawson, G., & Panagiotides, H. (2008). Trajectories of maternal depression over 7 years: Relations with child psychophysiology and behavior and role of contextual risks. *Development and Psychopathology*, 20(1), 55-77.
doi:<http://dx.doi.org/10.1017/S0954579408000035>
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Barnett, M.S. & Scaramella, L.V. (2013). Mothers' parenting and child sex differences in behavior problems among African American preschoolers. *Journal of Family Psychology*, 27(5), 773-783.
- Barkley, R. A., Anastopoulos, A. D., Guevremont, D. C., & Fletcher, K. E. (1992). Adolescents with attention deficit hyperactivity disorder: Mother-adolescent interactions, family beliefs and conflicts, and maternal psychopathology. *Journal of Abnormal Child Psychology*, 20(3), 263-288.
- Barry, T. D., Dunlap, S. T., Cotten, S. J., Lochman, J. E., & Wells, K. C. (2005). The influence of maternal stress and distress on disruptive behavior problems in boys. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44(3), 265-273.
- Baumeister, R. F., Muraven, M., & Tice, D. M. (2000). Ego depletion: A resource model of volition, self-regulation, and controlled processing. *Social Cognition*, 18(2), 130-150.

- Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. New York: Harper & Row.
- Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, *75*(2), 81.
- Bierman, K. L., Bruschi, C., Domitrovich, C., Fang, G. Y., Miller-Johnson, S., & the Conduct Problems Prevention Research Group. (2004). Early disruptive behaviors associated with emerging antisocial behavior among girls. In M. Putallaz & K. L. Bierman (Eds.), *Aggression, antisocial behavior, and violence among girls* (pp. 137–161). New York, NY: Guilford.
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist*, *57*(2), 111-127. doi:<http://dx.doi.org/10.1037/0003-066X.57.2.111>
- Blatt-Eisengart, I., Drabick, D., Monahan, K., and Steinberg, L. (2009). Sex differences in the longitudinal relations among family risk factors and childhood externalizing symptoms. *Developmental Psychology*, *45*(2), 491-502.
- Brotman, L. M., O'Neal, C. R., Huang, K. Y., Gouley, K. K., Rosenfelt, A., & Shrout, P. E. (2009). An experimental test of parenting practices as a mediator of early childhood physical aggression. *Journal of Child Psychology and Psychiatry*, *50*(3), 235-245.
- Burke, J. D., Pardini, D. A., & Loeber, R. (2008). Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *Journal of Abnormal Child Psychology*, *36*(5), 679-692.
- Byrne, B. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Erlbaum.

- Campbell, S., & von Stauffenberg, C. (2008). Child characteristics and family processes that predict behavioral readiness for school. *Disparities in school readiness: How families contribute to transitions in school* (pp. 225-258). New York, NY: Taylor & Francis Group/Lawrence Erlbaum Associates.
- Caughy, M. O. B., Huang, K.-Y., & Lima, J. (2009). Patterns of conflict interaction in mother-toddler dyads: differences between depressed and non-depressed mothers. *Journal of Child and Family Studies, 18*(1), 10–20.
- Chang, L., Schwartz, D., Dodge, K.A., & McBride-Chang, C. (2003). Harsh parenting in relation to child emotion regulation and aggression. *Journal of Family Psychology, 17*(4), 598-606.
- Cicchetti, D. (2002). The impact of social experience on neurobiological systems: Illustration from a constructivist view of child maltreatment. *Cognitive Development, 17*(3-4), 1407-1428. doi:[http://dx.doi.org/10.1016/S0885-2014\(02\)00121-1](http://dx.doi.org/10.1016/S0885-2014(02)00121-1)
- Cicchetti, D., Rogosch, F., and Toth, S. (1998). Maternal depressive disorder and contextual risk: Contributions to the development of attachment insecurity and behavior problems in toddlerhood, *Development and Psychopathology, 10*, 283-300.
- Civic, D., & Holt, V. L. (2000). Maternal depressive symptoms and child behavior problems in a nationally representative normal birthweight sample, *Maternal and Child Health Journal, 4*(4), 215-221.
- Cole, D.A., & Maxwell, S.E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*(4), 558-577.

- Combs-Ronto, L. A., Olson, S. L., Lunkenheimer, E. S., & Sameroff, A. J. (2009). Interactions between maternal parenting and children's early disruptive behavior: Bidirectional associations across the transition from preschool to school entry. *Journal of Abnormal Child Psychology, 37*(8), 1151-1163.
- Conduct Problems Prevention Research Group (CPPRG) (1992). A developmental and clinical model for the prevention of conduct disorder: The FAST Track Program. *Development and Psychopathology, 4*, 509-527.
- Connell, A.M. and Goodman, S.H. (2002). The association between psychopathology in fathers versus mothers and children's internalizing and externalizing behavior problems: A meta-analysis. *Psychological Bulletin, 128*(5), 746-773.
- Coyne, J., Kahn, J., & Gotlib, I. (1987). Depression. In T. Jacob (Ed.) *Family interaction and psychopathology: Theories, methods, and findings* (pp. 509–533). New York, NY: Plenum Press.
- Cui, M., Donnellan, M. B., & Conger, R. D. (2007). Reciprocal influences between parents' marital problems and adolescent internalizing and externalizing behavior. *Developmental Psychology, 43*, 1544–1552.
- Cummings, E. M., & Davies, P. T. (1994). Maternal depression and child development. *Child Psychology & Psychiatry & Allied Disciplines, 35*(1), 73-112.
- Cummings, E. M., & Davies, P. T. (1996). Emotional security as a regulatory process in normal development and the development of psychopathology. *Development and Psychopathology, 8*, 123-139.

- Cummings, E.M., Davies, P.T., Campbell, S.B. (2000). What is developmental psychopathology? In *Developmental psychopathology and family process: Theory, research and clinical implications* (pp. 17-34) New York, NY: The Guilford Press.
- Curtis, L.J., Dooley, M.D., Lipman, E.L., and Feeny, D.J. (2001). The role of permanent income and family structure in the determination of child health in Canada, *Health Economics*, *10*, 287-302.
- Dadds, M. R., & Powell, M. B. (1991). The relationship of interparental conflict and global marital adjustment to aggression, anxiety, and immaturity in aggressive and nonclinic children, *Journal of Abnormal Child Psychology*, *19*(5), 553-67.
- Davies, P. T., Cummings, E., & Winter, M. A. (2004). Pathways between profiles of family functioning, child security in the interparental subsystem, and child psychological problems. *Development and Psychopathology*, *16*(03), 525-550.
- DeCaro, J. A., & Worthman, C. M. (2008). Culture and the socialization of child cardiovascular regulation at school entry in the US. *American Journal of Human Biology*, *20*(5), 572–583.
- DeCaro, J. A., & Worthman, C. M. (2011). Changing family routines at kindergarten entry predict biomarkers of parental stress. *International Journal of Behavioral Development*, *35*(5), 441-448.
- Denham, S. A, Mitchell-Copeland, J., Strandberg, K., Auerbach, S., & Blair, K. (1997). Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motivation and Emotion*, *21*(1), 65-86. doi: 10.1023/A:1024426431247

- Dishion, T. J., & Patterson, G. R. (2006). The development and ecology of antisocial behavior in children and adolescents. *Developmental psychopathology, vol 3: Risk, disorder, and adaptation (2nd ed.)*. (pp. 503-541) Hoboken, NJ: John Wiley & Sons Inc.
- Dix, T., & Yan, N. (2014). Mothers' depressive symptoms and infant negative emotionality in the prediction of child adjustment at age 3: Testing the maternal reactivity and child vulnerability hypotheses. *Development and Psychopathology, 26*, 111-124.
- Dodge, K., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science, 250*(4988), 1678-1683. doi:10.1126/science.2270481.
- Downey, G. and Coyne, J. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin, 108*(1), 50-76.
- Drabick, D. A. G., Beauchaine, T. P., Gadow, K. D., Carlson, G. A., & Bromet, E. J. (2006). Risk factors for conduct problem and depressive symptoms in a cohort of Ukrainian children. *Journal of Clinical Child and Adolescent Psychology, 35*, 244–252.
- Duncan, Greg J., Brooks-Gunn, Jeanne. (1997). *Consequences of Growing Up Poor*. New York, NY: Russell Sage Foundation.
- Elgar, F.J., Curtis, L.J., McGrath, P.J., Waschbusch, D.A. and Steward, S.H. (2003). Antecedent-consequence conditions in maternal mood and child adjustment: A four-year cross-lagged study. *Journal of Clinical Child and Adolescent Psychology, 32*(3), 362-374.
- Entwisle, D. R., & Alexander, K. L. (1989). Factors affecting achievement test scores and marks of black and white first graders. *Elementary School Journal, 88*, 449-471.
doi:10.1086/461550.

- Errazuriz Alrellano, P.A., Harvey E.A., and Thakar, D.A. (2012) A longitudinal study of the relation between depressive symptomatology and parenting practices. *Family Relations*, 61(2), 271-282.
- Fergusson, D. M., Lynskey, M. T., & Horwood, L. J. (1993). The effect of maternal depression on maternal ratings of child behavior. *Journal of Abnormal Child Psychology*, 21, 245–269.
- Feske, U., Shear, M. K., Anderson, B., Cyranowski, J., Strassburger, M., Matty, M., et al. (2001). Comparison of severe life stress in depressed mothers and non-mothers: Do children matter? *Depression and Anxiety*, 13, 109–117.
- Field, T., Healy, B., Goldstein, S., & Guthertz, M. (1990). Behavior state matching and synchrony in mother-infant interactions of nondepresses versus depressed dyads, *Developmental Psychology*, 26, 7-14.
- Fiese, B. H., Tomcho, T. J., Douglas, M., Josephs, K., Poltrock, S., & Baker, T. (2002). A review of 50 years of research on naturally occurring family routines and rituals: Cause for celebration? *Journal of Family Psychology*, 16(4), 381–390.
- Fihrrer, I., McMahon, C. A., & Taylor, A. J. (2009). The impact of postnatal and concurrent maternal depression on child behavior during the early school years. *Journal of Affective Disorders*, 119(1), 116-123.
- Foster, E. M., Olchowski, A. E., & Webster-Stratton, C. (2007). Is stacking intervention components cost-effective? an analysis of the incredible years program. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46(11), 1414-1424.
doi:<http://dx.doi.org/10.1097/chi.0b013e3181514c8a>

- Gelfand, D., & Teti, D. (1990). The effects of maternal depression on children. *Clinical Psychology Review, 10*, 329–353.
- Goodman, S. H., & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review, 106*(3), 458-490.
- Goodman, S. H., & Gotlib, I. H. (2002). Introduction. In S. H. Goodman, & I. H. Gotlib (Eds.), *Children of depressed parents: Mechanisms of risk and implications for treatment* (pp. 3–9). Washington, DC: American Psychological Association.
- Goodman, S. H., Rouse, M. H., Connell, A. M., Broth, M. R., Hall, C. M., & Heyward, D. (2011). Maternal depression and child psychopathology: a meta-analytic review. *Clinical Child and Family Psychology Review, 14*(1), 1-27.
- Granic, I., & Patterson, G. (2006). Toward a comprehensive model of antisocial development: A dynamic systems approach. *Psychological Review, 113*(1), 101-131.
- Gross, H.E., Shaw, D.S., Burwell, R.A. and Nagin, D.S. (2009). Transactional processes in child disruptive behavior and maternal depression: A longitudinal study from early childhood to adolescence. *Development and Psychopathology, 21*, 139-156.
- Gross, H.E., Shaw, D.S., Moilanen, K.L., Dishion, T.J. & Wilson, M.N. (2008). Reciprocal models of child behavior and depressive symptoms in mothers and fathers in a sample of children at risk for early conduct problems. *Journal of Family Psychology, 22*(5), 742-751.
- Gunnar, M., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology, 58*, 145-173. doi: 10.1146/annurev.psych.58.110405.085605

- Hanisch, C., Hautmann, C., Plück, J., Eichelberger, I., & Döpfner, M. (2014). The prevention program for externalizing problem behavior (PEP) improves child behavior by reducing negative parenting: analysis of mediating processes in a randomized controlled trial. *Journal of Child Psychology and Psychiatry*, 55(5), 473-484.
- Harvey, E.A. and Metcalfe, L.A. (2012). The interplay among preschool child and family factors and the development of ODD symptoms. *Journal of Clinical Child and Adolescent Psychology*, 41(4), 458-470.
- Harvey, E. A., Metcalfe, L. A., Herbert, S. D., & Fanton, J. H. (2011). The role of family experiences and ADHD in the early development of oppositional defiant disorder. *Journal of Consulting and Clinical Psychology*, 79(6), 784.
- Hill, N. (2001). Parenting and academic socialization as they relate to school readiness: The roles of ethnicity and family income. *Journal of Educational Psychology*, 93(4), 686-697.
doi:10.1037/0022-0663.93.4.686.
- Hill, L. G., Lochman, J. E., Coie, J. D., & Greenberg, M. T. & The Conduct Problems Prevention Research Group (2004). Effectiveness of early screening for externalizing problems: Issues of screening accuracy and utility. *Journal of Consulting and Clinical Psychology*, 72(5), 809-820.
- Hipwell, A., Keenan, K., Kasza, K., Loeber, R., Stouthamer-Loeber, M., & Bean, T. (2008). Reciprocal influences between girls' conduct problems and depression, and parental punishment and warmth: A six year prospective analysis. *Journal of Abnormal Child Psychology*, 36(5), 663-677.
- Hops, H. (1992). Parental depression and child behavior problems: Implications for behavioural family intervention. *Behaviour Change*, 9(3), 126-138.

- Hops, H., Biglan, A., Sherman, L., Arthur, J., Friedman, L., and Osteen, V. (1987). Home observations of family interactions of depressed women, *Journal of Consulting and Clinical Psychology*, *55*, 341-346.
- Ingram, R. E. (1990). Self-focused attention in clinical disorders: Review and a conceptual model. *Psychological Bulletin*, *107*, 156–176. doi: 10.1037/0033-2909.107.2.156
- Jimmerson, S., Egeland, B., & Teo, A. (1999). A longitudinal study of achievement trajectories: Factors associated with change. *Journal of Educational Psychology*, *91*, 116-126. doi:10.1037/0022-0663.91.1.116
- Kam, C., Greenberg, M. T., Bierman, K. L., Coie, J. D., Dodge, K. A., Foster, M. E., . . . Pinderhughes, E. E. (2011). Maternal depressive symptoms and child social preference during the early school years: Mediation by maternal warmth and child emotion regulation. *Journal of Abnormal Child Psychology*, *39*(3), 365-377. doi:http://dx.doi.org/10.1007/s10802-010-9468-0
- Kane, P., & Garber, J. (2004). The relations among depression in fathers, children's psychopathology, and father-child conflict: A meta-analysis. *Clinical Psychology Review*, *24*, 339–360.
- Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin*, *121*, 95–113.
- Kim, H.K. and McKenry, P.C. (2002). The relationship between marriage and psychological well-being – a longitudinal analysis, *Journal of Family Issues* *23*, 885–911.
- Kouros, C. D., Merrilees, C. E., & Cummings, E. M. (2008). Marital conflict and children's emotional security in the context of parental depression. *Journal of Marriage and Family*, *70*(3), 684-697.

- Kringlen, E., Torgersen, S. and Cramer, V. (2001). A Norwegian psychiatric epidemiological study, *American Journal of Psychiatry*, 158, 1091–1098.
- Lansford, J. E., Sharma, C., Malone, P. S., Woodlief, D., Dodge, K. A., Oburu, P., ... & Di Giunta, L. (2014). Corporal Punishment, Maternal Warmth, and Child Adjustment: A Longitudinal Study in Eight Countries. *Journal of Clinical Child & Adolescent Psychology*, (ahead-of-print), 1-16.
- Lin, N., Ye, X., Ensel, W. (1999). Social support and depressed mood: a structural analysis, *Journal of Health and Social Behavior*, 40 (4), 344–359.
- Lipscomb, S. T., Leve, L. D., Harold, G. T., Neiderhiser, J. M., Shaw, D. S., & Ge, X. (2011). Trajectories of parenting and child negative emotionality during infancy and toddlerhood: A longitudinal analysis. *Child Development*, 82, 1661–1675. doi:10.1111/j.1467-8624.2011.01639.x
- Little, T.D. (2013). *Longitudinal Structural Equation Modeling*. New York, NY: The Guilford Press.
- Lochman, J.E. and The Conduct Problems Prevention Research Group. (1995). Screening of child behavior problems for prevention programs at school entry, *Journal of Consulting and Clinical Psychology*, 63, 549–559.
- Lochman, J. E., & Wells, K. C. (2004). The coping power program for preadolescent aggressive boys and their parents: Outcome effects at the 1-year follow-up. *Journal of Consulting and Clinical Psychology*, 72(4), 571-578. doi:http://dx.doi.org/10.1037/0022-006X.72.4.571
- Lovejoy, M.C., Graczyk, P.A., O'Hare, E., and Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*, 20(5), 561-592.

- Luster, T., & McAdoo, H. P. (1996). Family and child influences on educational attainment: A secondary analysis of the high scope/perry preschool data. *Developmental Psychology*, 32, 26-39. doi:10.1037/0012-1649.32.1.26
- Marcotte, D.E., Wilcox-Gok, V. (2001). Estimating the employment and earnings costs of mental illness: recent developments in the United States, *Social Science and Medicine*, 53 (1), 21–27.
- Martin, A., Ryan, R., & Brooks-Gunn, J. (2010). When fathers' supportiveness matters most: Maternal and paternal parenting and children's school readiness. *Journal of Family Psychology*, 24(2), 145-155. doi:10.1037/a0018073.
- Maughan, A., Cicchetti, D., Toth, S. L., & Rogosch, F. A. (2007). Early-occurring maternal depression and maternal negativity in predicting young children's emotion regulation and socioemotional difficulties. *Journal of Abnormal Child Psychology*, 35(5), 685-703. doi:http://dx.doi.org/10.1007/s10802-007-9129-0
- McCarty, C.A., McMahon, R.J. & Conduct Problems Prevention Research Group. (2003). Mediators of the relation between maternal depressive symptoms and child internalizing and disruptive behavior disorders. *Journal of Family Psychology*, 17(4), 545-556.
- McGroder, S. (2000). Parenting among low-income African American single mothers with preschool-age children: Patterns, predictors, and developmental correlates. *Child Development*, 71(3), 752-771. doi:10.1111/1467-8624.00183.
- Meadows, S. O. (2009). Is it there when you need it? Mismatch in perception of future availability and subsequent receipt of instrumental support, *Journal of Family Issues* 30, 1070–1097.

- Michelson, D., Davenport, C., Dretzke, J., Barlow, J., & Day, C. (2013). Do evidence-based interventions work when tested in the “real world?” A systematic review and meta-analysis of parent management training for the treatment of child disruptive behavior. *Clinical Child and Family Psychology Review*, *16*(1), 18-34.
doi:<http://dx.doi.org/10.1007/s10567-013-0128-0>
- Middleton, M., Scott, S. L., & Renk, K. (2009). Parental depression, parenting behaviours, and behaviour problems in young children. *Infant and Child Development*, *18*(4), 323-336.
- Miller, S., Loeber, R., & Hipwell, A. (2009). Peer deviance, parenting and disruptive behavior among young girls. *Journal of Abnormal Child Psychology*, *37*(2), 139-152.
- Olson, S.L., Lopez-Duran, N., Lunkenheimer, E.S., Chang, H. & Sameroff, A.J. (2011a). Individual differences in the development of early peer aggression: Integrating contributions of self-regulation, theory of mind, and parenting. *Development and Psychopathology*, *23*, 253-266.
- Olson, S.L., Tardif, T.Z., Miler, A., Felt, B., Grabell, A.S., Kessler, D., Wang, L., Karasawa, M., & Hirabayashi, H. (2011b). Inhibitory control and harsh discipline as predictors of externalizing problems in young children: A comparative study of U.S., Chinese and Japanese preschoolers. *Journal of Abnormal Psychology*, *39*, 1163-1175.
- Offord, D.R., Boyle, M.H., & Jones, B.R. (1987). Psychiatric disorder and poor school performance among welfare children in Ontario, *Canadian Journal of Psychiatry*, *32*, 518-525.
- O'Leary, S.G., & Vidair, H. B. (2005). Marital adjustment, child-rearing disagreements, and overreactive parenting: Predicting child behavior problems, *Journal of Family Psychology*, *19*(2), 208-216.

- Pardini, D.A., Fite, P.J. & Burke, J.D. (2008). Bidirectional associations between parenting practices and conduct problems in boys from childhood to adolescence: The moderating effect of age and African-American ethnicity. *Journal of Abnormal Child Psychology*, 36, 647-662.
- Park, J. H., Essex, M. J., Zahn-Waxler, C., Armstrong, J. M., Klein, M. H., & Goldsmith, H. H. (2005). Relational and overt aggression in middle childhood: Early child and family risk factors. *Early Education & Development*, 16(2), 233-258.
- Patterson, G. R. (1982). *Coercive family processes*. Eugene, OR: Castalia.
- Pearl, A. M., French, B. F., Dumas, J. E., Moreland, A. D., & Prinz, R. (2014). Bidirectional Effects of Parenting Quality and Child Externalizing Behavior in Predominantly Single Parent, Under-Resourced African American Families. *Journal of Child and Family Studies*, 23(2), 177-188.
- Pettit, G. S., Laird, R. D., Dodge, K. A., Bates, J. E., & Criss, M. M. (2001). Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Development*, 72(2), 583-598.
- Putallaz, M., & Bierman, K.L. (Editors) (2004). Aggression, antisocial behavior, and violence among girls: A developmental perspective. *Vol. 1: duke series in child development and public policy (K.A. Dodge & M. Putallaz, Series Editors)*. NY: Guilford.
- Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401
- Raver, C. C., & Knitzer, J. (2002). *Ready to enter: What research tells policy makers about strategies to promote social and emotional school readiness among three- and four-year-olds*. Washington, DC: National Center for Children in Poverty.

- Rimm-Kaufman, S., & Pianta, R. C. (2000). An ecological perspective on the transition to kindergarten: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology, 21*(5), 491-511.
- Romano, E., Tremblay, R. E., Boulerice, B., & Swisher, R. (2005). Multilevel correlates of childhood physical aggression and prosocial behavior. *Journal of Abnormal Child Psychology, 33*(5), 565-578.
- Rothbaum, F. & Weisz, J.R. (1994). Parental caregiving and child externalizing behavior in nonclinical samples: A meta-analysis. *Psychological Bulletin, 116*(1), 55-74.
- Ryan, R., Kalil, A., Leinenger, L. (2009). Low-income mothers' private safety nets and children's socioemotional well-being. *Journal of Marriage and Family 71* (2), 279–298.
- Scaramella, L. V., Neppl, T. K., Ontai, L. L., & Conger, R. D. (2008). Consequences of socioeconomic disadvantage across three generations: parenting behavior and child externalizing problems. *Journal of Family Psychology, 22*(5), 725.
- Shaw, D. S., Vondra, J. I., Hommerding, K. D., Keenan, K., & Dunn, M. (1994). Chronic family adversity and early child behavior problems: A longitudinal study of low income families. *Journal of Child Psychology and Psychiatry, 35*(6), 1109-1122.
- Shonkoff, J., & Phillips, D. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC US: National Academy Press.
- Silverthorn, P., and Frick, P.J. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. *Development and Psychopathology, 11*, 101-126.
- Stein, A., Malmberg, L., Leach, P., Barnes, J., & Sylva, K. (2013). The influence of different forms of early childcare on children's emotional and behavioural development at school

- entry. *Child: Care, Health and Development*, 39(5), 676-687.
doi:<http://dx.doi.org/10.1111/j.1365-2214.2012.01421.x>
- Stipek, D. J., & Ryan, R. H. (1997). Economically disadvantaged preschoolers: Ready to learn but further to go. *Developmental Psychology*, 33, 711–723. doi:10.1037/0012-1649.33.4.711
- Straus, M. (1979). Measuring intrafamily conflict and violence: The Conflict Tactics Scales. *Journal of Marriage and the Family*, 41, 75-88.
- Strayhorn, J. M., & Weidman, C. S. (1988). A Parent Practices Scale and its relation to parent and child mental health. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 613–618.
- Tichovolsky, M. H., Arnold, D. H., & Baker, C. N. (2013). Parent predictors of changes in child behavior problems. *Journal of Applied Developmental Psychology*, 34(6), 336-345.
- Timmermans, M., van Lier, Pol A. C., & Koot, H. M. (2009). Pathways of behavior problems from childhood to late adolescence leading to delinquency and academic underachievement. *Journal of Clinical Child and Adolescent Psychology*, 38(5), 630-638.
- Turney, K. (2012). Pathways of disadvantage: Explaining the relationship between maternal depression and children's problem behaviors. *Social Science Research*, 41(6), 1546-1564.
- van Loon, L.M.A., Granic, I., & Engles, R.C.M.E. (2011). The role of maternal depression on treatment outcome for children with externalizing behavior problems. *Journal of Psychopathology and Behavior Assessment*, 33, 178-186.
- Waylen, A. & Stewart-Brown, S. (2010). Factors influencing parenting in early childhood: A prospective longitudinal study focusing on change. *Child Care, Health & Development*, 36, 198-207.

- Werthamer-Larsson, L., Kellam, S. G., & Ovesen-McGregor, K. E. (1990). Teacher interview: Teacher observation of classroom adaptation—Revised (TOCA-R). *Johns Hopkins Prevention Center training manual*. Baltimore, MD: Johns Hopkins University.
- Wildenger, L. K., McIntyre, L. L., Fiese, B. H., & Eckert, T. L. (2008). Children's daily routines during kindergarten transition. *Early Childhood Education Journal*, 36(1), 69-74.
- Wolin, S. J., & Bennett, L. A. (1984). Family rituals. *Family Process*, 23, 401–420.
- Wong, J.J., Gonzales, N.A., Montaña, Z., Dumka, L. & Millsap, R.E. (2014). Parenting intervention effects on parental depressive symptoms: Examining the role of parenting and child behavior. *Journal of Family Psychology*, 28(3), 267-277.
- Youngren, M. A., & Lewinsohn, P. M. (1980). The functional relation between depression and problematic interpersonal behavior. *Journal of Abnormal Psychology*, 89, 333–341.
doi:10.1037/0021-843X.89.3.333
- Zahn-Waxler, C., Iannotti, R. J., Cummings, E. M., & Denham, S. (1990). Antecedents of problem behaviors in children of depressed mothers. *Development and Psychopathology*, 2(03), 271-291.

Erin Theresa Mathis

Curriculum Vitae

Summer 2016

EDUCATION

- 2016 Ph.D. **Pennsylvania State University**, Child Clinical Psychology,
Dissertation: Bidirectional Influences over Time: Maternal Depression, Negative Parenting Practices and Child Oppositional-Aggression
Advisor: Karen Bierman, Ph.D.
- 2012 M.S. **Pennsylvania State University**, Child Clinical Psychology,
Thesis: Child Emotion Regulation and Attention Control in Pre-kindergarten: Associations with Parenting Stress, Parent Warm-Sensitivity and Parent Negative Control
Advisor: Karen Bierman, Ph.D.
- 2008 B.A. **North Carolina State University**, Psychology, *Suma cum laude*
Advisor: Amy Halberstadt, Ph.D.

PROFESSIONAL EXPERIENCE

- 2016 – Present **Post-Doctoral Fellow**, Georgetown University, Department of Psychiatry
- 2015 – 2016 **Pre-Doctoral Fellow**, University of Maryland – Baltimore, Department of Psychiatry, APA Accredited Clinical Internship
- 2010 – 2015 **Training Interdisciplinary Education Scientists (TIES) Fellow**, Pennsylvania State University, Child Clinical Psychology Institute of Education Sciences (IES) - R305B090007
- 2008 – 2010 **Research Project Manager**, Innovation, Research and Training (IRT) Inc., Durham, NC
- 2008 – 2010 **IRB Administrator**, Innovation, Research and Training (IRT) Inc. Durham, NC

PUBLICATIONS

- Bierman, K.L., Welsh, J.A., Heinrichs, B.S., Nix, R.L., & **Mathis, E. T.** (2015). Helping head start parents promote their children's kindergarten adjustment: The research-based developmentally informed parent program. *Child Development*, 1-15.
- Mathis, E.T.**, & Bierman, K.L. (2015). Effects of parent and child pre-intervention characteristics on child skill acquisition during a school readiness intervention. *Early Childhood Research Quarterly*, 33, 87-97.
- Mathis, E.T.**, & Bierman, K.L. (2015). Dimensions of parenting associated with child prekindergarten emotion regulation and attention control in low-income families. *Social Development*, 24(3), 601-620.
- Parker, A. E., Kupersmidt, J. B., **Mathis, E. T.**, Scull, T. M., & Sims, C. (2014). The impact of mindfulness education on elementary school students: Evaluation of the Master Mind program. *Advances in School Mental Health Promotion*, 7(3), 184-204.
- Parker, A., **Mathis, E.T.**, & Kupersmidt, J. (2013). How is this child feeling? Preschool-aged children's ability to recognize emotion in faces and body poses. *Early Education and Development*, 24(2), 188-211.
- Welsh, J.A., Bierman, K.L., & **Mathis, E.T.** (2013). Parenting programs that promote school readiness. In M. Boivin and K. Bierman (Eds.) *Promoting School Readiness and Early Learning: The Implications of Developmental Research for Practice* (pp. 253-278). New York: Guilford Press.