THESIS

PARENT-CHILD ATTACHMENT AS A MEDIATOR AND MODERATOR OF PARENT DEPRESSIVE SYMPTOMS AND INFANT DYSREGULATION

Submitted by

Daniela Cruz Castorena

Department of Human Development and Family Studies

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Fall 2024

Master's Committee:

Advisor: Julie Rieker

Shelley Haddock
Meara Faw

ABSTRACT

PARENT-CHILD ATTACHMENT AS A MEDIATOR AND MODERATOR OF PARENT DEPRESSIVE SYMPTOMS AND INFANT DYSREGULATION

Maternal depression has been found to be a significant predictor of child developmental outcomes, often resulting in both internalizing and externalizing problematic behaviors (Cummings & Davies, 1994; Gelfand & Teti, 1990; Schiavo & Perosa, 2020). Although there are numerous studies observing the detrimental effects of mother depression on their children, less is known about the potential negative effects of father depression. Moreover, little is known about how fostering a secure attachment may act as a protective buffer (moderator) for children against these negative effects. The current study tested the extent to which parent-infant attachment influences the relationship between parental depression and infant dysregulation through moderating or mediating mechanisms. This longitudinal study involved following 300 mother-father-infant triads from 6 to 18 months of age. Parental depressive symptoms were measured using the General Depression subscale of the Inventory of Depression and Anxiety Symptoms (IDAS) at 6 months. Parent-infant attachment was coded based on observations from the Strange Situation at 16-months for fathers and at 18-months for mothers. The dysregulation subscale of the parent-reported Brief Infant-Toddler Social Emotional Assessment (BITSEA) was assessed at 16 and 18 months. Although a significant correlation was found showing that increased levels of mother depressive symptoms at 6 months was related to higher levels of mother-reported infant dysregulation, there were no significant results involving fathers, and no significant

evidence of mediating or moderating influences of parent-infant attachment on the link between depressive symptoms and infant dysregulation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

John Bowlby's attachment theory explains the foundational tenets of the relationship between a parent and their child, particularly a mother and her child (Bretherton, 1992). This theory focuses on how a child's experiences of being separated and/or connected to their mother will significantly impact their attachment to their mother, and how their attachment style has long-term implications for future relationships (Bretherton, 1992). Previous research has found that the parent-infant attachment style becomes apparent as soon as the child is 6-8 months old and can be assessed by the time the child is about 12 months of age (Smith et al., 2016). It is essential for a secure attachment to be fostered between infant and parent as this experience will influence future interactions with others (Ranson & Urichuk, 2008).

Particular factors, such as parental sensitivity, have been shown to foster a secure attachment (Atkinson et al., 2005; Zeegers et al., 2017). Sensitive behavior may likely be a result of high parental awareness and attunement of the infant's internal states (Zeegers et al., 2017). Securely attached infants are able to form a secure base with their caregivers by developing a secure dependence, which then encourages the exploration of unfamiliar environments and skill development (Bretherton, 1992). In contrast, an insecurely attached child is likely to lack a secure base with their caregivers, putting them at a disadvantage in their psychosocial development. Furthermore, securely attached infants are more likely to explore more, cry less frequently, and rely on their parents as a source of comfort compared to insecurely attached infants (Bretherton, 1992).

Given the importance of secure attachment and how parenting behaviors influence the development of attachment, the present study focused on the quality of the parent-child

attachment relationship as a key mechanism in the prediction of behavior problems, specifically dysregulation. Moreover, the study also examined parental psychopathology, i.e., depressive symptoms, as an important contributor to both infant attachment and dysregulation.

Parental Depressive Symptoms and Attachment

Given the importance of maternal sensitivity on infant attachment, it is critical to understand why parents can vary in sensitivity. As the attachment between the parent and infant is developing, the infant's own internal working model is forming as well; an internal working model is acquired through the interaction between the infant and caregiver, which then creates an internal guide for developing future attachments (Bretherton, 1992). A securely attached child is more likely to develop an internal working model where they view themselves as valued and independent, whereas an insecurely attached child may view themselves as having low worth and competence (Bretherton, 1992). As the infant's internal working model is forming in the first 6 months of their life, it is important to experience sensitive and responsive parenting (Edhborg et al., 2003).

However, a mother who shows evidence of psychopathology, such as depression, is likely to have difficulty being consistently sensitive and responsive toward their child, thus impacting the child's sense of self (Edhborg et al., 2003; Radke-Yarrow et al., 1985). Maternal depression has been shown to have associations with the mother-child attachment style usually presenting as insecure-resistant or insecure-avoidant due to depressed mothers having difficulty forming strong connections with their child (Radke-Yarrow et al., 1985; Wan & Green, 2009). In a study conducted by Radke-Yarrow et al. (1985), it was found that children with depressed mothers are more likely to be exposed to depressive episodes that may present as sad affect, hopelessness, and irritability. The researchers further found that this type of exposure was

associated with developing an insecure attachment due to interactions consisting more of negative affective expression (Radke-Yarrow et al., 1985).

Maternal Depression on Child Development

As mothers tend to more commonly serve as primary caregivers, past research has specifically focused on how maternal depression can impact child development. When observing older children, studies have reported links between maternal depression and low levels of socio-emotional competence (Cummings & Davies, 1994). However, even infants can begin to display signs of low socio-emotional competence and delays in social development (Cummings & Davies, 1994; Gelfand & Teti, 1990; Schiavo & Perosa, 2020). Researchers suggest that infants of depressed mothers may face a particular risk in learning how to emotionally self-regulate and form healthy attachments with others, and typically these infants display depressed and withdrawn behavior as well (Cummings & Davies, 1993; Gelfand & Teti, 1990). Studies have even shown there are negative effects of prenatal depression on socio-emotional competence in infants (Urizar & Munoz, 2021).

Furthermore, studies have found that maternal depression has negative outcomes in language development (Gelfant & Teti, 1990). These delays in expressive language are likely due to depressed mothers talking less to their children, interacting less with their children, and typically expressing less warmth toward them (Gelfant & Teti, 1990; Schiavo & Perosa, 2020). Moreover, researchers also suggest that while depressed mothers can be less responsive toward their babies, they can also display intrusive behaviors toward their children (i.e., impeding exploration) which can impact their autonomy development (Schiavo & Perosa, 2020). These infants also are more likely to struggle with dysregulation (unfixed sleeping schedule, elevated cortisol levels, limited play and exploratory behavior) and overall developmental delays (Field,

1998). Thus, infants exposed to maternal depressive symptoms are at risk for a host of negative outcomes.

Paternal Depression on Child Development

Although less well studied than mothers, fathers who experience depression also have an impact on their child's development. Research has shown that children who had fathers with depression at the time they were infants have poor developmental outcomes by the time they are 4-5 years old, as they are more likely to present higher levels of hyperactivity, to develop peer and conduct problems, and are less likely to engage in prosocial behavior (Fletcher et al., 2011). Similar to outcomes found in infants who have mothers with depression, early paternal depression has been linked with poor social/emotional outcomes, including speech and language problems (Fletcher et al., 2011; Dave et al., 2009).

Moreover, negative outcomes for children with depressed fathers can range from psychopathology development (i.e., conduct disorders) to dysregulation issues (i.e. excessive crying) (Sweeney & MacBeth, 2016). Previous studies have found associations between paternal depression and increased risk of internalizing and externalizing behaviors (Dave et al., 2009; Ramchandani et al., 2005; Sweeney & MacBeth, 2016). More specifically, children aged 3 to 5 years old with fathers who had depression early in infancy were at risk of developing behavioral problems (Ramchandani et al., 2005). Although mothers are more likely to take on the role as the primary caregiver, fathers with depression have also shown to significantly impact the development of negative behaviors in their infants.

Child Problem Behavior and Attachment

As previously mentioned, externalizing and internalizing behavioral problems are more likely to arise when exposed to maternal negativity and maternal insensitivity (Ranson &

Urichuk, 2008; Wan & Green, 2009). Typically, these problem behaviors are seen in adolescent children in issues surrounding friendliness, morality, and overall emotional intelligence, whereas with infants and toddlers it is most clearly seen with issues surrounding affective sharing, regulation/dysregulation, peer reciprocity, and possible aggression (Ranson & Urichuk, 2008; Wan & Green, 2009).

There is a significant lack of research studying the attachment style between a father and their infant child, as most studies primarily focus on the mother-child relationship. Some findings suggest that the child having an alternative parent attachment figure, such as a father, may be a protective factor against the effects of maternal depression (Edhborg et al., 2003; Radke-Yarrow et al., 1985). Previous research has investigated the compensatory effects of maternal depression on father-child relationship and attachment. That is, fathers can still have the ability to foster positive interactions with their child as a protective factor against maternal depression (Edhborg et al., 2003). However, the effects of father psychopathology on parent-child attachment and its impact on child problem behavior has not been further explored. Furthermore, studies have mainly focused on how attachment impacts behavioral issues in older toddlers, children, and adolescents; there has been little to no research that has focused on how these problem behaviors may present themselves within the first two years of a child's life.

Present Study

Understanding the effect parents have during the first year of a child's life is essential to detecting the behavioral patterns that may arise at a very young age and continue to create challenges as children develop. Infants vary significantly from each other in behavior and sensory experiences, which then has implications that mothers should aim to attune to their child's unique needs (Korner, 1971). It is suggested that the mother's responsiveness and

contributions to these needs will influence the mother-infant attachment relationship and will additionally impact later development.

Furthermore, research focusing on the individual relationship a father has with his child is necessary to understand the unique outcomes that can result from this specific parent-child attachment relationship. Additionally, it is important to explore the differences between mothers and fathers and their unique relationships with their child and how factors may be impacted differently depending on the caregiver. One aim of the present study is to examine how mother-child attachment and father-child attachment mediate the association between parent's psychopathology on their infants' problem behavior, in this case, dysregulation, and whether those processes differ, depending on which parent-child relationship is the focus.

Moreover, a second aim of the current study is to test parent-child attachment as a moderator. I want to examine if secure attachment can diminish the harmful effects of parental psychopathology on dysregulation. In other words, I test to see if a secure attachment can provide a buffering effect to a mother's and/or father's depressive symptoms. Alternatively, an insecure attachment relationship might exacerbate deleterious effects between parental psychopathology and infant dysregulation. Previous studies have tested parental attachment as a moderator in different contexts, such as testing for its moderating effects on the association between emotion regulation and relational aggression as well as how it moderates the impact between antenatal stress on infant fearfulness; links were found demonstrating that attachment can serve as a moderator in those situations (Bergman et al., 2008; Kokkinos et al., 2019). However, there seems to be a gap in the literature testing parent-child attachment as a moderator when observing the effects of parental depression on infants' problem behavior, which is an aim of the present study.

Research Question and Hypothesis

The aims of this study are to investigate the individual impacts of each parent's depressive symptoms (mothers and fathers) on their infant child's dysregulation and how the corresponding parent-attachment style may mediate and moderate this relationship. Based on the findings from previous literature on parent-child attachment, child problem behavior, and parental psychopathology, I hypothesize that infants whose parents have higher levels of depressive symptoms will be less likely to be secure and present more dysregulation (Edhborg et al., 2003; Radke-Yarrow et al., 1985; Wan & Green, 2009). Furthermore, I aim to test moderating effects and predict that secure attachment serves as a protective factor and buffer the negative effects from parent's depressive symptoms, which then reduces infant dysregulation or that insecure attachment will exacerbate the negative effects of depressive symptoms, leading to heightened infant dysregulation.

METHODS

Design

The study was a 2 x 2 randomized controlled trial testing the effects of two interventions designed to increase parent sensitivity and/or parents' communication with each other. Because the present thesis did not focus on the intervention effects, intervention status was treated as a covariate.

Participants

Approximately 300 families were recruited via convenience sampling to participate in this on-going project. Multiple sources were used to recruit families from St. Joseph and Allen Counties in Indiana; families were recruited from hospitals, OB-GYN clinics, community fairs, childbirth classes, and an ongoing recruitment database. Flyers were distributed to these locations, Facebook advertisements were posted, and the study was also advertised at community events where families could sign up in-person for various projects. Characteristics of the family participants consisted of a mother, a father, and their 6 month old infant, divided evenly between girls and boys. Parents did not need to be married to participate, but at least needed to be cohabiting to be included in the study. In addition, infants had to be carried to full term with no known medical issues and be at least 5 ½ pounds.

In order to increase the opportunity to recruit lower SES and minority families, families were also recruited through Women, Infants, and Children (WIC) and Early Head Start. As families were recruited from these sites, we employed stratified randomization structured as a two-stage procedure. First, participants were grouped into strata according to their income (sufficient vs. insufficient for their family size) and minority status (minority or non-Hispanic

white). Families whose annual income is at least $40,000 are considered to be sufficient (Self Sufficiency Standard, 2016). Afterwards, within each stratum, participants were randomly assigned to one of four intervention conditions.

Approximately 78.6% of mother participants identified as White, 3.4% identified as White Hispanic, 2.6% identified as Asian, 2.3% identified as Black, and 0.6% identified as American Indian/Alaskan Native. Approximately 74.4% of father participants identified as White, 5.4% identified as White Hispanic, 1.1% identified as Asian, 6% identified as Black, and 0.9% identified as American Indian/Alaskan Native Hispanic. Approximately 80.6% of participants reported to be married and approximately 14% reported to be living with their partner, but not married. Parents' ages ranged from 19 to 56 years, with mothers' mean age of 31 years and fathers' mean age of 33 years at the start of the study.

Procedure

All eligible families were contacted by project staff to review the key elements of the project and answer any questions. During the initial lab visit, participants read the consent form and were made aware of their rights as participants. Potential participants were reminded that their participation is completely voluntary, and they can withdraw at any point during the study with no negative consequences.

The present study is longitudinal in nature, consisting of four assessment time points when infants were 6-, 12-, 16-, and +18-months. At 6 months, baseline behaviors were assessed through parent surveys and observational measures conducted in the lab. The same measures were repeated at the three remaining visits except when noted in the measures section. The three latter visits constituted the post-intervention visits. Following the baseline visit, family participants were randomly assigned to one of four groups: Control, Sensitivity Intervention (SI),

Couples Intervention (CI), and a combined Sensitivity and Couples Intervention (SI +CI). This intervention phase lasted approximately 8 weeks and occurred when the infant was approximately 8 to 10 months of age.

Prior to each laboratory visit, participants were given questionnaires through a survey link that covered caregiving history (their own), infant temperament, parental depressive/anxious symptoms, family disorganization, inter-parental conflict, interparental security, parent involvement, parenting stress, parenting efficacy, and infant behavior problems and socio-emotional competence. During the laboratory visits, procedures included the following: the Still-Face Paradigm, Dyadic Toy Play, Inter-Parental Interaction, and the Strange Situation (visits for 16 and 18 months only) (Ainsworth et al., 1978; Tronick et al., 1978; Du Rocher Schudlich & Cummings, 2003). The present thesis focuses on some of the survey data and the Strange Situation procedure (see below for more details).

Measures

Parent Depressive/Anxious Symptoms

At each phase, parents were administered the Inventory for Depression and Anxiety (IDAS; Watson et al., 2007), which involves 10 subscales (i.e., General Depression, Well Being, Social Anxiety) with 64 total items and is assessed with Likert scales. This 5-point Likert scale (1 – *not at all*; 5 – *extremely*) was used to assess general and specific symptoms across domains within depression and anxiety. The IDAS has shown strong convergent validity and good discriminant validity, as well as strong short term retest reliability (Watson et al., 2007). Internal consistencies (Cronbach's α) were calculated to assess internal consistency (α = .90 for mothers and α = .88 for fathers) on the General Depression subscale used in this study. Both the mother and father depressive symptoms variables were truncated to decrease the skewness caused by

higher outliers, determined by using the following formula: Q3 + 1.5(IQR). The present study focused on the 6-month time point data for this subscale.

Dysregulation

Parents each completed the Brief Infant Toddler Social Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2006), which involves 42 items covering four domains (Dysregulation, Externalizing problems, Internalizing Problems, and Infant Problem Behavior) and is measured on a 3-point Likert scale (0 – *not true/rarely*; 2 – *very true/often*). The present study will focus on data from the first domain of the BITSEA. Based on the results, the BITSEA measure has overall high reliability and validity, thus it is an effective tool to capture my dependent variable of Infant Dysregulation. Cronbach's α for mother reports was .53 and .65 for father reports. The present study focused on the 16-month time point data for fathers and the 18-month time point data for mothers to align when they participated in the Strange Situation procedure.

Strange Situation

Fathers and their child participated in the Strange Situation (Ainsworth et al., 1978) when the child was 16 months; mothers and their child participated in the Strange Situation when the child was 18 months. Previous research shows that studies do not need to counterbalance the order of the visits if the visits are at least four weeks apart, which addresses issues concerning carry-over effects (Belsky et al., 1984). Thus, parent order was held constant in this study. The standardized procedure consists of 7 episodes, three minutes in length, and attachment will be assessed by a certified coder (coding is anticipated to be complete early in 2023). Twenty percent of the videos will be double coded to assess for interrater reliability using a gold standard coder. The episodes entail an infant playing in the laboratory room with toys while the parent reads a magazine (episode 1), a female "stranger" entering a room (episode 2), the parent leaving the

room (episodes 3 and 6), the parent returning to the room (episodes 4, and 7), and the infant alone in the room (episode 5).

The coders classified infants into one of 4 main categories (secure, insecure-avoidant, insecure-resistant, disorganized). Infants who fell in the secure category showed mild or no distress when the caregiver leaves the room and show positive behavior (e.g., smile, seek proximity to the caregiver, rapid recovery from distress) when caregiver returns. Infants who fell in the insecure-resistant category demonstrated higher levels of distress when their caregiver left and were more likely to resist contact once reunited. Those who were categorized as insecure-avoidant were less likely to show signs of distress when their caregiver leaves but show little interest when reunited with them. Infants classified as disorganized showed a variety of odd, unusual, contradictory, or conflicted behavior when the parent leaves and returns. The current study mainly focused on analyzing comparisons between Secure vs Insecure (resistant, avoidant, and disorganized) categories. Interrater reliability for attachment coding was calculated based on 35 videos that were double-coded. Percent agreement was 94%.

Control Variables

Potential covariates, such as demographic variables (i.e. parent race, infant gender, income, and parent education) and intervention status (control vs intervention) were examined in an effort to minimize bias that could have influenced the relationship between the main study variables (depressive symptoms, attachment, and infant dysregulation). Parent race, intervention, and infant gender were coded as binary.

RESULTS

This section presents descriptive statistics for depressive symptoms, infant-parent attachment, and parent-reported infant dysregulation. In addition, correlations among the variables and with demographic variables are presented. Finally, tests of moderation and mediation are presented.

Preliminary Analyses

Table 1 presents means and standard deviations for predictor variables: mother depressive symptoms, father depressive symptoms, mother-reported infant dysregulation, and father-reported infant dysregulation. A paired samples t-test showed that the means for depressive symptoms between mothers and fathers are significantly different from each other, such that mothers reported more depressive symptoms than fathers. The means for infant dysregulation were not significantly different from each other.

Table 1

Descriptive Statistics for Maternal and Paternal Depressive Symptoms and Ratings of Infant Dysregulation

	Mother		*Father*		*t(df)*
	X	SD	X	SD	
Depressive Symptoms	38.92	10.75	36.21	9.75	$t(324) = 3.54, p \leq .001$
Parent Reported Infant Dysregulation	3.14	2.22	3.32	2.54	$t(203) = -1.35, p = .09$

Correlation tests were also conducted to examine if there were significant linear relationships between mother and father depressive symptoms and between mother and father reported infant dysregulation. As can be seen in Table 2, there is a significant relationship

between mother and father depressive symptoms. In particular, the more depressive symptoms one parent reports experiencing, the more the other parent also reports. Furthermore, there appears to be a significant relationship between mother depressive symptoms and mother-reported infant dysregulation, suggesting that as mother depression symptoms increase, mother-reported infant dysregulation increases as well. There is also a significant relationship between mother and father reported infant dysregulation. That is, when one parent reports higher levels of infant dysregulation, the other parent also reports greater levels of infant dysregulation. Fathers' reports of depressive symptoms and infant dysregulation, however, were not significantly related.

Table 2

Correlations Between Parent Depressive Symptoms, Parent-Infant Attachment, and Parent-Reported Infant Dysregulation

Measure	*1*	*2*	*3*	*4*	*5*	*6*
1. Mother Depressive Symptoms	--					
2. Father Depressive Symptoms	.153**	--				
3. Mother Attachment	-.065	.059	--			
4. Father Attachment	.096	-.130	.136	--		
5. Mother-Reported Infant Dysregulation	.153*	-.015	.081	.096	--	
6. Father-Reported Infant Dysregulation	.018	.117	-.033	.057	.330**	--

Notes: * p < .05, ** p < 0.01

Table 3 presents the frequencies and percentages of parent-infant attachment classifications (secure vs. insecure) examining both mother-infant and father-infant attachment.

Table 4 shows the association between infant attachment security across parents. A Chi-square test was conducted to determine whether infant attachment security was related; χ^2 (1) = 1.97, p = .16. Results showed that infant attachment is not related across parents. Note that Ns are smaller in the Chi-square test due to missing data.

Table 3

Observed Frequencies of Parent-Infant Secure and Insecure Attachment Groups

	Insecure	Secure
	N (%)	*N (%)*
Mother-Infant Attachment	54 (44)	69 (56)
Father-Infant Attachment	65 (45)	78 (55)

Table 4

*Mother-Infant Secure vs Insecure * Father-Infant Secure vs Insecure Crosstabulation*

		Father-Infant Secure vs Insecure		
		Insecure	Secure	Total
Mother-Infant Secure vs Insecure	Insecure	26	21	47
	Secure	25	35	60
Total		51	56	107

Table 5 presents the correlations between demographic variables and depressive symptoms, reported infant dysregulation, and attachment security/insecurity (coded as binary) for each parent. Significant correlations were found between household income and education with mother depressive symptoms, suggesting that the lower reported income and the lower level of education, the higher depressive symptoms mothers would experience. Significant correlations were also found between race (coded as binary; White vs. non-White), income, and education with mother-reported infant dysregulation. This suggests that non-White mothers with

lower household income and lower education were more likely to report higher infant dysregulation. When looking at fathers, a significant correlation was found between infant gender and depressive symptoms, suggesting that fathers were more likely to report depressive symptoms with male infants. Furthermore, a significant correlation was also found between household income and reported infant dysregulation, suggesting that fathers with lower household incomes were more likely to report higher levels of infant dysregulation.

Table 5

Correlations Between Demographic Variables and Parent Depressive Symptoms, Parent-Reported Dysregulation, & Parent-Infant Attachment

Measure	Race	Intervention	Infant Gender	Income	Education
Mother Depressive Symptoms	.007	.044	.031	-.128*	-.120*
Mother-Reported Infant Dysregulation	-.169**	-.013	.090	-.146*	-.165**
Mother-Infant Attachment	-.042	.034	.065	.056	.080
Father Depressive Symptoms	.011	.014	-.123*	-.102	-.047
Father-Reported Infant Dysregulation	.043	-.045	-.061	-.135*	-.051
Father-Infant Attachment	.195*	.086	.039	.004	.123

Notes: Race: 0 = Non-white, 1 = White; Intervention: 0 = Intervention, 1= Control; Infant Gender: 0 = Male, 1 = Female; * $p < .05$, ** $p < 0.01$

Moderation Analyses

To test the degree to which parent depressive symptoms and parent-reported infant dysregulation were moderated by parent-infant attachment, two moderation analyses were conducted, one using data from mothers and one from fathers. Multiple regression models were run that included centered terms for depressive symptoms, attachment, and a depressive

symptoms x attachment interaction as the independent variables, predicting infant dysregulation. In addition, covariates were included based on their significant correlations with parent-reported dysregulation, which for the model involving mother data was educational attainment, race, and family income, whereas for the model involving father data was family income. Neither model was significant: $F(6,109) = 1.58$, $p = .16$, Adj. $R^2 = .029$ for mothers and $F(4,120) = .666$, $p = .62$, Adj. $R^2 = -.011$ for fathers. See Figures 1 and 2.

Figure 1

Multiple Regression Model of Mother Depressive Symptoms, Mother-Infant Attachment, and Depressive Symptoms Interacting with Attachment Predicting Mother-Reported Infant Dysregulation

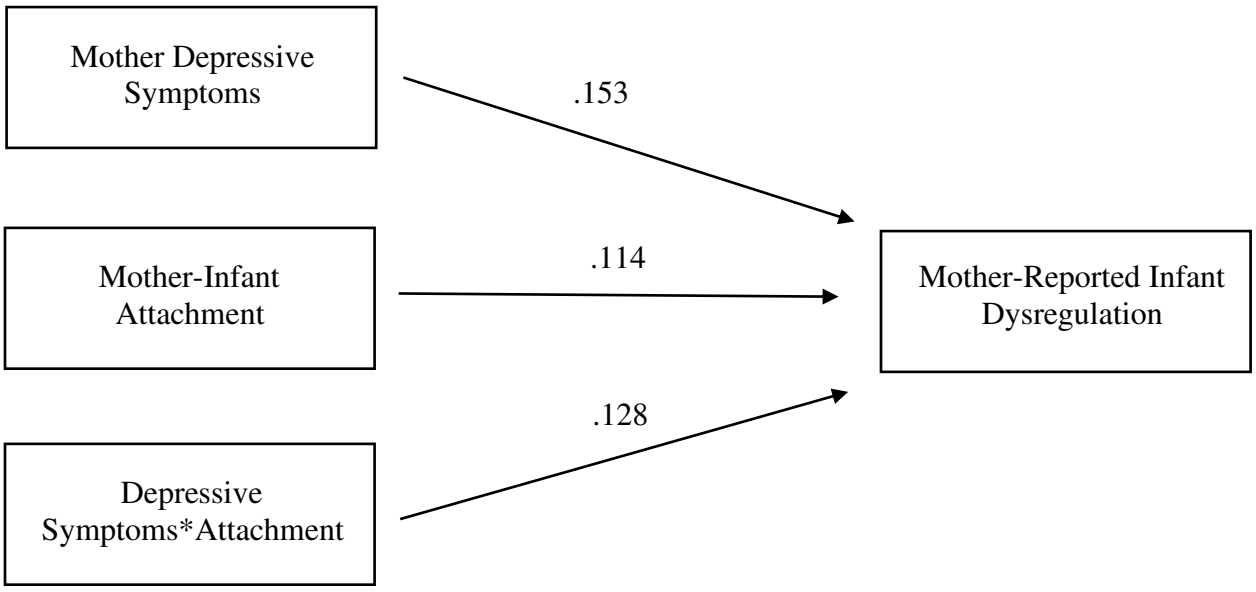
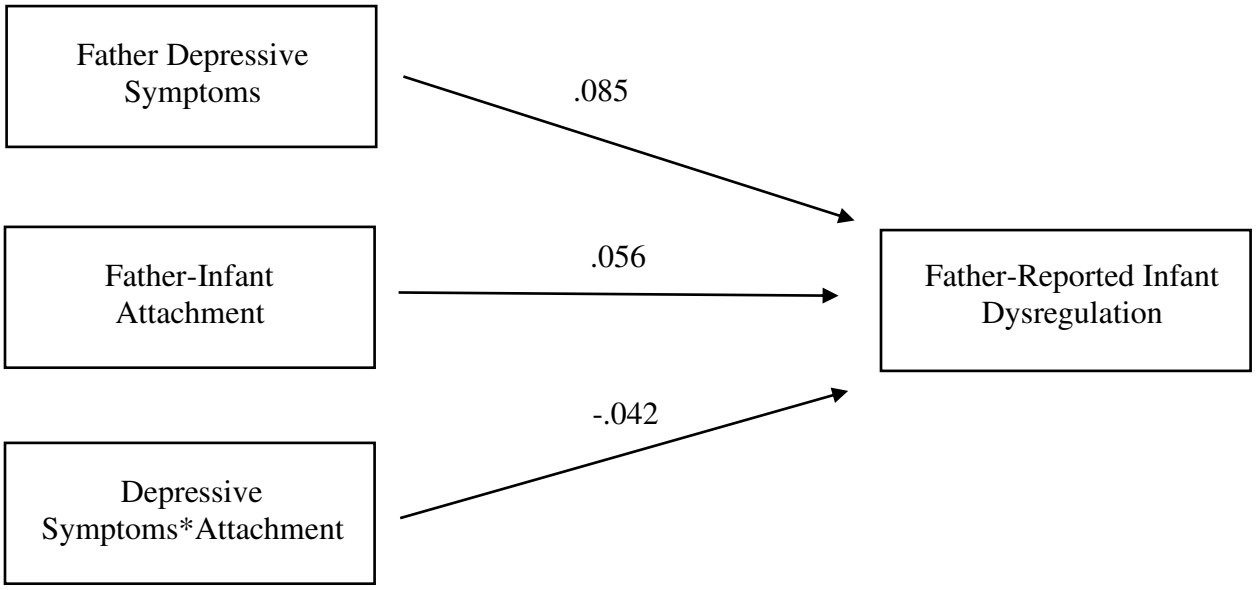


Figure 2

Multiple Regression Model of Father Depressive Symptoms, Father-Infant Attachment, and Depressive Symptoms Interacting with Attachment Predicting Father-Reported Infant Dysregulation



Mediation models were not tested because the correlations between infant-mother or infant-father attachment (the mediators in this case) and reported parent depressive symptoms or infant dysregulation were not significant, as can be seen in Table 2.

DISCUSSION

This study examined the degree to which parent-infant attachment during toddlerhood impacted the longitudinal relationship between parent depressive symptoms in infancy and parent-reported infant dysregulation in toddlerhood. Although there appeared to be a significant correlation between mothers' depressive symptoms and mother-reported infant dysregulation (see Table 2), results indicated that parent-infant attachment did not moderate the relationship between depressive symptoms and reported infant dysregulation. In addition, there was no evidence for infant-parent attachment serving as a mediator of the prediction between parental depressive symptoms and parent reported infant dysregulation. Associations involving father data were also nonsignificant.

Association Between Mother Depressive Symptoms and Reported Infant Dysregulation

When testing associations between variables, a significant correlation was found between mothers' depressive symptoms and their reports of infant dysregulation. Specifically, mothers who reported more depressive symptoms also reported higher levels of infant dysregulation. Consistent with previous research, infants of depressed mothers are more likely to be exposed to depressive facial expressions (i.e., sad affect) and behaviors consisting of irritability and hopelessness (Radke-Yarrow et al., 1985). Exposure to their mother's external depressive moods and behaviors poses risks to infants' abilities to emotionally self-regulate, and they are more likely to begin displaying problem behavior (Cummings & Davies, 1993; Gelfand & Teti, 1990). Furthermore, the association between depressive symptoms and parent-reported dysregulation may exist because mothers are more likely to have distorted perceptions of their infant's behavior when experiencing depressive symptoms. For example, a study conducted by Field et

al. (1993) found that symptomatic mothers were more likely to report more negative behavior of their infants than non-symptomatic mothers. Additionally, mothers with more depressive symptoms were also more likely to report more negative infant behavior than independent observers in the study. Other research contradicts this finding which indicates that there may not be sufficient empirical evidence that depressed mothers are more likely to have distorted negative perceptions toward their children compared to other observers (i.e., fathers, teachers) (Garstein et al., 2009; Richters, 1992; Richters & Pellegrini, 1989). Thus, more work needs to be done to disentangle the processes that might connect depression with children's problem behaviors.

Despite the positive correlation between mothers' depressive symptoms and their evaluations of infant dysregulation in this study, the same pattern was not detected for fathers. It is possible that differences between men and women in their expressions of depression explains the different results between fathers and mothers in this study. Previous research suggests that women are more likely to express depressive symptoms through crying, irritability, and high levels of fatigue, whereas men's expressions may be "masked" with substance use, anger, and difficulty in communicating feelings (Addis, 2008; Danielsson & Johansson, 2005). Thus, infants may be less likely to experience the potential negative effects of depressive symptoms in fathers. Another reason for the lack of association between fathers' depressive symptoms and infant dysregulation is that children during infancy and early toddlerhood may be less exposed to their fathers, as mothers may be more likely to take on childcare responsibilities and be more involved during that developmental period (Bailey, 1994; Craig, 2006). Less exposure from fathers could therefore imply that they may be less impacted by their depressive symptoms, even if certain expressions such as anger or sadness are present.

Nonsignificant Associations with Attachment

When testing for associations between attachment and depressive symptoms or infant dysregulation, there did not appear to be significant correlations with either for mother or father variables. It is possible that the measure of attachment was problematic, as there appeared to be approximately an equal amount of securely and insecurely attached infants to both parents. In community samples, the typical number of infants classified as secure is approximately 60 – 65% (Van Ijzendoorn et al., 1999). The current study may have found lower rates of security due to how the Strange Situation was conducted; since the procedure was typically conducted in the evenings to accommodate parents' work schedules, it is possible that the infants were overly tired and showed higher levels of distress and slower recovery, which are behaviors may influence coders to classify infants as insecure. For example, in a study comparing infants' reactions to maternal separation, those who were fatigued showed higher levels of distress than those who were alert (Ross & Karraker, 1999).

Furthermore, assessing dysregulation during this developmental stage is difficult, as the infant-toddler stage is generally a more dysregulated time period compared with other ages. One study, for example, found that rates of anger and fear show significant increases from 4-16 months in infancy (Braungart-Rieker et al. 2010). Thus, higher rates of dysregulation may be less connected to attachment and other factors during this time frame. It is possible that more accurate and significant connections with attachment may more likely be found if dysregulation was measured when children are older and show more effective ways to regulate; those who struggle with regulation at an older age may be reflecting a more challenging home environment. It should also be noted that the internal consistencies for the dysregulation scales were rather

modest, suggesting that parents were somewhat inconsistent in how they answered each item in the scale; thus, compromising its reliability.

Limitations and Future Directions

In sum, although there appeared to be a significant relationship between mother's depressive symptoms and their reports of infant dysregulation, the expected findings of parent-infant attachment showing moderating effects between the two did not emerge in this study. Future research should consider expanded time frames, as the current study only followed the participants for a year. A more extensive longitudinal study may provide more time to gain insight towards the effects of early parental depression and later patterns of dysregulation in children.

Furthermore, the current study has a somewhat narrow range of generalizability. For example, future studies should include data across ethnic groups which would allow for increased generalizability of the findings and a better understanding of how parent-infant attachment and depressive symptoms may present across different communities. Moreover, future studies should consider additional caregivers (i.e., grandparents, healthcare providers, daycare workers) and their impact on the dynamics of the parent-child relationship when observing depressive symptoms and child problem behavior. Additionally, although the parents in this study did express depressive symptomology, they did not meet criteria for clinical depression. Future studies that include a sample of parents who meet diagnosis for clinical depression may have a greater likelihood of finding significant linkages between attachment and child dysregulation, as previous research has shown there to be significant impact of parental depression on family functioning, such as increased marital discord, conflict, and mental health risks (Burke, 2003; Fendrich et al., 1990).

Finally, it should be noted that the present study focused on 6-month time point for the general depression subscale, the 16-month time point for father's report of infant dysregulation, and the 18-month time point for the mother's report of infant dysregulation. Due to parent-child attachment developing (Attachment in the Making phase; Ainsworth et al., 1978) at around 6-months, I decided that using the general depression scale at 6 months reflect a sensitive time period that could affect the parent-child attachment. The time points of focus for each parent's report of infant dysregulation were to correspond to when each parent participated in the Strange Situation procedure in order to obtain the parent's own assessment of their infant's dysregulated behavior at the same time period their attachment style was assessed. In a future study, testing more complex models using additional time points could reveal emerging linkages that were not detected in this study. Additionally, testing additional variables, such as parent sensitivity, could be useful in finding more accurate predictors of the relationship between parental depressive symptoms, infant dysregulation, and attachment.

Conclusion and Clinical Implications

Although some of the expected findings did not emerge in this study, a significant correlation between mother depressive symptoms at 6-months and mother-reported infant dysregulation at 18-months was found. However, the reason for the relationship between these two variables remains unclear; it is possible that as a mother's depressive symptoms increase, the child's dysregulation increases as well. Alternatively, perhaps as a mother's depression increases, they are more likely to perceive their child as more dysregulated due to the parent having a lower distress tolerance. Regardless of how these factors become connected, this finding suggests that mothers may need more support in accessing mental health resources to reduce depressive symptoms and increase emotion regulation skills. This could support mothers

in expanding their window of tolerance, allowing them to foster sensitivity and connection towards their child when expressing dysregulated behaviors.

REFERENCES

Addis, M. E. (2008). Gender and depression in men. *Clinical Psychology: Science and Practice*, *15*(3), 153–168. https://doi.org/10.1111/j.1468-2850.2008.00125.x

Ainsworth, M. D. S., Blehar, M., Waters, E., & Wall, S. (1978). Patterns of attachment. Hillsdale, NJ: Erlbaum.

Atkinson, L., Goldberg, S., Raval, V., Pederson, D., Benoit, D., Moran, G., Poulton, L., Myhal, N., Zwiers, M., Gleason, K., & Leung, E. (2005). On the relation between maternal state of mind and sensitivity in the prediction of infant attachment security. Developmental Psychology, 41(1), 42–53. https://doi.org/10.1037/0012-1649.41.1.42

Bailey, W. T. (1994). A longitudinal study of fathers' involvement with young children: Infancy to age 5 Years. *The Journal of Genetic Psychology*, *155*(3), 331–339. https://doi.org/10.1080/00221325.1994.9914783

Belsky, J., Rovine, M., & Taylor, D. G. (1984). The Pennsylvania Infant and Family Development Project: III. The origins of individual differences in infant–mother attachment—Maternal and infant contributions. *Child Development, 55,* 718–728.

Bergman, K., Sarkar, P., Glover, V., & O'Connor, T. G. (2008). Quality of child-parent attachment moderates the impact of antenatal stress on child fearfulness. *Journal of Child Psychology and Psychiatry, 49*(10), 1089–1098. https://doi.org/10.1111/j.1469-7610.2008.01987.x

Braungart-Rieker, J. M., Hill-Soderlund, A. L., & Karrass, J. (2010). Fear and anger reactivity trajectories from 4 to 16 months: The roles of temperament, regulation, and maternal

sensitivity. *Developmental Psychology*, *46*(4), 791–804. https://doi.org/10.1037/a0019673

Bretherton, lnge. (1992). The origins of attachment theory: John Bowlby and Mary Ainsworth. *Developmental Psychology*, *28*(5), 759–775. https://doi.org/0012-1649/92

Briggs-Gowan, M.J., & Carter, A.S. (2006). BITSEA Brief Infant-Toddler Social and Emotional Assessment Examiner's Manual. San Antonio, TX: Harcourt Assessment.

Burke, L. (2003). The impact of maternal depression on familial relationships. *International Review of Psychiatry*, *15*(3), 243–255. https://doi.org/10.1080/0954026031000136866

Craig, L. (2006). Does Father Care Mean Fathers Share? A Comparison of How Mothers and Fathers in Intact Families Spend Time with Children. *Gender & Society*, *20*(2), 259–281. https://doi.org/10.1177/0891243205285212

Cummings, E. M., & Davies, P. T. (1993). Maternal depression and child development. Journal of Child Psychology and Psychiatry, 35(1), 73–122. https://doi.org/10.1111/j.1469-7610.1994.tb01133.x

Danielsson, U., & Johansson, E. E. (2005). Beyond weeping and crying: A gender analysis of expressions of depression. *Scandinavian Journal of Primary Health Care*, *23*(3), 171–177. https://doi.org/10.1080/02813430510031315

Davé, S., Sherr, L., Senior, R., & Nazareth, I. (2009). Major paternal depression and child consultation for developmental and behavioural problems. *British Journal of General Practice, 59*(560), 180–185. https://doi.org/10.3399/bjgp09x407063

Du Rocher Schudlich, & Cummings, E. M. (2003). Parental dysphoria and children's internalizing symptoms: Marital conflict styles as mediators of risk. *Child Development, 74*, 1663-1681.

Edhborg, M., Lundh, W., Seimyr, L., & Widstrom, A. M. (2003). The parent-child relationship in the context of maternal depressive mood. *Archives of Women's Mental Health*, *6*(3), 211–216. https://doi.org/10.1007/s00737-003-0020-x

Fendrich, M., Warner, V., & Weissman, M. M. (1990). Family risk factors, parental depression, and psychopathology in offspring. *Developmental Psychology*, *26*(1), 40–50. https://doi.org/10.1037//0012-1649.26.1.40

Field, T., Morrow, C., & Adlestein, D. (1993). Depressed mothers' perceptions of infant behavior. *Infant Behavior and Development*, *16*(1), 99–108. https://doi.org/10.1016/0163-6383(93)80031-3

Field, T. (1998). Maternal depression effects on infants and early interventions. *Preventive Medicine, 27*(2), 200–203. https://doi.org/10.1006/pmed.1998.0293

Fletcher, R. J., Feeman, E., Garfield, C., & Vimpani, G. (2011). The effects of early paternal depression on children's development. Medical Journal of Australia, 195(11-12), 685–689. https://doi.org/10.5694/mja11.10192

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*(3), 233-239.

Gartstein, M. A., Bridgett, D. J., Dishion, T. J., & Kaufman, N. K. (2009). Depressed mood and maternal report of Child behavior problems: Another look at the Depression–Distortion Hypothesis. *Journal of Applied Developmental Psychology*, *30*(2), 149–160. https://doi.org/10.1016/j.appdev.2008.12.001

Gelfand, D., & Teti, D. M. (1990). The effects of maternal depression on children. Clinical Psychology Review, 10(3), 329–353. https://doi.org/10.1016/0272-7358(90)90065-i

Karabekiroglu, K., Briggs-Gowan, M. J., Carter, A. S., Rodopman-Arman, A., & Akbas, S. (2010). The clinical validity and reliability of the brief infant–toddler social and emotional assessment (BITSEA). *Infant Behavior and Development, 33*(4), 503–509. https://doi.org/10.1016/j.infbeh.2010.07.001

Kokkinos, C. M., Algiovanoglou, I., & Voulgaridou, I. (2019). Emotion regulation and relational aggression in adolescents: Parental attachment as moderator. *Journal of Child and Family Studies, 28*(11), 3146–3160. https://doi.org/10.1007/s10826-019-01491-9

Korner, A. F. (1971). Individual differences at birth: Implications for early experience and later development. *American Journal of Orthopsychiatry, 41*(4), 608–619. https://doi.org/10.1111/j.1939-0025.1971.tb03220.x

Radke-Yarrow, M., Cummings, E. M., Kuczynski, L., & Chapman, M. (1985). Patterns of attachment in two- and three-year-olds in normal families and families with parental depression. *Child Development*, *56*(4), 884. https://doi.org/10.2307/1130100

Ramchandani, P., Stein, A., Evans, J., & O'Connor, T. G. (2005). Paternal depression in the postnatal period and Child development: A prospective population study. *The Lancet, 365*(9478), 2201–2205. https://doi.org/10.1016/s0140-6736(05)66778-5

Ranson, K. E., & Urichuk, L. J. (2008). The effect of parent–child attachment relationships on Child Biopsychosocial Outcomes: A Review. *Early Child Development and Care*, *178*(2), 129–152. https://doi.org/10.1080/03004430600685282

Richters, J. E. (1992). Depressed mothers as informants about their children: A critical review of the evidence for distortion. *Psychological Bulletin*, *112*(3), 485–499. https://doi.org/10.1037/0033-2909.112.3.485

Richters, J., & Pellegrini, D. (1989). Depressed mothers' judgments about their children: An examination of the depression-distortion hypothesis. *Child Development*, *60*(5), 1068. https://doi.org/10.2307/1130780

Ross, C. N., & Karraker, K. H. (1999). Effects of fatigue on infant emotional reactivity and regulation. *Infant Mental Health Journal*, *20*(4), 410–428. https://doi.org/10.1002/(sici)1097-0355(199924)20:4<410::aid-imhj4>3.0.co;2-4

Schiavo, R. de, & Perosa, G. B. (2020). Child development, maternal depression and associated factors: A longitudinal study. Paidéia (Ribeirão Preto), 30. https://doi.org/10.1590/1982-4327e3012

Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington. (2016). The Self-Sufficiency Standard for Indiana 2016. Retrieved from https://selfsufficiencystandard.org/wp-content/uploads/2021/11/IN2016.pdf

Smith, J. D., Woodhouse, S. S., Clark, C. A. C., & Skowron, E. A. (2016). Attachment status and mother–preschooler parasympathetic response to the strange situation procedure. *Biological Psychology*, *114*, 39–48. https://doi.org/10.1016/j.biopsycho.2015.12.008

Sweeney, S., & MacBeth, A. (2016). The effects of paternal depression on child and adolescent outcomes: A systematic review. Journal of Affective Disorders, 205, 44–59. https://doi.org/10.1016/j.jad.2016.05.073

Tronick, E. Z., Als, H., Adamson, L., Wise, S., & Brazelton, T. B. (1978). The infant's response to entrapment between contradictory messages in face-to-face interaction. Journal of the American Academy of Child & Adolescent Psychiatry, 17, 1–13.

Urizar, G. G., & Muñoz, R. F. (2021). Role of maternal depression on Child development: A prospective analysis from pregnancy to early childhood. Child Psychiatry & Human Development, 53(3), 502–514. https://doi.org/10.1007/s10578-021-01138-1

Van Ijzendoorn, M. H., Schuengel, C., & Bakermans–Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*, *11*(2), 225–250. https://doi.org/10.1017/s0954579499002035

Wan, M. W., & Green, J. (2009). The impact of maternal psychopathology on child–mother attachment. *Archives of Women's Mental Health*, *12*(3), 123–134. https://doi.org/10.1007/s00737-009-0066-5

Watson, D., O' Hara, M. W., Simms, L. J., Kotov, R., Chmielewski, M., McDade-Montez, E. A., … & Stuart, S. (2007). Development and validation of the inventory of depression and anxiety symptoms. *Psychological Assessment, 19*, 253-268.

Zeegers, M. A. J., Colonnesi, C., Stams, G.-J. J. M., & Meins, E. (2017). Mind matters: A meta-analysis on parental mentalization and sensitivity as predictors of infant–parent attachment. *Psychological Bulletin, 143*(12), 1245–1272. https://doi.org/10.1037/bul0000114