

THESIS

PARENTAL DEPRESSIVE SYMPTOMS AND CHILD BEHAVIOR PROBLEMS:
EXPLORING THE ROLE OF INTERACTIVE REPAIR DURING MOTHER-CHILD
INTERACTIONS

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ABSTRACT

PARENTAL DEPRESSIVE SYMPTOMS AND CHILD BEHAVIOR PROBLEMS: EXPLORING THE ROLE OF INTERACTIVE REPAIR DURING MOTHER-CHILD INTERACTIONS

This study examined the role of interactive repair during a challenging task in the relationship between parental depressive symptoms and child behavior problems in a sample of 3.5-year-old children and their mothers ($N=100$). This study used data collected from parents as well as data collected during live observations in the laboratory setting. Dynamic Systems-based methods were used to measure interactive repair (i.e., returning to a positive interaction after a negative behavior) during mother-child interactions. Findings suggest that interactive repair partially mediates the relationship between maternal depressive symptoms and child internalizing behaviors. These results highlight the potential protective role of interactive repair related to child behavior problems in the context of maternal depressive symptoms. Implications of these findings for parental depressive symptoms and child behavior problems are discussed.

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TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
Introduction	1
Review of the Literature.....	2
Parental Depressive Symptoms and Child Behavior Problems.....	3
Parental Depressive Symptoms and Parent-Child Interaction.....	5
Interactive Repair and Child Behavior Problems	10
Summary and Theoretical Frameworks.....	12
The Proposed Study	18
Methods.....	20
Participants	20
Procedure	20
Measures	21
Plan of Analysis	25
Results	28
Preliminary Findings	28
Maternal Depressive Symptoms, Interactive Repair and Child Behavior Problems.....	29
Paternal Depressive Symptoms, Interactive Repair and Child Behavior Problems	31
Post-Hoc Analyses.....	31
Discussion	34
Limitations and Future Directions	39
References	42
Appendix 1: Parent and Child Behaviors	53
Positive Parent Behaviors	53
Positive Child Behaviors	54
Negative Parent Behaviors	55
Negative Child Behaviors.....	55

CHAPTER I

INTRODUCTION

Research has established that parental depressive symptoms may contribute to difficulties in a wide variety of child outcomes, including child behavior problems (e.g., Hoffman, Crnic & Baker, 2006; Maughan, Cicchetti, Toth & Rogosch, 2007). The literature indicates that depression influences the individual and family systems in a wide variety of ways, highlighting the importance of understanding the relationship between parental depression and child behavior (e.g., Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Paulson, Keefe & Leiferman, 2009; Wilson & Durbin, 2010). Although research indicates that parental depressive symptoms are related to poorer child outcomes, we still need to know more about how specific parent-child interaction processes contribute to those relationships.

The review of the current study highlights the importance of parent behaviors during parent-child interactions as related to child behavioral outcomes, while simultaneously building an argument for moving beyond an examination of individual behaviors to exploring dyadic processes during parent-child interactions. Specifically, this study aims to understand the role of interactive repair processes (i.e., returning to a positive interaction after a negative behavior) during parent-child interactions as related to child behavior problems in the context of parental behavior symptoms.

CHAPTER II

REVIEW OF THE LITERATURE

Depression is a psychological disorder that can be categorized by the experience of a certain set of symptoms on most days for at least two weeks. These symptoms include, but are not limited to, a loss of interest in things that once brought enjoyment, sleeping difficulties, fatigue, and having feelings of sadness, worthlessness and hopelessness (American Psychiatric Association, 2000; Levin, Heller, Mohanty, Herrington & Miller, 2007). Importantly, although depression is often considered to be primarily an emotional condition, depression also influences one's executive functioning, perceptions, attention and cognitions (Lee, Yu, Chen & Chen, 2011). Thus, depression can affect a person's thoughts, perspectives and behaviors through a variety of mechanisms. Furthermore, although depression is often considered and treated as an individual mental health issue, research makes it clear that depression is an inherently relational condition that influences one's interactions and relationships with others (Paulson et al., 2009; Wilson & Durbin, 2010). As a relational condition, it becomes important to understand the role depression may play within the family context.

Specifically, the influence of depression on parenting and on parent-child interactions has been of interest in recent child development research (Foster, Garber & Durlak, 2008; Paulson et al., 2009). This may be due to the prevalence of depression in United States as well as the fact that rates of depression tend to be highest in age groups most likely to have children (Kane & Garber, 2004). Research conducted over the past several decades suggests that children of parents with mental health problems are at higher risk for a range of social, emotion and physical problems (Carter, Garrity-Rokous, Chazan-Cohen, Little & Briggs-Gowan, 2001; Goodman 2007). For example, parental depression has been found to be a risk factor for a variety of poor

physical, social, and emotional outcomes in children and adolescents (Connell & Goodman, 2002; Jacob & Johnson, 1997; Johnson & Flake, 2007). Also, studies have found that children with mothers with depression are at risk for experiencing insecure attachments (Carter et al., 2011), developing depression (Johnson & Flake, 2007), and having less than optimal cognitive development (Johnson & Flake, 2007).

Furthermore, within the current literature on parental depression, some studies have examined depressed versus nondepressed parents based on clinical levels of depression (e.g., Pelaez, Field, Pickens, & Hart, 2008) and other studies have examined a continuum of parental depressive symptoms (e.g., Foster et al., 2008). The reviewed research will include findings from both types of studies; however, it is important to note that the current study will examine current levels of parental depressive symptoms.

Parental Depressive Symptoms and Child Behavior Problems

Although studies have looked at different child age groups as well as different aspects of depression (i.e., onset, chronicity, etc.), in general the research suggests that the presence of parental depressive symptoms are related to poorer outcomes in children. Furthermore, amidst the exploration of a variety of child outcomes regarding parental depressive symptoms, a growing body of literature has emerged that focuses on the relationship between parental depressive symptoms and child internalizing and externalizing behavioral problems (Hoffman et al., 2006; Maughan et al., 2007), which will be the focus of the current study. The attention to child behavioral problems may be due to the fact that both internalizing and externalizing behavior problems can have far-reaching effects on children's social, emotional and intellectual development (Kim & Cicchetti, 2010). For the purposes of the current study, "behavior problems" will refer to both internalizing and externalizing behaviors in children. Internalizing

behaviors typically refer to somewhat “inhibited” behaviors, including expressions of anxiety and depression, and externalizing behaviors typically represent more “acting-out” behaviors such as fighting or showing aggression (Barnett, Miller-Perrin, & Perrin, 2005).

In one recent study, current maternal depressive symptoms were examined in relation to child externalizing behaviors (mean age = 11.86) (Foster et al., 2008). Results indicated that higher levels of maternal depressive symptoms were related to higher levels of child externalizing behaviors as measured by the Child Behavior Checklist (CBCL). Similarly, in a longitudinal study examining both prenatal depressive symptoms and the reoccurrence of maternal depressive symptoms, researchers found that prenatal depressive symptoms were related to Externalizing behaviors and Total Problems, as measured by the CBCL (Luoma et al., 2001). Specifically, researchers found that more children whose mothers reported prenatal depressive symptoms scored high on both the Externalizing and Total Problems subscales than children whose mothers did not report such symptoms. In summary, this research makes it clear that parental depressive symptomatology can put children at risk for a variety of behavioral problems during early childhood.

Another recent study looked at the unique role of paternal depression on child internalizing and externalizing behaviors by controlling for maternal depression (Kane & Garber, 2009). This study found that paternal depressive symptoms were related to father-child conflict as well as internalizing and externalizing symptoms in children. Furthermore, the authors found that father-child conflict mediated the relationship between paternal depression and child externalizing symptoms above and beyond the effects of the mothers’ depressive symptoms and depressive history. Similarly, another study examining internalizing and externalizing behaviors found that high levels of paternal, and maternal, depressive symptoms were related to higher

levels of internalizing behaviors in children (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). Also, in a study examining postpartum depression in both mothers and fathers, father postpartum depressive symptoms predicted child internalizing and externalizing problems between child ages two and three, although mother depressive symptoms did not predict either type of behavior problems at that time point (Carro, Grant, Gotlib, & Compas, 1993).

Parental Depressive Symptoms and Parent-Child Interaction

Several mechanisms have been explored in seeking to better understand the relationship between parental depressive symptoms and child behavior problems, including parent-child interactions (Campbell, Cohn, & Meyers, 1995), parent scaffolding ability (Hoffman et al., 2006), parent-child conflict (Kane & Garber, 2009) and marital satisfaction (Jacob & Johnson, 1997). In a review of paternal depression, Wilson and Durbin (2009) highlighted the idea that one mechanism for the transmission of depression in families may be related to the effects of depression on parenting. Similarly, in their research on infants with depressed mothers, Tronick and Reck (2009) highlight the idea that “maternal depression is a communicable disorder” (p. 147) that disrupts children’s social and emotional development by way of distorting the aspects communication between mothers and their children.

One important contribution from studies examining parent-child interaction has been a better understanding of the way depressive symptoms are related to certain parent behaviors and strategies. Specifically, several studies have examined the relationship between parental depressive symptoms and positive and negative parenting strategies (Pelaez et al., 2008; Wilson & Durbin, 2009). Examples of positive parenting strategies include strategies that involve providing adequate and warm support for children, as well as giving praise and positive attention. Negative parenting strategies include instances in which the parent responds harshly

towards the child, uses unnecessary physical contact, and/or takes over the activity or task for the child (Foster et al., 2008).

Some of this research indicates that parents with depression may utilize less positive and/or more negative behaviors when guiding child behavior. For example, in a recent study examining current and past maternal depression as related to mother-child interactions, researchers found that mothers with current depressive symptoms as well as mothers who had a history of either chronic or severe depression showed lower levels of positive behaviors when interacting with their child (Foster et al., 2008). The same study found that mothers with current depressive symptoms exhibited more negative behaviors during interactions with their child. Similarly, a review of paternal depression and parenting behaviors found that fathers with depression tend to demonstrate increased amounts of negative behaviors and decreased amounts of positive behaviors when parenting (Wilson & Durbin, 2009). Furthermore, Goodman and Brumley (1990) examined mother-child interactions with mothers with schizophrenia, depression and “well” mothers and their children ages three months to five years old (p. 32). Results indicated that compared to well (i.e., no mental health diagnoses) mothers, mothers with depression were less responsive to their children and had less affective involvement with their children.

Another recent study examined positive and negative parenting strategies in the context of broader parenting styles (Pelaez et al., 2008). Specifically, the authors examined the relationship between maternal depression and authoritative, authoritarian and disengaged parenting. Results showed that all mothers spent the most time engaged in authoritative parenting (e.g., setting clear limits in a respectful way; giving encouragement), although mothers with depression spent significantly more time engaged in authoritarian (e.g., a lack of

encouragement and presence of verbal rejection) and disengaged parenting behaviors (e.g., being uninvolved or unresponsive to the child) (Palaez, et al., 2008). Furthermore, research indicates that parents with depression are significantly more likely to engage in harsh discipline practices than nondepressed parents (Conger, Patterson, & Ge, 1995; Whipple & Webster-Stratton, 1991). For example, one study found that stress-related depression was related to disrupted discipline practices for both mothers and fathers (Conger et al., 1995).

This research suggests that depression may have deleterious effects of one's ability to parent effectively. However, the current research between depression and these specific parenting strategies is somewhat unclear, as some studies have found differences in the use of both positive and negative parenting strategies between depressed and nondepressed parents (Jacob & Johnson, 1997; Wilson & Durbin, 2009), and other studies have only found differences in one of these areas (e.g., Palaez, et al., 2008). Thus, although this research indicates parental depressive symptoms may have implications for positive and negative parenting strategies, the mixed results regarding rates and ratios of each type of behavior indicate that there may be a more complex relationship between parental depressive symptoms and parent-child interaction than is able to be captured by solely examining parenting behaviors.

Tronick and colleagues (e.g., Gianino & Tronick, 1988; Tronick & Reck, 2009) have introduced a concept known as interactive repair into the realm of child development research. Instead of examining the rates and/or ratios of positive and negative occurrences during parent-child interactions, interactive repair describes the movement between the two (Tronick, 1989). Interactive repair is connected to several concepts in child development literature, including synchrony, mismatch, rupture and repair (see Gianino & Tronick, 1988; Tronick & Reck, 2009 for more information). For the purposes of the current study, interactive repair refers to the

mother-child dyad's ability to move to a positive interaction (i.e., where both parent and child are engaged in a positive behavior) after either person engages in a negative behavior.

Regarding depression and interactive repair, Tronick and Reck (2009) reported that mothers with high levels of depressive symptoms have longer periods of affective mismatch with their infant (e.g., when the child expresses positive affect and mother expresses negative affect) and fewer reparations after such occurrences. Likewise, an earlier study examined rates of repair after interrupted interactions as well as interactive coordination between depressed and nondepressed mothers with their infants (Jameson, Gelfand, Kulcsar, & Teti, 1997). In this study, interactive coordination referred to times when either the mother or child matched the "social and object-related goal of the other" (p. 550) and an interrupted interaction referred to any time the dyad moved away from this coordination. The results indicated that depressed mothers were less likely to repair interrupted interactions with their 13-29 month old children than were nondepressed mothers. Furthermore, this same study found that dyads with depressed mothers showed lower rates of interactive coordination overall when compared to dyads with nondepressed mothers. Similarly, in a study comparing mother-child dyads of clinically depressed mothers with healthy mother-child dyads, Reck and colleagues (2004) found that dyads with depressed mothers experienced lower levels of affective coordination, and that depressed mother dyads took longer to repair (i.e., return to a positive matched state) after a period of mismatched affect occurred (Reck et al., 2004).

As much of the interactive repair research has focused on affective repair (i.e., moving back to an interaction characterized by matched affect after mismatched affect has occurred (Reck et al., 2004), the current study aims to expand the knowledge about repair processes by examining behavioral repair during parent-child interaction. Above and beyond research on

affective repair, the potential relationship between parental depressive symptoms and behavioral repair is supported by broader research on depression. Specifically, in a review on depression and cognition, Gotlib and Joormann (2010) discussed how depressive symptoms may make it difficult for people to move past negative stimuli that have entered their environment. In other words, rumination on negative stimuli may make it harder for persons with depressive symptoms to shift their focus or change their behavior after a negative event, behavior or interaction occurs. Furthermore, research on mother-child interactions suggests that mothers play a specific and essential role in repairing interactions with their children that have been interrupted in some way (Jameson et al., 1997). The authors posit that during infant-mother behaviors, the infant is most likely to interrupt the interaction (e.g., by disengaging), and that the mother then repairs the interaction by creating another social bid. Although as children get older their role in interactions become more active (Jameson et al., 1997), research does indicate that in mother-toddler interactions, mothers who are better able to repair interactions and follow their toddlers' initiatives have toddlers who show fewer negative reactions during such interactions (Rocissano, Slade, & Lynch, 1987). In other words, it seems as though mothers have a distinct and important role when it comes to repairing interactions throughout early development. Together, these findings come together to highlight the potential for depressive symptoms to influence the role of interactive repair in the context of early parent-child interactions.

In summary, the current research on parental depressive symptoms and positive and negative parenting behaviors may not be creating a complete picture as to how depressive symptoms influence parent-child interactions. Jameson and colleagues make a similar argument, stating that global impressions of parent-child interactions with depressed mothers (i.e., that depressed mothers may be more hostile, intrusive or withdrawn) may provide a limited amount

of information regarding specific parent-child interaction patterns that may be problematic or that could require modification (Jameson et al., 1997). The current study aims to expand current knowledge about depressive symptoms and parent-child interactions by examining behavior from a dynamic standpoint, with the assumption that understanding dyadic patterns could potentially provide unique insight into the way parental depressive symptoms influence parent-child interactions. This shift from an examination of individual behavior to exploring dyadic patterns of interaction has been made by researchers studying the influence of psychopathology on parenting (e.g., Connell, Hughes-Scalise, Klostermann, & Azem, 2011), the bidirectional influences of parent and child behaviors as related to negative parenting and child behavior problems (Combs-Ronto, Olson, Lunkenheimer, & Sameroff, 2009) as well as in broader family research related to parent relationships and child behavior (Schermerhorn, Chow, & Cummings, 2010).

Interactive Repair and Child Behavior Problems

Research on parenting and child development indicates that parent-child interactions play a pivotal role in the development of behavioral outcomes (Denham et al., 2000; Foster et al., 2008; Gardner, Shaw, Dishion, Burton, & Supplee, 2007). One main focus on parent-child interaction research has been parent behaviors during such interactions (Jacob & Johnson, 1997; Wilson & Durbin, 2009). As was discussed with parental depression, some research has specifically focused in on the role of positive and negative parenting behaviors during parent-child interaction, which seems to have specific implications for child behavior problems as well. In general, this research has found relationships between both positive and negative parenting strategies and child behavior problems, such that higher levels of positive and/or lower levels of

negative parenting behaviors are related to better child behavior outcomes (Denham et al., 2000; Foster et al., 2007).

Although this research clearly highlights the importance of understanding parenting strategies and behaviors in the context of child behavior problems, other research suggests that different, and possibly more informative, sets of information can be gained through a more dynamic or bidirectional approach to studying parent-child interactions. For example, several recent studies have used Dynamic Systems methods to explore specific aspects of parent-child interaction patterns (e.g., dyadic flexibility and rigidity) during early childhood as related to child behavioral problems (Hollenstein, Granic, Stoolmiller, & Snyder, 2004; Lunkenheimer, Olson, Hollenstein, Sameroff, & Winter, 2011). Results indicate that dynamic processes have significant implications for both child externalizing behaviors (Lunkenheimer et al., 2011) and internalizing behavior problems (Hollenstein et al., 2004). Such findings highlight the fact that examining underlying processes that occur during parent-child interactions can provide a specific set of insights into the development and/or perpetuation of behavior problems during early childhood. Also, this research highlights the utility of using Dynamic Systems Theory methods in the study of interactive processes, which will be discussed in more detail in the following Theory section.

Furthermore, some research has suggested that interactive processes may have stronger implications for child well-being than individual occurrences of positive and negative behaviors (Tronick & Reck, 2009; Schore, 1994). As previously described, interactive repair is one specific aspect of parent-child interactions that has gained attention within the child development field. For example, research on early parent-child interaction demonstrates movement out of positive interactions, or positive synchrony, is very common during mother-child interactions,

and that it is the dyad's ability to repair the interaction that has significant implications for child well-being (Schore, 1994; Tronick & Reck, 2009). When discussing parent-child interactions, Tronick and Reck (2009) described the movement back to positive interactions as a mechanism by which children learn that the world is safe, that problems can be solved and that they themselves can have some mastery over their environment. Conversely, when reparations do not occur, the authors argued that children may form a negative bias in the way they view the world, such that they are more likely interpret and experience new situations as negative, despite the actual valance of the situation. The authors went on to argue that this lack of repair is one specific mechanism by which depression may be "transferred" from mothers to children. This builds on Tronick's (1989) earlier findings, which indicate that difficulties with interactive repair can be a risk factor for child behavioral dysregulation, including internalizing behaviors. Furthermore, Schore (1994) indicated that successful repairs can have positive implications for child regulation, such that repairs during parent-child interactions actually help in the development of brain regions associated with regulatory abilities.

Summary and Theoretical Frameworks

In summary, research indicates that parent-child interactions can have significant implications for child behavioral well-being (e.g., Denham et al., 2000; Foster et al., 2008; Gardner, Shaw, Dishion, Burton & Supplee, 2007) and parental depressive symptoms may have implications for the underlying processes that occur during those interactions (e.g., Tronick & Reck, 2009; Wilson & Durbin, 2009). The current study is focusing on a specific aspect of parent-child interaction known as interactive repair, as the reviewed research suggests that interactive repair is an important process that relates to maternal depressive symptoms and child behavioral maladjustment (e.g., Schore, 1994; Tronick & Reck, 2009). In sum, interactive repair

may be one unexplored mechanism regarding the transmission of risk between depressed parents and child behavior outcomes, as it potentially helps explain the relationship between the two (see Figure 1). Although not traditionally applied to parent-child interactions, Fredrickson’s Narrow Hypothesis (Fredrickson & Branigan, 2005), the Resource Allocation Hypothesis (Ellis & Ashbrook, 1988 as cited in Gotlib & Joornman, 2010) and the Affective Interference Hypothesis (Siegle, Ingram & Matt, 2002) can be used to support the current model. The Narrow Hypothesis, a corollary hypothesis to Fredrickson’s Broaden-and-Build theory (Fredrickson, 2001), states that negative emotions may shrink one’s scope of attention, cognition and action (Fredrickson & Branigan, 2005). This is in stark contrast to the Broaden-and-Build theory,

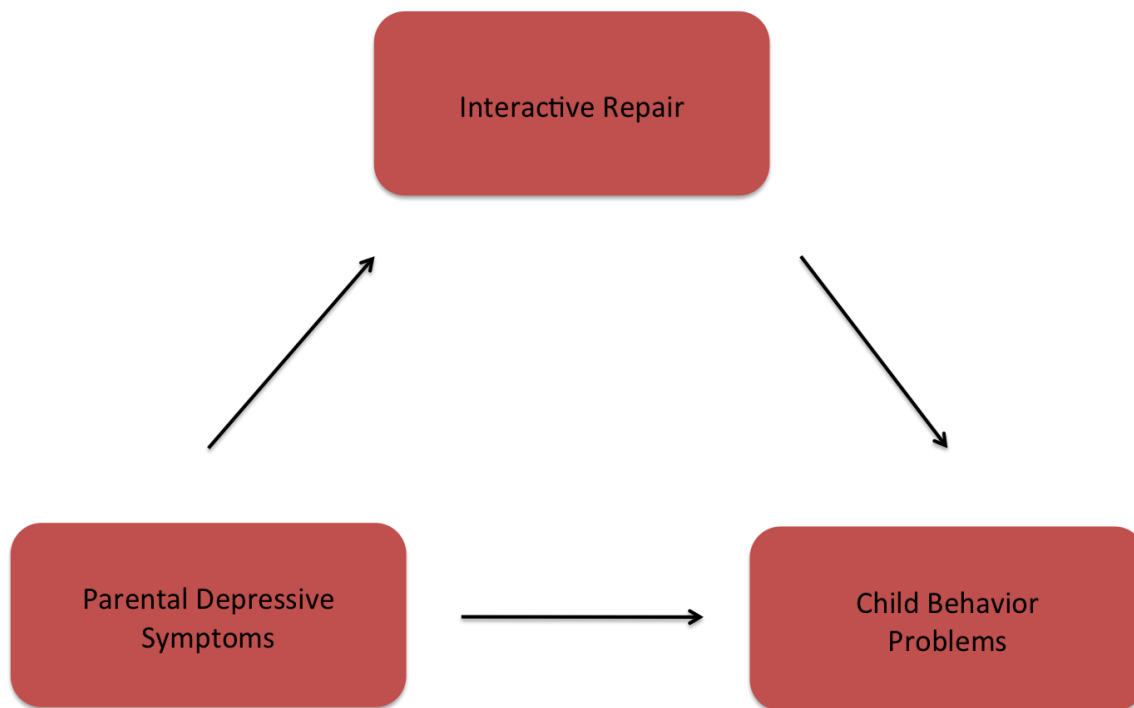


Figure 1

Interactive repair during the Parent-Child Challenge Task as a potential mediator between parental depressive symptoms and child behavior problems.

which posits that experiencing positive emotions may actually broaden one's momentary through-action repertoire, serving to build up one's physical, intellectual, social and/or psychological resources (Fredrickson, 2001). In other words, negative emotions, such as those commonly experienced within depression, may narrow momentary thought-action repertoires, which can decrease one's store of internal resources. The Resource Allocation Hypothesis (Ellis & Ashbrook, 1988 in Gotlib & Joorman, 2010) and the Affective Interference Hypothesis (Siegle et al., 2002) support similar notions. The Resource Allocation Hypothesis states that persons with depression may have reduced cognitive capacities, which can create deficits related to memory as well as engagement in other effortful cognitive processes. Furthermore, the Affective Interference Hypothesis suggests that persons with depression may experience a preoccupation with processing emotional material, and as such, they may struggle with tasks that require them to focus on other material outside of emotional stimuli (Siegle et al., 2002). Other research (Levin et al., 2007) suggests that persons with depression may experience difficulties in executive functioning tasks such as planning, cognitive flexibility and "the ability to direct behavior in a goal-directed manner" (p. 214) as well as controlling concentration and redirecting attention after the introduction of negative stimuli (Gotlib & Joormann, 2010).

Taken together, these theories may provide insight as to how depressive symptoms could influence the likelihood of interactive repair during parent-child interactions where parental depressive symptoms are present. Although interactive repair is dyadic in nature, research does indicate that mothers may have greater responsibility in repairing interactions with their children (Jameson et al., 1997; Rocissano et al., 1987). In other words, dyadic repair may include mothers needing to repair their own behavior and/or helping their child to do the same. What these theories, as well as broader depression research, indicate is that depressive symptoms may

make it more difficult to return oneself to a positive state or behavior after a negative interruption, which could have implications for the dyad's ability to return to a positive interaction. This is supported by research that has found that mothers with depression may struggle with co-regulatory processes when compared to mothers without depression (Feldman, 2007; Manian & Bornstein, 2009; Tronick, 1989). Based on the aforementioned theories, these findings may be due in part to a lower level of cognitive and/or emotional internal resources available at any one time, as well as across time.

Lastly, overall support for the current model can be found within Dynamic Systems (DS) Theory (DST). As discussed by Granic and Patterson (2006), "a dynamical system is a system that changes over time or a set of mathematical equations that specify how those changes occur" (p.102). In order to describe these dynamical systems, researchers often use terms from a broader set of ideas and notions originally used in the areas of mathematics and physics. DS has been described as a metatheoretical framework that includes a collection of abstract principles that have been applied within various disciplines and to a variety of phenomena at vastly different levels (Granic & Hollenstein, 2003). DST allows for the use of new methodologies, which help create new predictions, above and beyond statistical procedures that are more traditionally relied upon (Granic & Patterson, 2006).

A long line of developmentalists have made use of DS principles such as state space, feedback activities and self-organization in order to model the ways in which developmental pathways are created and maintained within a system (Granic & Patterson, 2006; Hollenstein, 2007). Self-organization refers to the process by which a system creates change from within its own internal mechanisms, and DS methods allow for an examination of these change processes in real-time (i.e., minute-to-minute). Hollenstein discussed these topics further in his review on

state space grids, dynamic systems and development (2007). According to Hollenstien, the link between dynamic systems theory and human development is as follows: Research in other areas such as math and physics shows that DS principles can account for the properties of open and dynamic systems; thus, because dyads, groups and individuals are themselves dynamic systems, then DS principles can be applied to human interactions and help account for behavioral patterns. In this way, DS methods can create a framework to better understand important developmental processes.

In the current study, these real-time change processes will be modeled through state-space grids. A “state” in DS terms refers to a specific condition that the system is occupying at a particular point in time and a “state space” refers to the range of all potential states (Hollenstein, 2007). In the current study, these states represent regions of positive and negative behaviors. The dyad’s movement across these states is analyzed through State Space Grid Analysis, which tracks the dyad’s movement between these states of behavior. Applied to the current study, these principles and methods of DS will help create a better understanding of the dynamics of how a parent-child dyad repairs their interaction in real-time after a rupture has occurred in the interaction.

In sum, when applied to developmental research, DS theory provides a framework by which we can further understand the interactions of nature and nurture as related to child outcomes (Lunkenheimer, 2008). More specifically, DS methods can be used in order to better understand both real-time (i.e., minute-to-minute) and developmental processes that occur in the lives of children that set the stage for both adaptive and maladaptive outcomes. In the context of the current study, DS methods are being used to understand how micro-level processes (e.g., interactive repair during parent-child interactions) may relate to child behavioral problems (e.g.,

internalizing and externalizing behaviors). In other words, DS methods are used in the current study to support the notion that real-time processes play an important role in child developmental outcomes. Lunkenheimer (2008) argued that DS must expand the examination of interaction-based processes to include not only maladaptive processes, but also protective and adaptive processes occurring within dyads/families. Lunkenheimer also made the point that in order to create the most effective interventions, we must first understand dynamic processes within the context(s) of which we eventually hope to intervene. Thus, making use of DS methods in the study of parent-child interactions may allow us to create a more accurate picture of the adaptive and/or maladaptive processes occurring within families, which could potentially inform future interventions.

CHAPTER III

THE PROPOSED STUDY

The current study aims to answer the following questions:

1. Does a relation exist between levels of parental depressive symptoms and child behavior problems?
2. Does a relation exist between levels of parental depressive symptoms and interactive repair? Specifically, are higher levels of parental depressive symptoms related to a lower likelihood of interactive repair occurring during mother-child interactions?
3. Does a relation exist between interactive repair and child behavior problems? Specifically, is a lower likelihood of interactive repair during mother-child interactions related to higher levels of child behavior problems?
4. Does interactive repair mediate the relation between parental depressive symptoms and child behavior problems?

By answering these research questions, the current study aims provide significant contributions to the knowledge of how parental depression influences interactive repair, and the role interactive repair may play in the transmission of risk and between parental depression and child behavior problems. Furthermore, it is important to note that although the current study is only able to make use of data from mother-child interactions, both maternal and paternal depressive symptoms will be examined in separate models. This decision is based in Family Systems Theory, which posits that each family subsystem (e.g., parent-child, sibling-sibling, etc.) can influence and be influenced by the other family subsystems (Stroud, Durbin, Wilson, & Mendelsohn, 2011). Jacob and Johnson (1997) explicitly supported the use of a systems approach when studying depression in families, stating that, “one parent’s depression has an

impact on relationships in which he or she may not be directly involved” (p. 404) and that just having a family member with depression can have an influence on parenting as well as the congeniality of all family members.

Based on the previously described research and theoretical frameworks, the following hypotheses were made regarding the current study:

1. Higher levels of parental depressive symptoms are related to higher levels of both internalizing and externalizing behaviors in children.
2. Higher levels of parental depressive symptoms are related a lower likelihood of interactive repair during mother-child interactions.
3. A lower likelihood of interactive repair is related to higher levels of both internalizing and externalizing behaviors in children.
4. Interactive repair mediates the relationship between parental depressive symptoms and child internalizing and externalizing behaviors.

CHAPTER IV

METHODS

Participants

Participants in this study were 100 children and their families (46% male), with the following racial makeup: 86% White, 8% biracial, 3% Asian, and 3% “other race.” Also, there was an ethnic makeup of 10% Latino or Hispanic children. On average, children were 41 months old ($SD = 3$ months). Regarding parental marital status, 79% of biological parents were married, 7% were cohabitation, 7% were single, 5% were divorced or separated and 1% were remarried. The median family income was about \$65,000 and on average, both mothers’ and fathers’ education was high (college graduate). Recruitment for this study included posting flyers in local child care centers, preschools and businesses, and through email to county agencies that serve families with young children. Families were excluded from participation in the study if parents or children had a heart condition that could interfere with the collection of physiological data and/or if the child had a pervasive developmental disorder.

Procedure

At time one (T1), mothers and children came into the laboratory at Colorado State University to participate in a variety of tasks that were videotaped for future coding. Of specific interest to the current study were the Wechsler Preschool and Primary Scale of Intelligence – Third Edition (WPPSI-III; Wechsler, 2002) and the Parent-child challenge task, which are described below. Also at this time, mothers filled out several questionnaires, including the CES-D. The mothers’ partners had filled out these questionnaires prior to T1, and the mothers brought those questionnaires with them to the T1 laboratory visits.

Parent-child challenge task. The parent-child challenge task (PCCT) was developed by Lunkenheimer (2010) to study dyadic parent-child patterns during a challenging, problem-solving situation. Mothers and children engaged in a task for six minutes in which mothers were instructed to help their children complete a puzzle using only their words (but not to physically complete the task for the child). The puzzle was made of seven wooden pieces that fit together in multiple different configurations to create various castles. Mothers and children completed three designs from a guidebook that increased in difficulty (easy, moderate, difficult). The task was designed to be challenging for both parents and children and therefore encourage persistence at a difficult task: If mother and child completed all three designs, the child would win a prize. The experimenter interrupted midway through the task to remind parents that they only had a short time left to finish. In actuality, children received the prize regardless of whether they completed all three designs or not. The current study made use of data collected in this task after the interruption took place.

Measures

Parental depressive symptoms. Depressive symptoms include abnormal sleeping habits (sleeping too much or too little), loss of interest in things that were once meaningful, feeling hopeless, lack of energy, change in eating habits (too much or too little), and irritability, among others (NIMH, 2010). In the current study, parental depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977), which was filled out by both mothers and fathers. The CES-D is a 20-item measure that asks how often participants felt a certain way within the past week. Sample items include: “I did not feel like eating; my appetite was poor,” “I felt sad,” and “I had crying spells.” Responses are based on a Likert scale ranging

from “*Rarely to none of the time (0-hours)*” to “*Most or all of the time (5-7 days)*.” Both mothers and fathers filled out the CES-D independently.

According to Radloff and Locke (2000), internal consistency (measured by Cronbach’s alpha) is high for the CES-D, ranging from around .85 to .90 in community and psychiatric samples respectively. The authors also reported that split-half reliability has also been high, with a range from .77-92. Because the CES-D is measuring a construct in which symptoms are expected to change over time, the $r = .51-.67$ in test-retest reliability is desirable. Previous studies have also found the CES-D to have relatively high criterion (e.g., Beekman et al., 1997; Shinar et al., 1986) and discriminant validity across a variety of samples, with specificity ranging from 73-94% and sensitivity ranging from 60-99% (e.g., as cited in Beekman et al., 1997; Shinar et al., 1986). One concern regarding the validity of the CES-D is that CES-D has been shown to predict depression and generalized anxiety equally (Breslau, 1985).

Child behavior problems. Externalizing and internalizing behavior problems were assessed via mother report at T1 using the Child Behavior Checklist (CBCL/1.5-5; Achenbach & Rescorla, 2000). The 99 items are rated on 3-point scales from 2 (*very true or often true of the child*) to 0 (*not true of the child*). The externalizing behavior subscale reflects behavioral dysregulation in the form of poor attentional control and physically aggressive behavior, and the internalizing subscale reflects dysregulation in the form of somatic complaints, anxiety, and depression. For externalizing, Cronbach’s alpha reliability was .93 and for internalizing, Cronbach’s alpha was .77.

Child verbal and perceptual abilities. Two tasks from the Wechsler Preschool and Primary Scale of Intelligence-Third Edition (WPPSI-III; Wechsler, 2002) were tested in the current study as potential control variables, based on their potential relations to the variables of

interest. These two tasks were the Block Design and the Receptive Vocabulary tasks. Overall reliability for these tasks was .53.

Block design. The Block Design task of the Wechsler Preschool and Primary Scale of Intelligence-Third Edition (WPPSI-III; Wechsler, 2002) is typically considered a sound test of perceptual abilities in children. The goal of the task is for the child to recreate a series of red and white designs that have been drawn on a card with a set of 9 cubes they have been given. These designs are abstract in nature and increase in difficulty as the child moves through the task. Each design has a time limit and there are bonus points given if items are completed in a certain amount of time. Motor skill ability as well as visual ability are related to performance on this task. There is a total possible score of 40 points for the 20 items, and a higher score represents a higher level of perceptual ability.

Receptive vocabulary. The Receptive Vocabulary task of the WPPSI-III (Wechsler, 2002) is designed to assess children's comprehension of verbal directives, integration of visual perception and auditory input, ability to discriminate auditory and visual stimuli, as well as auditory memory and auditory processing skills (Wechsler, 2002). In this task the examiner names an item out loud while the child looks at a set of 4 items; the child must correctly point to the item that the examiner named. The child receives a positive score for giving a correct response, and higher scores represent a better ability to process auditory and visual stimuli.

Interactive repair. Interactive repair was measured during the PCCT. Noldus Observer XT 8.0 software was used to code behavioral observations of the PCCT using the Dyadic Interaction Coding System (Lunkenheimer, 2009). Both parent and child behaviors were coded on a second-by-second basis, as was parent and child affect. Within this coding system, behavior and affect codes were mutually exclusive, such that one behavior and one affect code was

recorded for each person at one time (i.e., four codes were recorded at all times) for the entirety of the observation. If behaviors occurred in quick succession without a new behavior occurring (e.g., three instances of parental teaching in a row), then the coding of the original behavior was continuous throughout that interval.

Gridware 1.15 software (Lamey et al., 2004) was used to create State Space Grids (Lewis et al., 1999) and to track each dyad's movement between two types of regions: The positive region includes times when both mother and child are engaged in a positive behavior, and negative regions encompass times when either the parent and/or child are engaged in a negative behavior. GridWare 1.15 calculated the Transitional Propensity between the two types of regions, which represents the likelihood of the dyad moving to the positive region from any of the negative regions. This Transitional Propensity value was used as the index of interactive repair. Positive and negative parent and child behaviors are described in Appendix 1.

Three undergraduate and graduate research assistants coded the data and were tested for reliability on 20% of the dataset in relation to a standard set by the author and a trained graduate student. Reliability was calculated on an initial set of 10 videotapes, in addition to drift reliability assessed on an additional 10 tapes during the coding period. Reliability analysis was performed in the Noldus Observer 8.0 XT using a standard 3-second window. Interrater reliability *kappa* values with regard to specific codes ranged from .51 (Nonpersistence) to .80 (Positive Reinforcement). Actual reliability was likely somewhat higher given that the majority of behaviors were quick (e.g., 3 seconds long) and recurring, and reliability analysis in the Noldus Observer 8.0 XT could not account for the agreement between the recurrence of a coded behavior by one coder (i.e., a behavior is interrupted briefly and then resumes) while the other coder had coded the behavior as uninterrupted during this same time period.

CHAPTER V

PLAN OF ANALYSIS

Preliminary analyses were performed to examine the relations between parental depressive symptoms (both maternal and paternal), interactive repair and child internalizing and externalizing behaviors. Also, preliminary analyses were performed on the following sociodemographic and control variables to see if they needed to be included in the final models: socioeconomic status (SES), child gender, child age, maternal education, maternal race and child receptive vocabulary and block design scores from the WPPSI. Specifically, the following analyses will be performed to address the first three research questions (RQ). Importantly, these analyses will be performed using data from the post-stressor portion of the Parent-Child Challenge Task. Last, because some studies have found the variables of interest to be related to externalizing problems (Foster et al., 2008; Luoma et al., 2001), internalizing problems (Gross et al., 2008) or both (Carro et al., 1993), the current study will examine these behaviors in separate models.

First, this study aimed to test the relation between parental depressive symptoms and child behavior problems. Linear regressions were used to explore whether the level parental depressive symptoms is related to child behavior problems. Maternal and paternal depressive symptoms were examined separately, as well child internalizing and externalizing behaviors. The second research question focused on the relation between parental depressive symptoms and interactive repair. Specifically, are higher levels of parental depressive symptoms related to a lower likelihood that interactive repair will occur during a mother-child interaction? Linear regressions were used to explore whether the level of parental depressive symptoms is related to interactive repair. Maternal and paternal depressive symptoms were examined separately, as

well child internalizing and externalizing behaviors. The third research question aimed to test the relation between interactive repair and child behavior problems. Specifically, is a higher likelihood of interactive repair during mother-child interactions related to lower levels of child behavior problems? Linear regressions were used to explore whether the level parental depressive symptoms is related to child behavior problems. Maternal and paternal depressive symptoms will be examined separately, as well child internalizing and externalizing behaviors.

The final research question was a mediation analysis. Specifically, does interactive repair mediate the relation between parental depressive symptoms and child behavior problems? A regression analysis was used in order to test the mediation model between parental depressive symptoms, interactive repair and child behavior problems. Lastly, interactive repair was tested as the mediating variable between depressive symptoms and child internalizing and externalizing behaviors.

Specifically, the mediation model will be tested following Baron and Kenny's (1986) criteria for determining whether variables functioned as mediators. Thus, the following conditions must be met when determining whether interactive repair mediates the relationship between parental depressive symptoms and child behavior problems: (1) The relationship between the predictor (parental depressive symptoms) and the criterion (child internalizing and/or externalizing behaviors) is significant; (2) the relation between the predictor (parental depressive symptoms) and the mediator (interactive repair) is significant; (3) the relation between the mediator variable (interactive repair) and the criterion variable (child internalizing and/or externalizing behaviors) is significant when both variables are entered into the analysis simultaneously; and (4) the significant relationship between parental depressive symptoms and child internalizing and/or externalizing behaviors is attenuated by including interactive in the

model. If the analysis shows that the attenuation is partial, where the path between depressive symptoms and child behavior problems is reduced but still significant, then Sobel's (1982) test will be used to test the models.

CHAPTER VI

RESULTS

Preliminary Findings

Table 1 shows descriptive statistics for maternal and paternal depressive symptoms, mother-child interactive repair and child internalizing and externalizing behavior scores. Based on prior literature, family socioeconomic status (SES), child gender, child age, maternal education, maternal race and child receptive vocabulary and Block Design scores were examined as potential control variables for the analyses. Analyses indicated that with the exception of SES, no other potential control variables were significantly related to the predictor variables, and thus were not included in the final models. After examining the correlational analyses between SES and maternal depressive symptoms, two specific outliers were removed from the analyses. The first outlier had a maternal CES-D score that was five standard deviations above the mean, and a SES score approximately 2.5 standard deviations below the mean. The second outlier had a maternal CES-D score that was approximately 3.5 standard deviations above the mean and a SES score approximately 2 standard deviations below the mean. With these cases present, the correlation between maternal depressive symptoms and SES was $-.29$ ($p < .05$); after removing these two cases the same correlation dropped to $-.121$, *n.s.*

Table 1

Correlations, Means and Standard Deviations for Parental Depressive Symptoms (DS), Interactive Repair and Child Internalizing and Externalizing Behaviors

	1	2	3	4	5
1. Maternal DS	-	.59	-.24*	.36**	.30**
2. Paternal DS		-	-.07	-.10	.08
3. Interactive Repair			-	-.29**	
-.20*					
4. Child Internalizing				-	.46**
5. Child Externalizing					-
Mean	6.90	6.99	.001	7.17	10.67
SD	5.73	6.20	.002	4.32	6.65
Range	0-28	0-29	0-.01	0-18	0-28
N	98	85	98	98	98

* $p < .05$

** $p < .01$

DS = Depressive Symptoms

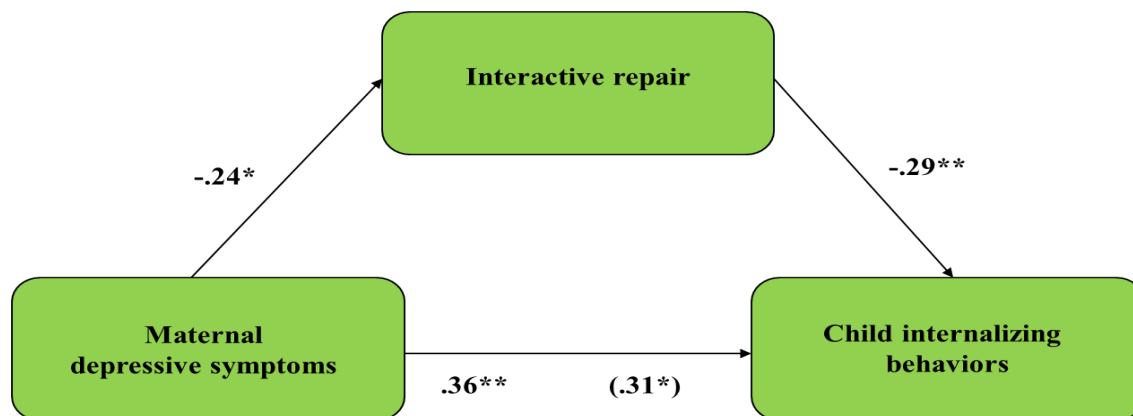
Maternal Depressive Symptoms, Interactive Repair and Child Behavior Problems

In order to test the first two conditions for mediation, regression analyses were computed between the variables of interest. Linear regression results indicated that maternal depressive symptoms were significantly related to child internalizing ($\beta = .359$, $t(97) = 3.77$, $p < .001$) and externalizing behaviors ($\beta = .299$, $t(97) = 3.07$, $p < .001$). Second, linear regression results indicated that maternal depressive symptoms were significantly related to interactive repair ($\beta = -.240$, $t(97) = -2.43$, $p < .05$). Results also indicated that interactive repair was significantly related to levels of both child internalizing ($\beta = -.287$, $t(97) = -2.94$, $p < .05$) and externalizing behaviors ($\beta = -.200$, $t(97) = -2.00$, $p < .05$).

Lastly, based on these prior analyses, hierarchical linear regressions were performed to test interactive repair as a mediator between maternal depressive symptoms and child internalizing and externalizing behaviors. The hypothesis was supported in the first model such that repair was a significant partial mediator between maternal depressive symptoms and child

internalizing behaviors, ($F(2, 97)=8.12, p<.01; R^2=.15, p<.01$). The standardized regression coefficient between the predictor and outcome decreased interactive repair was entered as the mediator (see Figure 2; Table 2). A Sobel Test was also used to further understand the relations between maternal depressive symptoms, interactive repair and child internalizing behaviors. Results from this test support the prior analyses, showing that interactive repair does partially mediate the relationship between maternal depressive symptoms and child internalizing behaviors (Sobel test = 2.22, SE = .003, $p<.05$).

The hypothesis for the externalizing behaviors model was not supported as the relationship between interactive repair and child externalizing behavior no longer reached statistical significance in the final mediation model (see Table 3). A Sobel Test was used to further understand the relations between maternal depressive symptoms, interactive repair and child externalizing behaviors. Results from the Sobel Test, similar to the prior analyses, do not show interactive repair as a partial mediator between maternal depressive symptoms and child externalizing behaviors.



$p < .05^* p < .01^{**}, R^2=.15, R^2 \text{ change}=.043$

Figure 2

Interactive repair during the Parent-Child Challenge Task as a partial mediator between maternal depressive symptoms and child internalizing behaviors.

Table 2

Interactive Repair Predicting Child Internalizing Behaviors, Controlling for Current Level of Maternal Depressive Symptoms.

	Beta	<i>t</i>	<i>p</i>	<i>R</i>² Change
Step 1				
(Constant)		8.26	.000	
Maternal Depressive Symptoms	.359	3.78	.000	
Step 2				
(Constant)		8.19	.000	
Maternal Depressive Symptoms	.308	3.20	.002	
Interactive Repair	-.213	-2.20	.029	.043

Table 3

Interactive Repair Predicting Child Externalizing Behaviors, Controlling for Current Level of Maternal Depressive Symptoms.

	Beta	<i>t</i>	<i>p</i>
Step 1			
(Constant)		8.19	.000
Maternal Depressive Symptoms	.299	3.07	.003
Step 2			
(Constant)		7.54	.000
Maternal Depressive Symptoms	.266	2.66	.009
Interactive Repair	-.136	-1.36	.176

Paternal Depressive Symptoms, Interactive Repair and Child Behavior Problems

Parental depressive symptoms were not related to interactive repair or either type of child behavior problems at a level of statistical significance. In other words, in this sample, interactive repair did not mediate the relationship between paternal depressive symptoms and child internalizing or externalizing behaviors. Thus, mediation could not be tested.

Post-Hoc Analyses

Analyses indicated that the measure of interactive repair was positively skewed (skewness = 2.22). Specifically, roughly 40% of the dyads experienced no instances of

interactive repair. In the context of these findings, we considered that all dyads may not have had the chance to repair during this mother-child interaction. Post-hoc analyses were performed in order to determine if any differences existed in the following three groups related to interactive repair: Dyads where there was no chance to repair (i.e., dyads that stayed in the positive region throughout the interaction), dyads where repair could have happened but did not, and dyads where repair did occur. An analysis of variance (ANOVA) was performed to examine whether there were mean differences in internalizing behavior scores depending on repair group. This analysis yielded a significant main effect of group, ($F(2, 91) = 3.82, p < .05$). Post-hoc tests using the Bonferroni procedure showed that children in the “No Chance of Repair” group, ($M = 8.81, SD = 4.79$), had significantly higher internalizing scores compared to children in the “Did Repair” group, ($M = 6.25, SD = 3.83$) (see Figure 2). The effect size for the significant mean difference was $d = .59$. According to Cohen (1988), this is considered a medium effect size. That is, children in dyads that remained in the positive behavior region throughout the interaction showed significantly higher levels of internalizing behaviors than children in dyads that made successful return(s) to the positive region after a negative behavior had occurred.

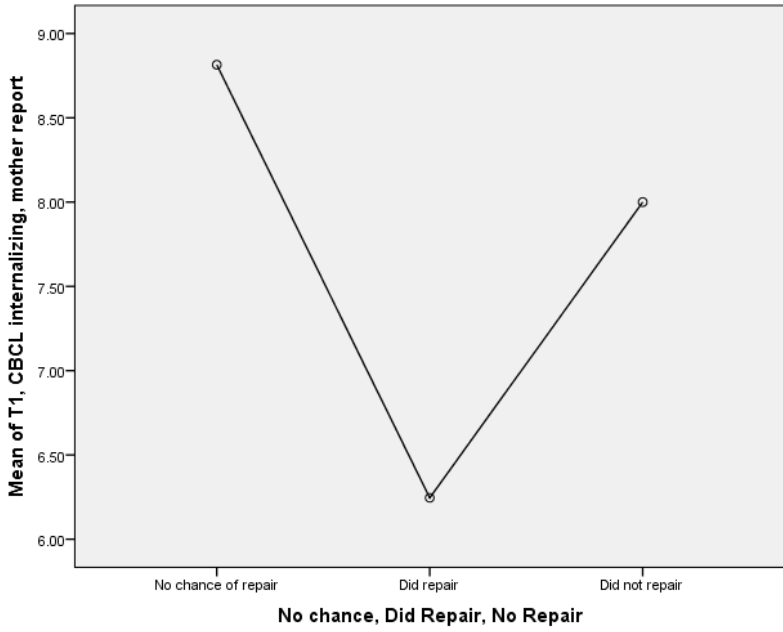


Figure 3

Internalizing scores by repair group for the Parent-Child Challenge Task

CHAPTER VII

DISCUSSION

The main aim of this study was to improve the understanding of the role interactive repair may play in the relationship between parental depressive symptoms and child behavior problems. More specifically, the current study aimed to expand current knowledge regarding the role of interactive repair, which in previous research has primarily focused on affective repair, to include the examination of behavioral interactive repair. Results indicated that for the current sample, interactive repair serves as a partial mediator in the relationship between current depressive symptoms and current levels of child internalizing behaviors. However, the same was not true for externalizing behaviors, or for any models tested with paternal depressive symptoms.

These results suggest that interactive repair may be an important process that relates to maternal depressive symptoms and child behavioral problems, but that further study will be needed in order to fully understand the role and function of interactive repair within this context. In other words, the constraints of the current study do not allow us to make conclusive statements about the role of repair in other samples or situations. Taking this into account, the current findings add to the literature in several important ways. First, by examining interactive repair as a potential mediator in these relationships, this study is able to add to the understanding of the transmission of risk between parents with depressive symptoms and their children. More specifically, the literature on depression in families suggests that both biological and environmental factors are at work in the relationship between parental depressive symptoms and child well-being (Cummings & Davies, 1993; Kim-Cohen, Moffitt, Taylor, Pawlby & Caspi, 2005). Although research on biological factors give us great insight into the way depressive symptoms may be ‘passed on’ or ‘transmitted’ to children, such factors are hard, if not

impossible, to alter. Conversely, research indicates that parental behaviors can be altered through intervention, and that such interventions can lead to better child outcomes (Dishion et al., 2008; Gardner et al., 2007). Thus, although the transmission of risk between parent psychopathology is not entirely behaviorally based, studying behavior may be one way to work towards improved child outcomes.

The results from the current study have specific implications both for parental depressive symptoms and for child behavior problems. By exploring the role of depressive symptoms on a continuum, as opposed to using clinical cut-offs, the current results indicate that depressive symptomatology has important implications for child development, even when below the threshold of a clinical diagnosis. It is important to note that the most common cut-off score for “high depressive symptoms” is 16 (Radloff, 1977; Cook et al., 2004); the average for parental depressive symptoms in the current sample was 6.9 and 7 for mothers and fathers, respectively. Thus, the current sample had relatively low levels of reported maternal depressive symptoms, and yet, relationships existed between depressive symptoms, parent-child interaction processes and child behavioral outcomes. These findings indicate that it is not just clinical depression that may put families at risk, but rather that the presence of even low-to-moderate levels of depressive symptoms can influence family patterns and outcomes. These findings also have implications for understanding the development and/or maintenance of behavioral problems in early childhood in the context of parental depressive symptoms. In particular, research has clearly indicated that parental depressive symptoms are associated with poorer child outcomes, even though the mechanisms between the two are largely a matter of conjecture (Jameson et al., 1997). That said, recognizing factors that may protect against the development of behavioral problems suggests that child behavioral problems are not inevitable in families where depressive

symptoms are present. On the contrary, these results support DS theory's assumptions that development is dynamic and involves a variety of systems and feedback loops, which interact together to support and/or create different developmental trajectories (e.g., Granic & Hollenstein, 2003; Hollenstein, 2011;).

The current findings also have several implications for the future study of interactive repair within parent-child interactions. Importantly, interactive repair has been focused on in a variety of contexts and across different populations, from infant-mother interactions (e.g., Tronick, 1989) to adult partner interactions (e.g., Gottman, 1998). The current study's examination of behavioral repair during early childhood adds to the current child development literature on repair as this construct has most commonly been examined in the context of affective aspects of interaction (e.g., Tronick, 1989; Tronick & Reck, 2009). Importantly, just as affective repair has been associated with better child regulation outcomes (e.g., Tronick, 1989), the results from the current study indicate that behavioral repair may have the potential to serve a similar function. Obviously, further research is warranted in order to more clearly understand the role of behavioral interactive repair; however, the current results may help set the stage for examining behavioral repair alone and/or along with affective repair in future research.

Furthermore, although other rupture/repair research has focused on infant-mother interactions (e.g., Tronick, 1989; Tronick & Reck, 2009), the current study examined these types of interaction in the context of early childhood. Research indicates that early childhood may be an especially important time in the development of regulatory skills (e.g., Calkins, 1994; Lunkenheimer et al., 2011; McClelland & Tominey, 2011), which highlights the importance of examining potential risk and protective factors that may occur during this point in development. Thus, by understanding how interactive repair may function in parent-child relationships in early

childhood, the current study helps set the stage for understanding the role of interactive repair across developmental periods.

Similarly, the examination of repair processes during the Parent-Child Challenge Task adds to the literature that has also studied these processes under stressful conditions (Skowron, Kozlowski, & Pincus, 2010). Specific to the current study, research indicates that mothers with depression and/or current depressive symptoms tend to have more challenging or conflictual (i.e., higher levels of negative affect and/or behaviors) interactions with their children (Conger et al., 1995; Goodman & Brumley, 1990; Palaez et al., 2008). That said, the challenging and stressful PCCT may have provided a more informative context for examining repair than a low-/no-stress task might have for mother-child dyads where depressive symptoms are present. In other words, because mother-child interactions for mothers with depressive symptoms may normally be more stressful in general, a challenging task may be a more optimal way to study the influence of parental depressive symptoms in a laboratory setting.

The current study also provides support for the notion in rupture and repair literature that the ability to repair may be more important than the rupture that has occurred. Otherwise said, rupture and conflict may be inevitable during interactions across time; however, the ability to make repairs after such ruptures seems to carry more weight related to individual and/or family outcomes as compared to the actual rupture(s) (Gottman, 1998; Tronick & Gianino, 1986). Specifically, several studies have indicated that healthy mother-child dyads experience mismatches (or unsynchronized interactions) up to 70% of the time, depending on age (Feldman, 2007; Tronick & Gianino, 1986). Tronick and Gianino (1986) commented that it is not these periods of mismatch that necessarily set the stage for poorer child outcomes; rather, it is situations of “atypical interaction of unresolvable mismatches, as in the case of maternal

depression” that have harmful implications for child outcomes. Results from the current study support this conclusion in the sense that higher levels of interactive repair were related to lower levels of internalizing behaviors.

Post-hoc analyses provide specific support for this as well. Post-hoc analyses showed children in dyads where there was no chance of repair (i.e., dyads that never experienced a negative behavior by either person during the entirety of the interaction) had significantly higher mean levels of internalizing behaviors compared to those dyads that did experience any interactive repair, and comparable levels of internalizing behaviors when compared to dyads that did not repair even though negative behavior(s) occurred. In other words, children in dyads who did not experience any negative behaviors (and thus, had no chance to repair) had higher levels of internalizing behaviors compared to children in dyads who experienced negative behaviors during interactions, but repaired them. However, due to group size and the possibility that more subgroups could exist within the “no chance” group, firm conclusions should not be drawn from these findings alone. Rather, these analyses can support further exploration of interactive repair as an important mechanism in the development of both adaptive and maladaptive child behavior patterns in the presence of maternal depressive symptoms.

Lastly, the current study also adds to the literature in a more methodological sense. The use of dynamic-systems based indices to capture interactive repair highlights the utility of these methods for child development research, especially in the context of parent-child interaction. Importantly, the current results do not dismiss the importance of examining individual patterns of behavior; instead, the results help support the argument that dynamic processes are also important in the context of parent-child interactions. The use of DS research methods has increased in the child development field over the last 20 years (Hollenstein, 2011), which may be

because such methods allow researchers to have insight into interactive processes that are not available when using other techniques. Granic and Hollenstein (2003) made the point that DS researchers do not aim to completely abandon other well-established techniques used to examine developmental processes. Rather they argue that utilizing DS methods within developmental research may help answer empirical questions that are beyond the scope of other techniques.

Limitations and Future Directions

The current study is not without limitations. The current sample was a convenience sample taken from relatively stable community and included primarily nonHispanic White, middle- to upper-class families. This poses two main problems for the current study: First, it is difficult to generalize these findings to other populations, and second the relatively low levels of depressive symptoms in this sample may have made it harder to understand the true role of depressive symptoms in parent-child interactions. More specifically, the distribution for both maternal and paternal depressive symptoms was positively skewed... The homogeneity of this sample also could help explain why relationships did not exist between expected control variables and maternal or paternal depressive symptoms. Otherwise said, this sample may not have included enough variation in demographic variables to allow us to understand the ways in which typical control variables are related to the current model. Together, these limitations make it clear that it will be extremely important to test these relationships in higher-risk and more diverse samples in order to determine all the potential ways parental depressive symptoms, interactive repair and child behavior problems are related.

Another limitation in the current study is that data were collected at only one time point. Research on coordination and repair suggests that problematic interactions during infancy may be at risk for later psychopathology later on (Jameson et al., 1997); however, the current study

does not allow for us to control for any prior interaction patterns. In other words, early (i.e., infancy) parent-child interaction patterns may be influencing current child behavior problems, but the current study has no way of controlling for such a possibility. Similarly, by only examining one time point, the current results do not inform us about the long-term risk or protection associated with interactive repair as related to child behavior problems within the context of maternal depressive symptoms. Ideally, future research could examine parent-child interactions at multiple time-points across important developmental periods in order to fully understand the role of constructs such as interactive repair in the relationship between depressive symptoms and child behavioral outcomes.

Another methodological limitation in the current study includes only making use of one reporter regarding depressive symptoms and child behaviors. Specifically, self-reports were used to assess levels of depressive symptoms, and only maternal reports of child behavior were used in the current study. Research indicates that making use of multiple informants can create a better understanding of the outcome of interest (Achenbach, McConaughy & Howell, 1987). Thus, future research should aim to collect information from other sources (e.g., other parents or caregivers, teachers, peers). Similarly, only maternal-child interactions were examined in the context of the current study. The absence of father-child observation opportunities could help explain why paternal depressive symptom models were not significant in the current study. Child development researchers have highlighted the absence, and importance of, fathers in developmental research, especially as research does indicate that fathers play an important role in child emotional, social and behavioral outcomes (Cummings, Merrilees & George, 2010; Grossmann, Grossmann, Kindler & Zimmermann, 2008; Lamb, 1975). Taken together,

limitations of the current study as well as of broader child development research, this study can further highlight the necessity of including fathers in child development research.

Furthermore, the post-hoc analyses within the current study make it clear that we need a better understanding of the “no chance of repair” dyads. Small group sizes may impede a complete understanding of this group within the current study; however, the current results do provide potential evidence that negative behaviors during interactions may serve some sort of positive function. However, the researchers expect that variation exists amongst groups that had no chance of repairing, and as such, it would not be wise to draw strict conclusions from the post-hoc analyses in this study.

In conclusion, the current study adds to the understanding of the potential mechanisms that may exist between parental depressive symptoms and child behavioral outcomes; however, we have obviously not created a complete understanding of this relationship. Rather, as discussed by Jameson and colleagues (1997), there is no single factor that connects parental depressive symptoms and child maladjustment. Rather, families with depressed parent(s) may simultaneously face a variety of stressors (e.g., chaotic living situations, high financial stress and/or marital conflict), all of which may influence and/or be influenced by parent-child relationships. That said, creating a better understanding of specific mechanisms that may be at work in the relationship between parental depressive symptoms and child behavior problems can only inform and improve future research and intervention efforts.

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APPENDIX 1

PARENT AND CHILD BEHAVIORS

Positive Parent Behaviors

Proactive structure (PS). PS was defined as instances when the parent works to prompt, guide or encourage the child to behave in a positive, desired manner. Examples include mother statements/questions such as, “Why don’t you add another block on top of your tower?”, “Let’s build a castle together”, or “Let’s pretend this box is the garage and we have to drive all the cars in to put them away,” among others.

Positive reinforcement. Positive reinforcement included instances in which the mother verbally expressed praise or support for the child’s behavior, emotion and/or comment. Examples of positive reinforcement included phrases such as, “Good job!” or “I like the castle you built.” Non-verbal actions could also be coded as positive reinforcement as long as they clearly indicated approval and/or positive regard (e.g., clapping, giving a thumbs-up, etc.).

Emotional support. Emotional support was defined as times when positive emotions, signs of endearment or expressions of empathy were shared between mother and child. These expressions could be verbal or non-verbal. Examples included positive or affectionate physical behavior was present, such as a hug, kiss or pat on the back and phrases such as “I love you,” or “Are you feeling a little scared?”

Teaching. Teaching was defined as instances when the parent explained to the child how something worked in order to assist him/her with completing the task (e.g., “I think the red block goes in the middle” or “You might be able to flip it the other way”), or when the parent asked a question that allowed the child the opportunity to learn or respond verbally or behaviorally (e.g., “What does the picture show?”).

Directives. Directives were defined as instances where the parent had a specific agenda and made clear and/or firm commands for a specific response or behavior the parents did or did not want the child to perform. Directives included Do commands (e.g., “Grab the blue block” or “Put it here”) and Don’t commands (e.g., “No, you do it” or “Don’t throw it”) as long as the Don’t commands were not harsh or critical, which were captured under another code.

Engagement. Engagement was defined as instances when the mother was interacting with the child, but when that interaction was relatively mundane and/or passive. This could include times when the mother was watching or tracking the behavior of the child. Examples of engagement include the mother handing the child a block to put on his or her tower and/or mundane conversations about everyday routines (e.g., “What will we have for dinner tonight?”).

Positive Child Behaviors

Compliance. Compliance was defined as instances in which the child clearly responded to the parent’s bid for a behavior change (e.g., cleaning up toys as requested) or to a teaching or proactive structure by the parent that asked for a specific behavior (e.g., singing a clean-up song the parent suggested).

Persistence. Persistence refers to times when the child is persisting and sustaining work on a task without being given a directive. In other words, it reflects times that the child keeps working on a task once the task has been initially explained or set up.

Social Engagement. Social engagement represents times when the child is engaging in social, emotional, play-oriented or routine conversation with the parent. It also captures instances when the child is interacting with the parent but is not working on a specific task or responding to a request from the parent to change a behavior.

Negative Parent Behaviors

Disengagement. Disengagement was defined as instances in which the mother was not interacting or engaging with the child, when the other was ignoring the child and/or when the mother seemed “tuned out” or bored with the child.

Intrusion. Intrusion was defined as instances when the parent intruded upon the child’s task-related behavior or took over and physically completed part of the task for the child, which she had been instructed by the experimenter not to do. Examples included the parent performing any part of the puzzle task for the child, or physically restraining the child for reasons other than to protect or ensure safety (e.g., holding the child back from the puzzle because the child was playing with the pieces in an off-task manner).

Negative Discipline. There are three categories of behaviors that make up negative discipline: First, a negative directive referred to times when the mother gave the child a directive that had a negative consequence (e.g., “Clean up now or I’ll spank you”). The second type of negative discipline was criticism; defined as times when the mother used explicit verbal expressions that showed disapproval of the child’s behavior, emotions or appearance (e.g., “You’re not cleaning up very fast”). Also, non-verbal actions could be coded as criticism if they clearly indicated disapproval (e.g., the mother rolling her eyes). The last type of negative discipline was negative physical acts which included times when there was intrusive physical contact, such as hitting, slapping or shoving.

Negative Child Behaviors

Noncompliance. Noncompliance includes times when the child clearly ignores, disagrees or refuses to cooperate with the parent’s bid for behavior change. Noncompliance also includes times when the child negotiates with the parent in an aversive manner (“You clean it up!”).

Nonpersistence. Nonpersistence refers to instances when the child is not staying on task in the framework of the task that has been set up. This is distinct from noncompliance, when the child specifically does not comply with a directive. Instead, nonpersistence refers to times when the child is bored, spaced out, distracted, and generally engaging in off-task behavior and the parent has not given them a specific directive as to what they should be doing.

Emotion Dysregulation (ED). ED captures children's emotional outbursts and dysregulated behaviors that are not captured under noncompliance. ED captures emotional outbursts that are either overly positive or overly negative. Some examples include when the child throws a tantrum, cries, or running around the room giggling.