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**A STUDY OF STABILITY: MATERNAL REFLECTIVE FUNCTIONING FROM  
PREGNANCY TO SEVEN MONTHS POSTPARTUM**

by

**KRISTYN WONG**

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

**DOCTOR OF PHILOSOPHY**

2016

MAJOR: PSYCHOLOGY (Cognitive,  
Developmental, Social)

Approved By:

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Co-Advisor Date

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Co-Advisor Date

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## DEDICATION

*“The propensity to make strong emotional bonds to particular individuals is a basic component of human nature.”*

*-John Bowlby*

I would like to dedicate this work to many of the individuals that I have made strong emotional bonds with throughout my life and journey through graduate school. To my parents, who have always provided me unconditional love and support. Please remember that children who are healthy, loving, and successful are a result of sensitive and supportive parenting. I am truly blessed to have had such amazing parents to guide me. To my sister, who has shown me the importance of sibling relationships, and has continued to grow with me throughout this process. To Jack, who has been my biggest fan, you have given me the motivation to finish what I started! To the faculty and my fellow peers at the Merrill Palmer Institute, your passion and intelligence have and will continue to inspire me throughout my career. To my committee members, Dr. Marjorie Beeghly, Dr. Ty Partridge, Dr. Lara Jones, and Dr. Carolyn Dayton, thank you so much for all of your expertise and effort. Finally, to Dr. Ann Stacks, who has been the most incredible mentor, your dedication to improving the lives of infants and families everywhere is contagious. Thank you for giving me this amazing opportunity, for helping me to find my place, for believing in me, for teaching me, and for showing me that meaningful research can make all the difference.

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## CHAPTER 1 INTRODUCTION

Decades of literature support the link between the quality of infants' attachment relationships and social-emotional well-being across the lifespan (Ainsworth, 1979; Bowlby, 1969; Thompson, 2008; van IJzendoorn, 1995). This attachment relationship forms the basis for one's representation of future relationships and capacities for reflective functioning. Reflective functioning (Sharp & Fonagy, 2008) is an individual's capacity for understanding and inquiring about others internal experiences, such as thoughts, emotions and beliefs, that underlie his/her ability to interpret and respond to the needs of others. Two types of reflective functioning have been noted in the literature, adult reflective functioning (Fonagy, Steele, Steele, Moran, & Higgit, 1991), which is an adult's ability to be reflective about early caregiving relationships, and parental reflective functioning (Slade, 2005) which focuses on a parent's capacity to reflect on the current/emerging relationship with his/her own child. This ability allows a parent to respond sensitively and contingently to his/her child's needs, thereby supporting attachment security and social-emotional well-being (Slade, 2005). As a result, interventions that target reflective functioning are being developed and tested, including interventions that begin in pregnancy. However, it is not yet clear whether parental reflective functioning changes over time, especially from pregnancy to postpartum, making it difficult to interpret changes in reflective functioning that result from intervention.

This dissertation will begin with an introduction to the concept of reflective functioning followed by a review of the measures and scoring procedures used to assess both adult and parental reflective functioning. The remaining paragraphs will then review the literature on the predictors of reflective functioning, interventions that target reflective functioning, and the stability of reflective functioning.



## **Reflective Functioning**

Rooted at the intersection of attachment and psychoanalytic theory, reflective functioning is an established clinical construct connected to a growing body of research. Reflective functioning is the quantifiable index of the ability to mentalize with regard to attachment relationships (Fonagy, 2008). Mentalization, a concept adapted from the Theory of Mind literature (Premack & Woodruff, 1978), refers to an individual's capacity to attribute thoughts, feelings, ideas and intentions, called mental states, to oneself and others (Sharp & Fonagy, 2008). The ability to mentalize drives one's curiosity for understanding the self and other, which allows one to anticipate and respond to behavior. Developmental in nature, this cognitive capacity underlies affect regulation, attentional control, and self-organization all of which aid in the ability to make meaning of behavior.

Established within the context of early attachment relationships, reflective functioning allows an individual to understand that behavior is driven by mental states (Fonagy & Target, 1997). In the first year of life, parents regulate their infant's affective experience by interpreting, organizing, and mirroring back, or re-presenting, the infant's feelings back to them. Accurate and modulated mirroring of the infant's experience provides the infant with a symbolic understanding of the self and contributes to his/her internal working model of relationships. Unmodulated representations that are too close to reality may become a source of fear that can overwhelm the infant. Inaccurate representations that are clouded with the parent's own unresolved or preoccupied histories can have detrimental effects on the infant's attachment, development of the self, mental health and the later ability to mentalize (Fonagy & Target, 1997; Fonagy, 2008; Katznelson, 2014).

**Assessing Two Types of Reflective Functioning.** Two types of reflective functioning have been cited within the literature, adult reflective functioning and parental reflective

functioning. Similar in nature, these constructs are operationalized with regard to two different types of attachment relationships. Adult reflective functioning (Fonagy et al., 1991) is considered an individual's ability to mentalize in relation to his/her childhood experiences with attachment figures. Parental reflective functioning, introduced by Slade and colleagues (2005), is a measure of reflective functioning regarding a parent's current relationship with her child. The capacity for reflective functioning varies across individuals; typically higher levels of reflective functioning are associated with more optimal outcomes

An individual's capacity for reflection is assessed using semi-structured attachment-based interviews that are coded for reflective functioning, following the work of Fonagy and colleagues (1991). Three attachment-based interviews used are the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985), the Pregnancy Interview (PI-R, Slade, Grunebaum, Haganir, & Reeves, 1987), and the Parent Development Interview (PDI-R; Slade, Aber, Bresgi, Berger, & Kaplan, 2003). In addition to these interviews, Rosenblum et al. (2008) have also developed a reflectivity scale for use with the Working Model of the Child Interview (Zeanah & Benoit, 1995). Traditionally used to assess adult attachment classifications, the AAI was designed to elicit mental representations of attachment experiences during childhood using a series of questions that evoke responses recalled from memory. Individuals are asked questions about early relationships with parents and parenting behavior. They are also asked about early feelings of separation/loss, and maltreatment. The AAI can also be coded for adult reflective functioning using the Reflective Functioning Scale that was developed by Fonagy and colleagues (1998). This scale was adapted by Slade and colleagues (2005) to code parental reflective functioning on the PI and the PDI. These interviews model the nature and structure of the AAI, however they attempt to evoke responses related to the developing parent-child relationship. The PI attempts to elicit an expectant parent's

reflective functioning regarding her unborn child and how she envisions herself as a parent in the future, the PI is typically used during the third trimester of pregnancy. The PDI is different in that it can be conducted at any time during the child's life, typically it is conducted during infancy when the child is still pre-verbal. Slade (2005) suggests that when children are preverbal, parents often experience feelings of stress and have difficulty meeting their child's needs, making it a prime time to assess parental reflective functioning. Similar to the AAI, the PDI asks parents to answer two types of questions, permit and demand questions. Permit questions are used to establish rapport and learn about the environment in which the relationship develops (e.g. What do you like most about your child? Can you choose three words to describe the relationship between you and your child?). Demand questions require explicit thought regarding a parent's own and her child's internal experience, parents are also asked to give specific examples related to internal experiences and behaviors (e.g. What gives you the most joy as a parent? Can you tell me about a time when your child was upset?)

**Coding Reflective Functioning.** Scoring for all three interviews follows Fonagy and colleagues' (1998) Reflective Functioning Scale that was originally designed for use with the AAI. The Reflective Functioning Scale and its adaptation require coders to score individual demand questions on a scale from -1 to 9, following instructions in the coding manual (described below) and then to assign an overall typicality score. Coders are instructed to identify indices of mental state language and to assess whether individuals use any of the four types of mentalization; 1) the ability understand that others' minds are opaque and one cannot always know what others are experiencing or that one can purposely hide his/her own experiences, 2) the explicit capacity to understand that mental states underlie behavior, 3) being able to recognize that there is a developmental component to experiencing mental states, and 4) acknowledging mental states in

regard to the interviewer. Negative reflective functioning (-1 and 0) is exhibited by a narrative that demonstrates a rejection of reflective functioning. Interviews such as these are relatively rare in non-clinical samples and contain incongruent and/or inappropriate or bizarre attributions of reflective functioning. Low reflective functioning (1 to 3) is typically denoted by a limited ability to acknowledge and discuss mental states (thoughts, feelings, beliefs, intentions, and desires). Those with average reflective capacity (5-6) demonstrate a consistent ability to link mental states and behaviors, however these narratives are not as intricate and clearly described as in the high category and generally use only one type of mentalization; this is the most common score in low-risk samples. Individuals with high reflective capacity (7+) have narratives which utilize multiple types of mentalization, these narratives are both complex and coherent. Previous studies have linked high levels of adult reflective functioning with the absence of psychological disorders, and healthy interpersonal functioning. For this reason, Peter Fonagy and colleagues were interested in understanding how adult reflective functioning contributed to parenting, child development, and mental health.

### **Predictors of Reflective Functioning**

**Childhood Attachment Experiences & Reflective Functioning.** The London Parent Child Project (Fonagy et al., 1991) was the first study to assess parents' early attachment relationships, the development reflective functioning, their combined influence on parent-child relationships, and attachment in the next generation. Participants were first time expectant parents who were interviewed with the AAI during pregnancy. The AAI was used to identify adult attachment classifications and also coded for adult reflective functioning. Results revealed that adult attachment security was significantly correlated with adult reflective functioning for both participant mothers and fathers. Large significant correlations were found between coherence of

narratives and adult reflective functioning scores. This finding was replicated by Bouchard and colleagues (2008) who also found a relationship between adult reflective functioning scores on the AAI and attachment security in a sample of seventy-three ex-psychiatric patients and non-clinical community volunteers.

In an effort to expand the research on adult attachment experiences during childhood and parental reflective functioning, Slade, Grienenberger, Bernbach, Levy, & Locker (2005) investigated parents' early attachment experiences and their capacity for parental reflective functioning. Forty women completed the AAI during their third trimester of pregnancy and the PDI when infants were 10 months old. Consistent with the findings above for adult reflective functioning, results revealed that parents classified as autonomous (secure) on the AAI had significantly higher parental reflective functioning scores than those classified as dismissing, preoccupied, or unresolved. Findings support the notion that parents' representations of early childhood attachment figures significantly influence the capacity to be reflective about their own children.

More recently, research has begun to explore the association between other representational measures of attachment and parental reflective functioning on the PDI. Huth-Bocks et al. (2014) examined association between maternal secure base scripts, assessed using the Attachment Script Assessment (ASA; Waters & Rodrigues-Doolabh, 2001, 2004) and parental reflective functioning using the PDI in a sample of 115 trauma-exposed mothers. The ASA assesses an individual's representation of the availability of a secure base figure across four different story stems. Scores on the ASA are associated with both adult attachment classifications on the AAI (Dykas, Woodhouse, Cassidy, & Waters, 2006; Waters & Rodrigues-Doolabh, 2001) and child attachment assessed with the Strange Situation (Tini, Corcoran, Rodrigues-Doolabh, &

Waters, 2003). In their study, Huth-Bocks and colleagues (2014) found that overall secure base scripts were significantly associated with parental reflective functioning, and mothers with secure scripts about the mother-child relationship demonstrated higher reflective functioning scores on the PDI than those with marginal or no/atypical scripts.

In conclusion, a growing body of research supports the link between adults' attachment experiences and their reflective functioning about both childhood attachment figures and their relationship with their child. This research also suggests that insecure adult attachment, low reflective functioning and psychiatric diagnoses are related. Some studies suggest that the relationship between adult attachment and psychopathology is mediated by the inability to mentalize, and associated with difficulties in self-regulation and perspective taking (Fonagy, 2008; Sharp & Fonagy, 2008).

**Psychopathology & Reflective Functioning.** Within the adult attachment literature, insecure adult attachment on the AAI has been linked to clinical levels of psychopathology (Bouchard et al., 2008; Bakermans-Kranenburg & van IJzendoorn, 2009). In a meta-analysis which included over 10,000 AAI's from both clinical and non-clinical studies; over 70% of clinical participants were classified as insecure. Patients with depression exhibited more dismissing and preoccupied attachments, whereas individuals affected by internalizing disorders (eg. Suicidal thoughts or Borderline Personality Disorder) were more likely to be classified as unresolved, and individuals affected by externalizing disorders were more likely to be classified as dismissing. On a similar note, Fonagy and colleagues (1996) also found relationships between adult attachment, psychiatric symptoms and psychiatric diagnosis. They examined adult reflective functioning and patterns of attachment in a sample of 82 in patient participants and non-clinical controls. Non-clinical controls were matched on gender, IQ, and demographic factors. Results suggest significant

differences in attachment classifications by diagnosis. For example, of the clinical participants who were diagnosed with Borderline Personality Disorder (BPD), almost 90% were classified as unresolved. Across groups, there were significantly more clinical patients (76%) who were rated as unresolved compared to the control group (7%). Findings from these studies support the link between psychopathology and increased likelihood for insecure or unresolved adult attachment classification.

Some researchers have proposed that reflective functioning may be the mechanism by which adult attachment influences psychopathology. Fonagy & Luyten (2009) argue that disruptions in early attachment relationships are associated affective dysregulation and the inability to perceive the intentions and behaviors of others, which are key features of BPD. Following this hypothesis, a review of the research on reflective functioning and psychiatric diagnosis by Katznelson (2014) suggested that reflective functioning scores among patients with major depressive disorder, panic disorder, eating disorders, and psychosis are typically lower than average.

As discussed in Katznelson's (2014) review, the majority of research on reflective functioning in clinical samples has focused on individuals with Borderline Personality Disorder because key features of the disorder, including emotional dysregulation, high levels of impulsivity, the inability to perceive the intention of others, and disrupted interpersonal functioning, are also associated with the capacity for reflective functioning (Lecours & Bouchard, 2011; Fonagy et al., 1996; 2006; 2008). Across clinical studies, patients with BPD demonstrate the lowest levels of reflective functioning compared to patients with other psychiatric disorders; this suggests that inability to mentalize may contribute to symptoms of BPD (Fisher-Kern et al., 2010; Fonagy et al., 1996; Levy et al., 2006).

**Risk, Parenting and Parental Reflective Functioning.** The majority of the research on reflective functioning and psychopathology has been focused on adult reflective functioning. Theoretically, both adult and parental reflective functioning should be highly correlated with one another, and as such parental reflective functioning should also be correlated with parental psychopathology. Findings from the few studies on parental reflective functioning and parent psychopathology parallel those in the adult reflective functioning literature. Studies with clinical and high risk samples such as those in substance abuse treatment or exposed to intimate partner violence find lower mean parental reflective functioning scores (Schechter et al., 2008; Suchman et al., 2008; Pajulo et al., 2012). Schechter et al., 2008 found mean reflective functioning scores of 3.3 in a sample of trauma exposed women. Whereas, mean reflective functioning scores in samples of substance using mothers have ranged from 3.0 to 3.38 (Suchman et al., 2008; Pajulo et al., 2012). Previous literature does support the idea that psychopathology is a risk factor that is associated with parental reflective functioning. A few studies have begun to look at associations among other types of risk and parental reflective functioning. Demographic risk factors such as low levels of education, single parenting, and low income have been associated with parental reflective functioning (Sadler et al., 2013; Stacks et al., 2014). To date, only one study has assessed associations among sociodemographic risk factors in pregnancy and prenatal reflective functioning. Smaling and colleagues (2015) investigated the relationship between prenatal reflective functioning and both psychosocial and demographic risk factors. Participants were split into high and low risk groups based on a cumulative risk status. Cumulative risk status was created using a composite where participants received a point for every risk factor they endorsed. Risk factors included low levels of education, current substance use, unemployment, single parenthood, low income, young maternal age, a psychiatric diagnosis, and lack of social support network. In



this study, maternal education, social support and substance abuse were all significant predictors of prenatal reflective functioning. High-risk mothers had significantly lower prenatal reflective functioning scores than mothers with lower levels of risk.

### **Risk and Parenting**

While research on parental risk and reflective functioning is limited, there is a robust literature that links both demographic and psychosocial risk to parenting. Maternal psychopathology, depression in particular is associated with less optimal parenting (Cohn, Campbell, Matias, & Hopkins, 1990; Coyne et al, 2007; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). The literature suggests that cumulative risk is also associated with parenting, such that as demographic and psychosocial risk factors accumulate, parenting sensitivity decreases and that parenting mediates the relationship between cumulative risk and behavior problems (Trentacosta, Hyde, Shaw, Dishion, Gardner, & Wilson, 2008). Research suggests that interventions that improve parenting in high-risk families also support responsive parenting reduce the risk of child conduct problems (Dishon, Shaw, Connell, Gardner, Weaver, & Wilson, 2008; Shaw, Dishon, Supplee, Gardner & Arnds, 2006).

### **Parenting and Child Social-Emotional Outcomes**

Parental sensitivity is a robust predictor of child social-emotional well-being, such as child attachment. The link between attachment security and parenting sensitivity has been replicated many times. Differences in observed maternal caregiving behavior and infant attachment classification have been found, such that secure infants experience moderate levels of stimulating and responsive interactions with mothers, whereas insecure infants were more likely to receive either too much stimulation, or too little in interactions with mothers (Belsky, Rovine, & Taylor, 1984). McElwain & Booth La-Force (2006) conducted a study investigating the relationship

between maternal sensitivity (both to distress and non-distress) and infant attachment security using data from the NICHD Study of Early Care. Findings suggest that being sensitive to infant distress at 6 months increased the likelihood of having a child who was classified as secure. Although many acknowledge the importance of maternal sensitivity in the promotion of infant attachment security, De Wolff & van IJzendoorn's (1997) meta-analysis suggest that mutuality and synchrony also appear to be important factors associated with attachment security. The authors conclude that when assessing parenting sensitivity, it is important to do so from a context specific perspective that allows the consideration of more complex interactions between parenting and other environmental factors such as stress and poverty. In a re-examination of the De Wolff & van IJzendoorn's(1997) study, Neviar & Becker (2008) conducted a meta-analysis that broadened the definition of parenting sensitivity to include responsiveness and synchronous behavior, results suggested a strong association between parenting sensitivity and infant attachment. This relationship was weaker in the context of high demographic risk but still remained significant. Other studies confirm that family contextual risk factors increase the likelihood that children will develop a disorganized attachment (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), perhaps due in part to the negative effects that these psychosocial risks have on parenting (Lyons-Ruth, Easterbrooks, & Cibelli, 1997).

Previous research has linked adult attachment, parenting sensitivity and infant attachment security. As a result, researchers have become interested in the malleable factors that support parenting sensitivity, which include the ability to recognize, correctly interpret, and respond contingently to children's emotional and physical needs. Additionally, researchers have become interested in a parent's ability to understanding her own and her child's internal experiences.

Concepts such as mind-mindedness and insightfulness play an important role in a mother's ability to engage in sensitive parenting (Arnot & Meins, 2007; Koren-Karie, Oppenheim, Dolev, Shencor, & Etzion-Carasso, 2002). Both mind-mindedness and insightfulness are thought of as conceptual cousins to parental reflective functioning. However, parental reflective functioning differs from these concepts in that it extends beyond the recognition of a child's internal experience and includes the ability to be curious about others' experiences and intention, to link internal experiences to behavior and to understand how internal experiences change as a function of development and time. There is growing evidence that parental reflective functioning supports sensitive caregiving, which in turn, supports a secure attachment. As a result an increasing amount of work has examined parental reflective functioning across a number of different populations.

### **Parental Reflective Functioning, Parenting Sensitivity and Infant Attachment**

A small number of studies found evidence supporting the link between parental reflective functioning and infant attachment security. Slade, Grienenberger, Bernbach, Levy, & Locker (2005) conducted the first study to examine adult attachment and parental reflective functioning in a sample of 40 pregnant women who were followed across the first year of their infant's life. The authors found that parental reflective functioning was associated with both adult attachment measured with the AAI in pregnancy and secure infant attachment at 14 months (measured with the Strange Situation). Furthermore, the relationship between adult attachment, and infant attachment classification was mediated by parental reflective functioning. Additional findings from this sample suggest that reflective functioning was negatively associated with disrupted affective communication, which was in turn associated with resistant and disorganized infant attachment (Grienenberger, Kelly, & Slade, 2005). Stacks and colleagues (2014) replicated the meditation in a larger sample of mothers with and without a history of childhood maltreatment.

Results indicated that reflective functioning was positively correlated with sensitive parenting and negatively correlated with harsh parenting. The authors also found significant differences in parental reflective functioning scores among attachment classification; consistent with previous findings, children classified as securely attached had mothers with higher reflective functioning scores than those classified as insecure. Furthermore, the relationship between reflective functioning and attachment security was mediated by parenting. Both studies by Slade & colleagues (2005) and Stacks & colleagues (2014) suggest that reflective functioning scores of 5 and above are associated with a secure attachment.

### **Parental Reflective Functioning and Child Behavior**

Previous research confirms that infant attachment security is fostered by parental reflective functioning via its effect on parenting, and that parenting and infant attachment are associated with children's behavior. There is some evidence that parental reflective functioning also supports prosocial behavior. Wong, Stacks, Muzik and Rosenblum (in press) found that the relationship between infant negative affect and toddler behavior problems was moderated by parental reflective functioning, such that negative affect was associated with behavior problems at low and moderate levels of parental reflective functioning, but not at high levels of reflective functioning. Similarly Ordway, Sadler, Dixon, Close, Mayes, & Slade (2014) found that mothers who participated in an intervention that targeted parental reflective functioning (pregnancy to 2 years) reported significantly less externalizing behavior problems when the child was 3-5 years old. Literature on parental reflective functioning, parenting, attachment, and child behavior has resulted in the creation of interventions that target reflective functioning/mentalization as a means to support parenting, attachment security, and child prosocial behavior.

### **Interventions Targeting Parental Reflective Functioning**

In recent years, the development and evaluation of mentalization-based interventions has increased. The examination of these interventions has been acknowledged as an important step in understanding their effect on parental reflective functioning, responsive parenting and infant attachment security in substance abusing, depressed, and demographically at-risk parents. The Minding the Baby project (MTB; Slade, 2002) is a home-based intervention that serves demographically at-risk parents, beginning in pregnancy through an integrated model, which includes a team of pediatric nurse practitioners and social workers. Families are seen weekly, beginning in the second trimester of pregnancy through the child's second birthday. Nurse home visitors focus on providing physical health care while the social worker focuses on providing necessary mental health care for the mother-infant dyad. Both sets of home visitors aim to support and model a reflective stance and give a voice to both mother and infant across the infant's first two years. Results of the MTB project show that intervention mothers displayed less disrupted communication with their four-month-old infants, and higher percentages of securely attached children, than the control mothers did (Sadler et al., 2013). Follow up studies found significant increases parental reflective functioning from pregnancy to two years for both intervention and control mothers, suggesting that an increase in reflective functioning may be a part of normal development. Interestingly, a small group of intervention mothers who had reflective functioning scores below 3 during pregnancy showed significant increases when their child was 24 months.

In another intervention study, Schechter et al. (2006) explored the effectiveness of a clinician assisted video-feedback intervention in a sample of mothers with PTSD. The video-feedback intervention (CAVES) focused on supporting mothers' parental reflective functioning during feedback sessions of video-taped separation episodes. The intervention, which included 3 study visits, integrated principles of infant-parent psychotherapy with an emphasis on modeling

reflective functioning for parents. In the first visit, mothers were asked to complete a number of measures assessing basic demographic information, treatment history, life circumstances, and posttraumatic stress symptoms, they also participated in the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995) coded with the Reflective Functioning Scale (Fonagy et al., 1998) to assess parental reflective functioning. At the second visit, mother-infant dyads participated in a number of videotaped interactions. For the final visit, mothers returned to meet with the clinician to discuss four 30-second excerpts of the infant-parent interactions. For each excerpt clinicians asked mothers what they saw (i.e. how their child was feeling, how they were feeling, and why they think it was chosen for viewing), they also asked the mother to choose five words to describe her child's personality (a question asked in the WMCI) based on the video. If the words were different than those described at the initial visit, mothers were probed about why they changed the word. Each of these segments were utilized as a time to model and support the parent in being curious and understanding their child's internal experiences and needs. Findings indicated that negative attributions to the child decreased after the CAVES segment, and that mothers with higher levels of reflective functioning at baseline, showed greater decreases in negativity towards their child.

Recently, Muzik et al. (2015) reported preliminary outcomes of a manualized group intervention which targeted mental health and parenting in a sample of trauma exposed mothers. The intervention, Mom Power (MP), combines evidence-based techniques from Cognitive-Behavioral Therapy and Motivational Interviewing with infant mental health to promote nurturing parenting and improve parental reflective functioning. MP consists of 10 weekly group sessions with an emphasis on five key pillars: attachment-based parenting education, self-care, social support, integration of care, and predictable parent-child interactions. Preliminary results of the

MP intervention suggest that the intervention is effective at increasing parents' reflectivity, empathy, emotional and behavioral responsiveness with their children, reducing symptoms of depression/PTSD, and decreasing parents' feelings of helplessness (Muzik et al., 2015).

Some interventions have also attempted to improve parenting and child outcomes for substance abusing mothers and their infants. Suchman, DeCoste, Castiglioni, McMahon, Rounsaville, & Mayes (2010) examined the effects of an attachment-based therapy program (Mothers and Toddlers Program) on parental reflective functioning in a sample of women enrolled in a substance use treatment program. Results showed that mothers demonstrated increases in reflective functioning and sensitive caregiving behavior. In similar fashion, Pajulo et al. (2012) also developed a residential treatment program for substance abusing mothers in Finland that focused on preventing substance use, supporting mother-infant relationships, and promoting maternal reflective functioning. At completion, 60% of mothers demonstrated increases in reflective functioning. Substance type (i.e. Drugs vs. drugs and alcohol) influenced positive changes, such that mothers who used drugs only showed greater increases in reflective functioning.

In sum, a number of interventions have begun to target parental reflective functioning in a variety of at-risk populations. The interventions that were effective at improving parental reflective functioning did not include a control group, while the intervention that did include a control group showed increases in reflective functioning across both the intervention and control groups. In the non-control studies, it was assumed that reflective functioning remains stable without intervention and that improvements in reflective functioning are a result of the intervention. Thus, it is important to have empirical evidence to support the theoretical notion that reflective functioning remains stable over time. Studies that examine stability are limited, and the stability across the transition to parenthood has still not been tested.

## **The Stability of Reflective Functioning**

Because reflective functioning is rooted in attachment theory, from a theoretical standpoint, it should remain stable over time. There is some empirical evidence to support the stability of reflective functioning in adulthood, however less is known about the stability of parental reflective functioning. Representational measures of attachment suggest a stability of attachment overtime, for example, studies suggest concordance in Strange Situation classification from infancy to 18 months and 6 years (Main & Cassidy, 1998; Waters 1978). From 12 to 18 months 96% of children had the same attachment classification (3-category) and between 12 months and 6 years 84% of children had the same attachment classification (3-category). Two longitudinal studies suggest that attachment is also moderately stable from infancy to adulthood. Waters, Merrick, Treboux, Crowell, & Albershiem (2000) found evidence for the stability of attachment from 12 months to 20 years. Seventy two percent of participants remained in the same attachment classification over time. Results from Fraley's (2002) meta-analysis also support the finding that early representations of attachment and caregiving experiences are retained over time and shape attachment into adulthood. This is contrary to the belief that representations are being continually shaped by new experiences with significant others. Furthermore, there also appears to be stability in adult attachment, Sagi and colleagues (1994) found that across a 3-month time period, 89% of participants remained in the same adult attachment classification (4- category). Similarly, Benoit & Parker (1994) found stability for 77% of participants' adult attachment category across a 12-month period (4-category). Parents' representations of their attachment relationship with their infant also appears to be stable across the transition from pregnancy to one year postpartum. Theran, Levendosky, Bogat, and Huth-Bocks (2005) found that after collapsing classifications to balanced and non-balanced, 71% of participants remained in the same category at both time points.



Furthermore, women classified as balanced at time 1 were more likely to remain stable over time, than those classified as non-balanced.

Since reflective functioning has close ties to both adult and infant attachment many hypothesize that it also remains stable over time (Steele, Hodges, Kaniuk, & Steele, 2010). There is some evidence that reflective functioning remains stable over time. Taubner et al. (2013) investigated the internal structure of the Reflective Functioning Scale by combining several studies that used the AAI coded with the Reflective Functioning Scale. Across studies the authors found evidence for the stability of adult reflective functioning in overall reflective functioning scores ( $r = .64$ ). Crumbley's (2009) dissertation study examined the stability of reflective functioning using the AAI during pregnancy and the PDI at 10 months postpartum. Interestingly, correlations indicate stability of reflective functioning across time points and interviews ( $r = .52$ ). To examine stability of parental reflective functioning, Aber, Belsky, Slade, & Crnic (1999) assessed parental reflective functioning using the PDI at both 15 and 28 months of infant age. Using structural equation modeling, the authors found support for the stability of parental reflective functioning in mother's responses on the PDI on the factors of joy-pleasure/coherence, anger, and guilt-separation distress. More research is needed to better understand the stability of parental reflective functioning especially because the literature is fairly limited.

While parental reflective functioning should theoretically remain stable over time, research suggests that parenting behavior is influenced by developmental changes in both parents and children and can change over time. These developmental changes may also influence changes in parental reflective functioning. Two studies have found small increases in parental reflective functioning in samples without intervention. As previously mentioned, the control group in the Minding the Baby project demonstrated increases in parental reflective functioning from

pregnancy to toddlerhood. Additionally, in Poznansky's (2010) dissertation study, the author reported increases in parental reflective functioning in a sample of 30 first-time mothers. Prior to their infant's birth, mothers participated in the AAI to assess adult attachment. The PDI was used to assess parental reflective functioning at 10 and 28 months of infant age. Findings suggest that majority of mothers (25 of 30) showed increases in parental reflective functioning. Furthermore, only mothers with insecure adult attachment representations demonstrated a significant increase in parental reflective functioning from infancy to toddlerhood, whereas mothers with autonomous (secure) adult attachment representations demonstrated stability in reflective functioning. Taken together, research on the stability of parental reflective functioning has yielded mixed results. Some studies suggest that parental reflective functioning remains stable, while others suggest a natural developmental increase.

To date, no studies have empirically assessed the stability of parental reflective functioning from pregnancy to postpartum in a non-intervention sample, making it difficult to interpret the findings from intervention studies that assess change in parental reflective functioning, especially interventions that begin in pregnancy. Poznansky's (2010) dissertation study is the only study that has found empirical evidence regarding factors associated with stability and change of parental reflective functioning. A growing body of evidence suggests that educational attainment and other demographic risks are associated with parental reflective functioning (Stacks et al., 2014; Smaling et al., 2015). Women with lower levels of education may have less stable reflective functioning over time due to the limited capacity to think abstractly. This would make thinking about an unborn fetus difficult, however, the presence of an actual infant may allow a woman to be more capable of thinking about her infant's needs. Additionally, multiparous women or women who have had multiple children, may demonstrate less stable parental reflective functioning scores over time as

a result of having prior experience being a parent. More studies should explore factors that contribute to the instability of parental reflective functioning including parity, adult attachment, and risk.

### **Current Study Aims**

The current study seeks to further understand the stability of parental reflective functioning from pregnancy to postpartum, as well as examine possible factors that influence stability in reflective functioning including parity, adult romantic attachment, and demographic risk. More specifically, this study aims to:

1. Describe the stability reflective functioning from the third trimester of pregnancy to seven months postpartum.
  - a. It is hypothesized that more than 50% of mothers will remain in the same reflective functioning category and will have the same reflective functioning score at pregnancy and postpartum
2. Statistically examine stability in the current sample from the third trimester of pregnancy to seven months postpartum.
  - a. It is hypothesized that there will be a significant correlation between prenatal reflective functioning and postnatal reflective functioning.
3. Explore the relationship between parity and parental reflective functioning.
  - a. It is hypothesized that mean levels of prenatal and postnatal reflective functioning will not differ among primiparous and multiparous women.
  - b. It is hypothesized that parity will not moderate the relationship between pre and postnatal reflective functioning, such that the relationship between pre and

postnatal reflective functioning will remain significant for both primiparous and multiparous women, suggesting stability in reflective functioning over time.

- c. Further, it is hypothesized that there will be a stronger correlation between prenatal and postnatal reflective functioning for multiparous women than for primiparous women.
4. Examine the relationship between adult romantic attachment and parental reflective functioning.
    - a. It is hypothesized that prenatal and postnatal reflective functioning scores will be negatively correlated with adult attachment avoidance and anxiety.
    - b. Additionally, it is hypothesized that the relationship between pre and postnatal reflective functioning will be moderated by romantic attachment anxiety and avoidance, such that for those high in avoidance and anxiety the relationship between pre and postnatal reflective functioning will not be significant.
  5. Examine the relationship between demographic risk factors and parental reflective functioning.
    - a. It is hypothesized that prenatal and postnatal reflective functioning will be negatively correlated with maternal age and annual income.
    - b. It is expected that there will be significant differences in pre and postnatal reflective functioning by maternal education, such that mothers with a high school diploma will have lower prenatal and postnatal reflective functioning than mothers with college experience.

- c. It is also hypothesized that prenatal and postnatal reflective functioning will not differ by marital status.
  - d. Further, it is hypothesized that an accumulation of risk will be negatively correlated with both prenatal and postnatal reflective functioning.
6. Describe how demographic risks impact stability of reflective functioning.
- a. It is hypothesized that cumulative risk will moderate the relationship between prenatal and postnatal reflective functioning.
  - b. Mothers with higher levels of risk, will demonstrate a weaker correlation between prenatal and postnatal reflective functioning scores, suggesting a greater degree of change.
  - c. It is also hypothesized that mothers with less than a high school diploma will show weaker correlations in pre and postnatal reflection than mothers with at least some college.

## CHAPTER 2 METHODS

### Procedure

The current study utilized a subsample of mothers from the Parental Representations during Pre- and Postnatal Periods Linked to Early Outcomes Study (PuRPLE). The PuRPLE study aimed to understand how pre- and post-natal maternal representations influence infant behavior and development. Participants were recruited from the Perinatal Imaging of Neural Connectivity Study (PINC), which used functional MRI to examine fetal brain connectivity. Participants in the PINC study were recruited from a local obstetrics clinic when their fetus was between 27 to 29 weeks of gestational age. Women were introduced to the PINC study by a medical professional at an obstetrics clinic (nurse, midwife, or doctor) with whom they had a prior relationship. Women who were interested in the study were introduced to a research assistant who reviewed study protocols and addressed any questions/concerns. Women who provided informed consent were scheduled for their first fMRI scan. At their initial visit for the fMRI scan, women completed basic demographic information and a battery of self-report measures assessing stress, health practices, substance use, experiences in relationships, and symptoms of depression and anxiety. Women were also asked to provide permission to access their medical records in order to obtain other pertinent health information.

Participants in the PuRPLE study were recruited from the PINC study in two ways. Most women were recruited at their initial visit for the PINC study, participants were asked if they had interest in a follow up research study aimed at understanding how thoughts and feelings during pregnancy influence parenting and child outcomes and how they may be linked to fetal brain development and infant development across the first year of life. A research assistant was present to review study protocol for the PuRPLE study and to answer any questions/concerns for interested

participants. If research assistants were unable to meet participants at their fMRI scan, they were contacted via telephone to assess their interest in participating in the PURPLE study.

Mothers who provided consent for the PuRPLE study were asked to participate in three study visits. The first visit took place during the third trimester of pregnancy, the second at their infants' birth, and the final visit at approximately seven months postpartum. During pregnancy, women were asked to participate in an hour-long visit either at the clinic where they were recruited or in a research laboratory. Mothers completed a number of self-report measures on maternal characteristics associated with mental health and parenting (including demographic information, depression symptoms, pregnancy anxiety, stressful life events, abuse potential and social support), and took part in a semi-structured interview to assess prenatal reflective functioning. The second visit consisted of a neurobehavioral assessment of the newborn's development. Infants ranged in age from a few days to four weeks. The third visit was a 2.5-hour laboratory visit at approximately seven months of infant age. Mother-infant dyads participated in a parent-child interaction paradigm, and afterwards the infant's development was assessed. During this time, mothers completed self-report measures on depression and anxiety symptoms, child abuse potential, infant temperament, parenting stress, and difficult life events. Finally, mothers were asked to participate in a semi-structured interview to assess postnatal parental reflective functioning. Mother and infant saliva samples were collected to assess hormone levels and examine genetic factors associated with development.

## **Participants**

The current study utilized data from a sub-sample of mothers ( $N = 47$ ) who participated in the PuRPLE study and had parental reflective functioning data at both the prenatal and seven-month visits. In addition to this, the current study used data regarding demographic information,

parity, and adult romantic attachment that were collected from the PINC study. Mothers ranged in age from 19-40 ( $M = 25.73$ ,  $SD = 5.09$ ). Annual household income fell between less than \$10,000 to \$80,000, with 65% of participants earning less than \$20,000 per year. The majority of mothers were African American (80.4%,  $n = 37$ ), 13% were Caucasian ( $n = 6$ ), 2.2% were Asian American ( $n = 1$ ), and 4.3% identified as other ( $n = 2$ ). Just over half of mothers were single (53.3%), and 46.7% were married or partnered. Mothers self-reported their highest level of education which ranged from No GED/ High School Diploma to a Master's Degree. Approximately 45.7% of women reported having 'some college' ( $n = 21$ ), 28.3% reported having a GED or diploma ( $n = 13$ ), 17.4% reported having no GED or diploma ( $n = 8$ ), 6.5% had a 4 year college degree ( $n = 3$ ) and 2.2% had a Master's Degree ( $n = 1$ ). Demographic data for study mothers are summarized in Table 1.

## Measures

**Demographics.** Basic demographic information were collected at the initial PINC visit during pregnancy. Mothers were asked about basic demographic information including their age, race, education level, annual income, and marital status.

**Parity.** Data on women's number of gravida and para were collected from medical records for the PINC study by a trained research assistant. Gravida refers to the number of times a woman has been pregnant, and para refers to the number of times a woman has given birth to a fetus older than 20 weeks gestation. Women who are expecting their first child are commonly referred to as primiparous, whereas women who have had multiple children are referred to as multiparous.

**Experiences in Close Relationships- Revised** (ECR-R; Fraley, Waller, & Brennan, 2000). Adult romantic attachment was assessed prenatally at the initial PINC study visit. The ECR-R is a 36-item self-report measure that assesses an individual's attachment related anxiety and avoidance.



Individuals are asked to read statements that describe how they feel “generally” with regard to intimate relationships (eg. “I am afraid that I will lose my partner’s love”). Each statement is rated on a 7-point scale, where 1=strongly disagree and 7= strongly agree. The ECR-R yields two scales, attachment-related anxiety, and attachment-related avoidance. Anxiety subscale scores are calculated by taking the average of items 1-18, and avoidance subscale scores are calculated by taking the average of items 19-36. Subscale scores range from 1-7. Fraley, Waller, & Brennan (2000) suggest the ECR-R has high reliability estimates for both the attachment-related anxiety and attachment-related avoidance scales ( $\alpha >.90$ ). Similar reliability estimates were found in the current study for attachment-related anxiety ( $\alpha >.93$ ) and attachment-related avoidance ( $\alpha >.91$ ).

**Pregnancy Interview- Revised** (PI-R, Slade, Grunebaum, Hugarir, & Reeves, 1987; Slade, 2011). Prenatal reflective functioning was assessed using a 22 item semi-structured interview. This interview asks pregnant mothers about their experience during pregnancy, and the relationship they have with their unborn child. Questions on the interview specifically attempt to elicit a mother’s thoughts about her unborn child, emotions associated with the pregnancy as well as her relationship with her unborn child (e.g. Would you say you have a relationship with the baby now? When you think of the first six months of your baby’s life, when do you imagine you will be the happiest? Why?). Responses are audio recorded and transcribed verbatim for coding. Interviews are coded with an adapted version of the Reflective Functioning Scale (Fonagy, Steele, Steele, & Target, 1998; Slade, 2005). Scores lie on an eleven-point scale from -1 to 9, more detailed information on scoring is presented below. Coders established reliability on a gold-standard set of transcripts. All of the transcripts were double coded at the individual item level and the overall score. Disagreements were conferenced and consensus scores were used in the analyses. High inter-rater agreement was found for overall reflective functioning scores (ICC= .833;  $p < .001$ ).

**Parent Development Interview- Revised Short Form (PDI-R2-SF; Slade et al., 2003).**

Parental reflective functioning was assessed using a 30-item semi-structured interview that was voice recorded and transcribed. The PDI assesses the parent's ability to consider their child as a separate individual who is able to have a different internal experience than themselves. On the PDI, parents are asked two types of questions, demand and permit questions. Permit questions are used to establish rapport and inquire about the environment in which the relationship is fostered. Demand questions are those that require the parent to explicitly think about their child's internal experience (eg. Can you tell me about a time when your child was upset? Can you tell me about a time when your child felt rejected?). Demand questions from the PDI were scored for parental reflective functioning using an adapted version of the Reflective Functioning Scale (Fonagy, Steele, Steele, & Target, 1998; Slade et al., 2005). Like the PI, scores can range from -1 to 9, with higher scores representing higher levels of reflective capacity. Although all questions are considered, scores on demand questions are most important for calculating an overall typicality score for the interview. When coding for reflective functioning on both the PI and the PDI, four specific types of reflection are acknowledged; 1) the ability understand that others minds are opaque and one cannot always know what others are experiencing and that one can purposely hide his/her own experiences, 2) the explicit capacity to understand that mental states underlie behavior, 3) being able to recognize that there is a developmental component to experiencing mental states, and 4) acknowledging mental states in regard to the interviewer. The first three types of reflection are typically identified in a parent's explanation of her own and others internal experiences and behaviors, and the fourth type is the parent's ability to step out of her narrative and acknowledge that the interviewer may not completely understand/grasp or agree with her internal experience. As previously discussed, scores below zero are typically only seen within psychiatric populations.

Low scores (1 to 3) suggest the inability to think about and acknowledge one's own and their child's internal experience. Parents who score a 3 are typically able to acknowledge mental states, but lack the ability to link them with behavior. Average scores (5) are given when parents are consistently able to link mental states, but are not demonstrating the complexities in responses that are seen in high scores. High scores (7+) or marked parental reflective functioning are given when parents are consistently able to demonstrate a link between mental states and behavior, and are able to utilize multiple types of reflection when discussing the relationship between themselves and their child in a complex and coherent way. Recent studies on parental functioning suggest that scores of 5 and higher are associated with secure attachment (Slade et al., 2005; Stacks et al., 2014). Coders were trained to reliability on a gold-standard set of transcripts. All transcripts were double coded for individual questions and the overall score and disagreements were conferenced and consensus scores were used for the analyses. Raters demonstrated a high degree reliability (ICC= .839;  $p < .001$ ).

**Risk Composite.** A risk composite was created using four demographic variables assessed prenatally. This composite was created by dummy coding each variable and summing the four risk variables together. Maternal age was dummy coded with zero representing mothers older than 21 years and one representing below 21 years to create an age risk variable. Annual household income risk was created by selecting cases in which the total household income was below \$20,000 per year. Again, zero represented having a household income above that amount and one representing having a household income below \$20,000/year. Education risk was created by dummy coding cases where individuals who had a GED/HS Diploma or higher as zero, and less than HS as one. Marital status risk was created by dummy coding married parents as zero, and single parents as one. A total risk composite was created by summing the four risk variables, scores ranged from

zero to four, with higher scores indicating greater risk. Descriptive statistics for this variable can be found in Table 1.

### **Data Cleaning & Analysis Plan**

Prior to analyses, all study variables were examined for accuracy of input, which included identifying plausible ranges, means, and standard deviations. Next, univariate outliers were examined by calculating z-scores for each continuous variable. If individual scores fell outside of the range of  $\pm 3.29$ , they were considered to be univariate outliers. No univariate outliers were identified. To identify the amount of missing data within the sample, a missing variable analysis (MVA) was conducted. As noted in the methods section, all cases included in the current study had complete reflective functioning data at both the prenatal and seven-month time points. All but two variables had less than 5% of missing data. The MVA indicated that parity had 12.8% of missing data which can be attributed to missing medical record information, as a result these cases were not included in aim two leading to a lower sample size ( $n = 41$ ). Additionally, the MVA indicated that 6.4% of data was missing for annual household income, as a result these cases were not included in the analyses for aim four ( $n = 44$ ).

In order to examine study variables for non-normality, histograms were checked for skew and kurtosis. In addition to this, z-scores were also computed by taking the value of the skew or kurtosis and dividing by its standard error, in order to further verify the departure from normality ( $z > 1.96$ ). Two variables were identified as skewed these included maternal age (skewness = .770,  $SE = .347$ ) and annual household income (skewness = 1.43,  $SE = .373$ ). A square root transformation returned mother's age back to normality (skewness = .572,  $SE = .347$ ), whereas a log transformation returned annual income back to normality (skewness = .473,  $SE = .374$ ). For all of the remaining analyses, with the exception of the descriptive statistics and correlation

analyses, the transformed variables for age and income were used. Multi-variate outliers were examined using Mahalanobis distance, no multi-variate outliers were identified.

Prior to examining study aims, descriptive statistics for all study variables were examined. For the first aim descriptive statistics were used to describe the stability in both categorical and continuous reflective functioning scores. The second aim was to statistically examine stability from pregnancy to postpartum, using correlational analyses. The third aim examined the associations between parity and parental reflective functioning using t-tests, correlations and moderation analyses. The fourth aim of the study, to explore associations between parental reflective functioning and adult attachment was examined using correlation and moderation analyses. Correlations, a one way ANOVA, and t-test were used to assess relationships among demographic risk factors and reflective functioning, the fifth study aim. Finally, the relationship between demographic risk factors and stability of parental reflective functioning was examined using correlation and moderation analyses.

## CHAPTER 3 RESULTS

### Preliminary Analyses

**Descriptive Findings.** As a preliminary step in analyzing the data, univariate analyses were conducted to calculate descriptive statistics for study variables. Prenatal reflective functioning scores ranged from 0 to 7, ( $M = 3.09$ ,  $SD = 1.41$ ) and postnatal reflective functioning scores ranged from 2 to 7, ( $M = 3.81$ ,  $SD = 1.50$ ). Parity information obtained from medical records indicated that participant mothers had 0 to 5 children ( $M = .732$ ,  $SD = 1.12$ ), with this pregnancy being the first for over half of women (58.5%,  $n = 24$ ). Romantic attachment subscale scores for anxiety ranged from 1 to 4.72 ( $M = 2.41$ ,  $SD = 1.13$ ), whereas subscale scores for avoidance ranged from 1 to 4.56 ( $M = 2.45$ ,  $SD = 1.15$ ). During pregnancy, the majority of mothers were rated as having moderate levels of cumulative risk (70.5%, 2-3 risk factors), 25% of mothers had no to low risk (0-1 risk factors), and 4.5% of mothers were considered high risk having all four risk factors (see Table 3). Descriptive statistics and frequencies for study variables are presented in Table 1.

### Aim One: Describing the Stability of Reflective Functioning

The literature on the stability of reflective functioning is extremely limited, therefore the current study sought to describe the stability of reflective functioning in the following two ways: First, to describe participants' overall score at both the prenatal and seven-month time point including the percentage whose score remained the same versus those whose changed and second, to describe the categorical classification (low, moderate or high) for each participant at both the prenatal and seven-month time point and the percentage of participants who shifted between categories or remained in the same category. In the prenatal period, 59.5% of participants had reflective functioning scores of 2 or 3 (see Table 4). At seven months, approximately 47% of participants had reflective functioning scores of 2 or 3 (see Table 5). Overall change in reflective

functioning scores can be seen in Table 8, results indicate that 40.4% of participants demonstrated no change in score from the prenatal to seven-month time point; 29.8% changed by 1 point, 25.6% changed by 2 points, 4.3% changed by 3 points.

Table 9 describes categorical stability of parental reflective functioning. Three categories were established, based on the work of (Fonagy, Target, Steele, & Steele, 1998) and the Slade coding system (Slade et al., 2005). The low reflective functioning category included scores from 0 to 2, moderate reflective functioning included scores from 3 to 4, and high reflective functioning included scores of 5 and above. At the prenatal time point, 40.4% of the sample was classified as low, 44.6% were classified as moderate, and 14.9% were classified as high (see Table 6). At the seven-month time point, 23.4% of the sample was classified as low, 48.9% were classified as moderate, and 27.7% were classified as high (see Table 7). Data from both time points were examined for stability, 61.7% remained in the same category from pregnancy to seven-months, 34% shifted to a higher category, and 4.3% shifted to a lower category (see Table 9).

### **Aim Two: Statistically Examining the Stability of Reflective Functioning**

Aim 2 sought to examine the stability of reflective functioning from the third trimester of pregnancy to seven-months postpartum. More specifically, it was hypothesized that there would be a significant correlation between prenatal reflective functioning and postnatal reflective functioning. To test this hypothesis, a correlation that corrects for attenuation was computed by taking the raw correlation between prenatal and postnatal reflective functioning scores ( $r = .717$ ,  $p < .001$ ; Table 2), and dividing this number by the square root of the product of the reliability from the prenatal scores and the reliability of the postnatal scores ( $r_{xy}/\sqrt{r_{xx}*r_{yy}}$ ). As hypothesized prenatal reflective functioning was found to be significantly correlated with postnatal reflective functioning after correcting for attenuation ( $r(47) = .857$ ). To further examine categorical change

from pregnancy to postpartum, a chi-square test was performed. Results indicated there was a significant relationship between prenatal and postnatal reflective functioning  $\chi^2(4, N = 47) = 30.74, p < .001$ .

### **Aim Three: Parity and Parental Reflective Functioning**

Aim 3 sought to explore the relationship between parity and parental reflective functioning. First, it was hypothesized that mean levels of prenatal and postnatal reflective functioning would not differ among primiparous and multiparous women. To test this hypothesis a series of t-tests were conducted to understand if mean levels of reflective functioning during pregnancy and postpartum were significantly different from one another. Results indicated that primiparous mothers ( $M = 3.21, SD = 1.35$ ) did not significantly differ in level of prenatal reflective functioning compared to multiparous mothers ( $M = 3.00, SD = 1.58, t(39) = -.453, ns$ ). Additionally, results indicated that primiparous mothers ( $M = 3.58, SD = 1.50$ ) did not significantly differ in level of postnatal reflective functioning compared to multiparous mothers ( $M = 3.94, SD = 1.52, t(39) = .748, ns$ ).

Second, it was hypothesized that parity would not moderate the relationship between pre and postnatal reflective functioning, such that the relationship between pre and postnatal reflective functioning would remain significant for both primiparous and multiparous women, suggesting stability in reflective functioning over time. This hypothesis was examined using the PROCESS macro for SPSS (Hayes, 2012). PROCESS simplifies moderation analyses by automatically centering and running multiple regression analyses. In addition to this, PROCESS yields relevant information regarding the conditional effects of the dependent variable on the independent variable which are useful for creating interaction plots that clarify the direction and nature of the moderating



relationship. Results indicate that parity did not moderate the relationship between prenatal and postnatal reflective functioning ( $\Delta R^2 = .000$ ,  $F(1, 37) = .002$ ,  $ns$ ,  $b = -.010$ ,  $t(37) = -.045$ ,  $ns$ ).

Third, it was hypothesized that there would be a stronger correlation between prenatal and postnatal reflective functioning for multiparous women than for primiparous women. As hypothesized, the relationship between prenatal and postnatal reflective functioning was significant for both primiparous ( $r(24) = .69$ ,  $p < .001$ ), and multiparous mothers ( $r(17) = .81$ ,  $p < .001$ ), but the relationship between pre and postnatal reflective functioning was stronger for mothers who had multiple children.

#### **Aim Four: Parental Reflective Functioning and Adult Romantic Attachment**

Aim 4 examined the relationship between parental reflective functioning and romantic attachment anxiety and avoidance. First, it was hypothesized that prenatal and postnatal reflective functioning scores would be negatively correlated with attachment avoidance and anxiety. As seen in Table 2, correlations revealed that prenatal reflective functioning was not significantly associated with adult attachment anxiety ( $r(47) = .033$ ,  $ns$ ) or avoidance ( $r(47) = .029$ ,  $ns$ ). Similarly postnatal reflective functioning was not significantly associated with adult attachment anxiety ( $r(47) = -.117$ ,  $ns$ ) or avoidance ( $r(47) = -.034$ ,  $ns$ ).

Second, it was hypothesized that both attachment anxiety and attachment avoidance would contribute to instability in parental reflective functioning from pregnancy to seven-months postpartum. Based findings from Poznansky (2010) the current study hypothesized that mothers rated high on attachment avoidance and anxiety would demonstrate instability in parental reflective functioning from pregnancy to postpartum. For mothers low in attachment anxiety and avoidance, prenatal reflective functioning would be a significant predictor of postnatal reflective functioning, thus demonstrating stability. This was tested using the PROCESS macro for SPSS.

Contrary to the hypothesis, results revealed that neither adult attachment anxiety ( $\Delta R^2 = .001$ ,  $F(1, 43) = .119$ , *ns*,  $b = -.034$ ,  $t(43) = -.345$ , *ns*) nor avoidance ( $\Delta R^2 = .005$ ,  $F(1, 43) = .432$ , *ns*,  $b = -.065$ ,  $t(43) = -.657$ , *ns*) moderated the relationship between prenatal and postnatal reflective functioning.

### **Aim Five: Demographic Risk and Parental Reflective Functioning**

Aim 5 sought to examine the relationship between demographic risk factors and parental reflective functioning. First, it was hypothesized that prenatal and postnatal reflective functioning would be negatively correlated with maternal age and annual income. This hypothesis was examined using bivariate correlations. Contrary to the hypothesis, neither prenatal nor postnatal reflective functioning were significantly correlated with maternal age ( $r = .080$ , *ns*;  $r = .241$ , *ns*) or annual income ( $r = .073$ , *ns*;  $r = .178$ , *ns*; see Table 2).

Second, it was hypothesized that there would be significant differences in pre and postnatal reflective functioning by maternal education, such that mothers with a high school diploma would have lower prenatal and postnatal reflective functioning than mothers with ‘some college’ experience. To examine differences in maternal education, the variable was collapsed into four groups, 1) no GED/diploma, 2) GED/HS diploma, 3) Some college, and 4) Bachelor’s degree and above. This was examined using a one way ANOVA, results identified significant differences in prenatal reflective functioning scores by education level,  $F(3, 46) = 2.86$ ,  $p = .048$ . Levene’s statistic to test homogeneity of variance, was found to be significant ( $F = 5.89$ ,  $p < .001$ ) thus equal variances were not assumed. As a result, the Games-Howell posthoc analysis was used and revealed that the average prenatal reflective functioning score was significantly lower for mothers who had only a GED/high school diploma versus mothers who had reported attending some

college. There were no significant differences found in postnatal reflective functioning by education level,  $F(3, 46) = 1.27, ns$ .

Third, it was hypothesized that prenatal and postnatal reflective functioning would not differ by marital status. This hypothesis was examined by conducting a t-test. Results indicated that single mothers ( $M = 2.67, SD = 1.20$ ) had significantly lower levels of prenatal reflective functioning than married/partnered mothers ( $M = 3.52, SD = 1.50, t(45) = -2.16, p = .036$ ). Fourth, it was hypothesized that an accumulation of risk would be negatively correlated with both pre and postnatal reflective functioning. This hypothesis was examined using bivariate correlations (see Table 2), results indicated that contrary to the hypothesis, cumulative risk was not significantly associated with prenatal ( $r(47) = -.037, ns$ ) or postnatal reflective functioning ( $r(47) = -.090, ns$ ).

#### **Aim Six: Demographic Risk and Stability**

Aim 6 examined how demographic risk factors impacted the stability of parental reflective functioning from pregnancy to seven months postpartum. First, it was hypothesized that that cumulative risk would moderate the relationship between prenatal reflective functioning and postnatal reflective functioning, such that mothers who had higher levels of risk would demonstrate instability of reflective functioning from pregnancy to seven months postpartum. On the other hand it was expected that mothers with lower levels of risk would demonstrate stability of reflective functioning. To examine this aim, moderation analyses were conducted using the PROCESS macro for SPSS. Results revealed that cumulative risk did not significantly moderate the relationship between prenatal and postnatal reflective functioning ( $\Delta R^2 = .006, F(1, 40) = .5147, ns, b = -.100, t(40) = -.717, ns$ ).

Second, it was hypothesized that mothers with higher levels of risk would demonstrate a weaker correlation between pre and postnatal reflective functioning scores. This was examined by

splitting the data file by cumulative risk score, and conducting bivariate correlations between prenatal and postnatal reflective functioning scores to compare the strength of association by level of risk. Prenatal and postnatal reflective functioning were only significantly correlated with one another for mothers with zero ( $r(2) = 1.00, p < .001$ ), two ( $r(19) = .836, p < .001$ ) and four risk factors ( $r(2) = 1.00, p < .001$ ). Although, this finding wasn't completely expected, taken together with the other findings of the study, it may be that one or two demographic risk factors included in the cumulative risk composite are influencing the stability of reflective functioning.

The third and final aim, hypothesized that mothers with less than a high school diploma would show weaker correlations in pre and postnatal reflection than mothers with at least some college. This hypothesis was examined using bivariate correlations after data were split based on education level. Contrary to the hypothesis, results indicate that mothers with less than a high school diploma actually showed greater correlations ( $r(8) = .933, p < .001$ ) than those with at least some college ( $r(21) = .593, p < .001$ ).

## CHAPTER 4 DISCUSSION

The current study explored the stability of reflective functioning from pregnancy to postpartum, as well as factors that influenced stability. Learning more about the stability of reflective functioning has important implications for reflective parenting interventions, including the interpretation of intervention effects. Further, no studies have examined the stability of reflective functioning from pregnancy to postpartum or explored whether parity or demographic risk might impact stability. There were six aims in this study, the first was to describe the stability of reflective functioning in two distinct ways – continuously and categorically. The second aim was to statistically examine the association between prenatal and postnatal reflective functioning assessed using the Pregnancy Interview (PI) and the Parent Development Interview-Revised (PDI-R2) in a high-risk, non-clinical sample of mothers. The third aim was to explore the relationship between parity and parental reflective functioning, specifically to compare mean levels and correlations of prenatal and postnatal reflective functioning in primiparous and multiparous mothers. The fourth was to examine the relationship between adult romantic attachment and parental reflective functioning, specifically to explore whether maternal attachment anxiety and avoidance moderated the relationship between prenatal and postnatal reflective functioning. The fifth aim was to examine the relationship between parental reflective functioning and demographic risk factors, and the accumulation of risk factors. The final aim described how cumulative risk influenced the relationship between prenatal and postnatal reflective functioning, and explored differences in this relationship by education level. Findings revealed that reflective functioning was stable from pregnancy to postpartum, regardless of parity, romantic attachment avoidance or anxiety, or demographic risk. However, the strength of the relationship between prenatal and postnatal reflective functioning was weaker, though still significant, for women who were having their first child.

### **Stability of Reflective Functioning**

As hypothesized, results from the current study suggest that reflective functioning is stable from pregnancy to postpartum. In this non-intervention sample, prenatal and postnatal reflective functioning were highly correlated ( $r = .717$ , attenuated  $r = .857$ ). This finding is consistent with findings from Taubner et al. (2013) regarding adult reflective functioning and provides empirical evidence for the theoretical notion that parental reflective functioning is stable from pregnancy to postpartum. In this study, 40.4% of mother's scores remained the same, on an 11-point scale, from pregnancy to postpartum. These findings appear to be somewhat inconsistent with findings of Pozansky (2010) and Sadler and colleagues (2013) who reported significant change in reflective functioning scores over time. Pozansky (2010) found that only 16.7% of mothers had the same reflective functioning score when their infant was 10 months and 28 months. She noted that 40% of her sample changed by only one point, on the 11-point reflective functioning scale, and 40% changed by two points.

The mixed findings between Poznansky's study, and the current study, suggest that more research is needed to understand the stability of reflective functioning. To further understand these mixed findings, it is useful to examine scoring procedures and interpretation that were used in both studies. The Reflective Functioning Scale (RFS; Fonagy et al., 1998) has scoring anchor points at 1, 3, 5 and 7. A score of 1 is indicative of a narrative that is lacking in reflective functioning, whereas a score of 3 indicates low or limited capacity for reflection. Scores of 5 are typically representative of ordinary or average levels of reflective functioning, this is the average score seen within normal populations. Narratives that are rated a 7, are considered to have marked indices of reflective functioning. Scores that fall between anchor points, indicate that the parent may be on the cusp of a higher score, but may not be indicative of a change in category. Additionally, these

may not correspond to changes in parenting or child outcome. In fact, to date no studies have specifically examined the amount of change in parental reflective functioning that is associated with moderate or large effects on parenting quality or child outcomes. Previous studies do suggest that scores of 5 or higher are associated with a secure attachment (Slade et al., 2005; Stacks et al., 2014). In this study, a number of parents demonstrated increases of two (21.3%) or three (4.3%) points from pregnancy to postpartum, and it is not certain whether these parents (most of whom were classified as having low reflective functioning) sought out infant mental health services, which are widely available to this study sample. Pozansky (2010) did not comment on whether parents in her study could have also been involved in an intervention while they were enrolled in her study. In Pozansky's study each time point was coded by a different coding team, and reliability correlations were not reported, which may contribute to the finding of a lack of stability. In the current study 100% of transcripts were double coded, with a high degree of intra-rater reliability at pregnancy and postpartum for overall score (.833 and .839, respectively).

Changes in average reflective functioning scores in non-intervention samples have been noted. Pozansky (2010) found a .5 increase in maternal reflective functioning over a one-year period and Sadler et al. (2013) reported that the control group in their intervention, on average showed a .7 increase from pregnancy to 24 months postpartum. While these increases were statistically significant, they show a relatively small change in score, on an 11-point scale. Further, it is not clear whether these slight changes are related to changes in parenting or child outcome.

Since scores are anchored on the reflective functioning scale it may be more meaningful to look at stability from a categorical perspective. In this study, 61.7% of the sample remained in the same parental reflective functioning category at pregnancy and postpartum. Chi square results indicate that there was a significant association between the prenatal reflective functioning

category and postnatal reflective functioning category, 29 out of 47 participants remained stable (see Table 10). This finding is consistent with concordance rates for other representational assessments. For example, studies examining the stability of attachment in infancy suggest concordance rates ranging from 50% to 96% (Main & Cassidy, 1998; Vaughn, Egeland, Sroufe, & Waters, 1979; Vondra, Hommerding, & Shaw, 1999; Waters, 1978). In a longitudinal study by Waters and colleagues (2000), 72% of individuals remained in the same attachment category from infancy to adulthood. Further, the literature on the stability of adult attachment has also documented similar percentages over time, 77 to 89% (Sagi et al., 1994; Benoit & Parker, 1994). There is also evidence for the stability of maternal representations of the parent-child attachment relationship. Benoit, Parker, & Zeanah (1999) found 80% stability across a 12 month period, whereas Theran et al. (2005) found 71% stability across the same time period.

Taken together, these findings raise a number of important points that are crucial to understanding and interpreting findings from empirical studies on reflective functioning, and interventions that target reflective functioning. Thus far, the existing literature has yet to further examine the interpretation of change in reflective functioning, however, based on empirical evidence linking reflective functioning to parenting sensitivity and child attachment, researchers have developed and tested interventions targeting reflective functioning. Findings from these studies suggest increases in reflective functioning but it is difficult to truly understand if the intervention effects without an understanding of the stability of parental reflective functioning, especially for studies that did not include a control group (Suchman et al., 2008; Schechter et al., 2008). Findings from this study which suggest stability in non-intervention samples combined with findings from intervention studies that show correspondence between increases in reflective functioning and improvements in parenting sensitivity and child behavior (Slade, 2006; Sadler et



al., 2013; Ordway et al., 2014) suggest that parental reflective functioning is indeed a target for intervention. Yet, it still is not clear the degree of change in reflective functioning that is required to modify parenting, child attachment or child behavior.

While the current study suggest a relatively high degree of stability, reflective functioning was not perfectly stable. In fact, 53% of mothers increased in reflective functioning score from pregnancy to postpartum (increases ranged from one to three points). Yet, it is not clear how this change should be interpreted. For example, is a one-point increase that moves a parent from the low to moderate category more meaningful than a one-point increase within a category? Furthermore, an important question for consideration by researchers is what degree of change in reflective functioning scores results in a meaningful change in parenting behavior that has positive impacts on infant behavior and development? Additionally, it is important to examine what factors account for change in these community-based, non-intervention samples. The current study sought to understand if parity, maternal attachment style or risk were associated with changes in reflective functioning.

### **Parity and Reflective Functioning**

The third aim of the study explored reflective functioning and parity, to better understand how the two variables were related. Reflective functioning remained significantly correlated for both primiparous and multiparous women, yet the correlation was weaker for primiparous women. This finding is consistent with the work of Daniel Stern (1991) who theorized that a mother's mental representations greatly influence the parent-child relationship. The literature on representations of attachment suggest that each relationship a mother has including those with her own parents, and each of her children continuously shape her representation of the relationship with her child(ren) (Bruschweiler Stern, 1999; Huth-Bocks et al., 2014; Slade, Cohen, Sadler, &

Miller, 2009;Theran et al., 2005). Stern (1991) further suggested that a mother's representation of herself as a parent and of her fetus 'increases in richness and specificity' during the third trimester of pregnancy, and once the child is born the representation becomes 'less specific and re-elaborated' as a result of adjusting to represent her actual infant. Perhaps this re-elaboration can be operationalized as parental reflective functioning. For women having their first child, the transition to parenting is accompanied by biological and neurological changes that support caregiving (Kim, Leckman, Mayes, Feldman, Wang & Swain, 2010). These neurobiological shifts combined with the experience of parenting, may allow a multiparous women a greater ability to draw on representations from other children to 'imagine' and reflect on what both joyful and difficult aspects of parenting will be and what her child might be like and to describe her relationship.

### **Romantic Attachment and Reflective Functioning**

Representations of caregiving and reflective functioning are influenced by childhood attachment experiences (George & Solomon, 2008; Slade et al., 2005) and there is evidence that concordance between adult attachment and child attachment is highest for mothers classified as autonomous/secure on the AAI. Further, Poznansky (2010) reported that mothers classified as insecure on the AAI demonstrated significant increases in parental reflective functioning from infancy to toddlerhood. Whereas, mothers classified as autonomous (secure) demonstrated stability in reflective functioning from infancy to toddlerhood. This study hypothesized that reflective functioning would be less stable among insecure mothers, results were inconsistent with Poznansky's findings. In this sample, parental reflective functioning was not associated with romantic attachment anxiety or avoidance. Additionally, neither of the domains appeared to contribute to the instability of reflective functioning.

Hazan & Shaver (1987) suggest that adult romantic attachment and childhood attachment are similar constructs in that both demonstrate similar concordances across attachment styles. Furthermore, they theorize that child attachment and romantic attachment both stem from representations related to experiences with caregivers. However, there is also evidence that adult attachment classification and adult romantic attachment style are only modestly associated (Shaver, Belsky, & Brennan, 2000). As a result, using adult romantic attachment as a proxy in the current study to replicate findings related to adult attachment may be why findings were not as expected. The ECR only yields two dimensions of adult romantic attachment, and denotes where an individual lies on a continuum for anxiety and for avoidance. Unlike the AAI, this measure does not yield romantic attachment categories, therefore making it difficult to interpret and compare results among secure and insecure romantic attachment classifications. Another possible reason for the lack of association between adult romantic attachment and reflective functioning may be because the current sample had a relatively restricted range for both subscales of anxiety (1- 4.72) and avoidance (1- 4.56). The lack of variance in scores for each subscale may have contributed to the non-significant relationship to reflective functioning.

Some studies have explored the relationship between romantic attachment and parent-child relationships. In Huth-Bocks et al. (2014) study, it was found that overall secure base scriptedness was related to positive parenting, however scripts related to romantic partners were found to be unrelated to parenting. These findings support the idea that representations of romantic attachments may not be the appropriate proxy when examining factors that influence parent-child relationships and parenting behavior. Thompson (2010) argues that although some researchers suggest that infant attachment and romantic attachment are related, each type has their own distinct evolutionary purpose. Furthermore, the relationship between romantic attachment and infant

attachment may be more complex than some have proposed it to be. Thus, examining adult attachment (for example on the AAI) may be more appropriate than examining romantic attachment as a mediator for change.

### **Cumulative Risk and Prenatal Reflective Functioning**

It was hypothesized that the stability of reflective functioning may be influenced by risk, based on previous work by Stacks et al., (2014) and Smaling et al. (2015) who found associations between parental reflective functioning and demographic risk. This hypothesis was partially supported. In this sample, parental reflective functioning was not related to maternal age or annual income. Significant differences were found in prenatal reflective functioning among mothers with varying levels of education, and among mothers who were married. Interestingly, after examining varying levels of cumulative risk and the relationship between prenatal and postnatal reflective functioning, the results indicate that this relationship was only significant for mothers with zero and four risk factors. This finding suggests that the relationship may not be affected by cumulative risk, but that specific risk factors may be driving the association. To further explore this, the relationship between prenatal and postnatal reflective functioning was examined by maternal education level. The results did not support the hypothesis that mothers with lower levels of education would demonstrate a weaker correlation between prenatal and postnatal reflective functioning. One possible reason for this may be that specific outlier cases distorted the overall findings and interpretation, even after no univariate and multivariate outliers were found. Specifically, upon examining the data, it was found that one of the mothers in the study with the a high level of education (a bachelor's degree) received the lowest score in the sample on prenatal reflective functioning and also demonstrated the greatest change (3 points) in reflective functioning across time points.

## **Limitations**

The current study was part of a larger study which examined fetal brain connectivity, biology, and parenting as predictors of infant outcomes. The variables collected in the larger study allowed for the analysis of other important questions related to the stability of parental reflective functioning. However, since the primary aim of the larger study was not to examine the stability of reflective functioning, there are a few limitations to consider. First, the sample size was relatively small, which restricted the complexity of statistical analyses. However, this was the first study to empirically test the stability of reflective functioning from pregnancy to postpartum in a non-intervention sample. As such, the results are meaningful despite some limitations. Second, this study used a self-report measure of adult romantic attachment and there was very little variability in scores, which may have limited our ability to detect whether adult attachment insecurity was associated with differences in the stability of reflective functioning. Finally, parents were not asked to report on services they were receiving and we cannot be sure whether change in reflective functioning were related to parents receiving services.

## **Conclusions & Future Directions**

In conclusion, the current study suggests that without intervention parental reflective functioning remains relatively stable over time. This finding is important for interpreting intervention effects, and supports the existing literature which suggests that parental reflective functioning is a promising intervention target. More research is needed to better understand the stability and change of parental reflective functioning in a variety of non-intervention samples while concordantly examining changes in parenting behavior over time. Replication of the current study is needed, longitudinal studies that examine how parental reflective functioning changes over time will add important contributions to the literature. Future studies should explore the

different ways to interpret change in parental reflective functioning. Additionally, these studies should also attempt to identify who is most likely to change, and what other factors may contribute to change.

Table 1

*Descriptive Statistics for All Study Variables*

Maternal Characteristics	Mean (SD)	Percentage	Sample Size	Range
Mother's Race			46	
Caucasian		13.0		
African American		80.4		
Asian American		2.2		
Other		4.3		
Mother's Age	25.73 (5.09)		47	19-40
Mother's Martial Status			45	
Single		53.3		
Married/Partnered		46.7		
Mother's Education			46	
No GED/Diploma		17.4		
GED/ HS Diploma		28.3		
Some College		45.7		
Bachelor's Degree		6.5		
Master's Degree		2.2		
Total Household Income			43	
Less than \$10,000		40.0		
\$10,000-20,000		25.0		
\$20,000-30,000		17.5		
\$30,000-40,000		5.0		
\$40,000-50,000		2.5		
\$50,000-60,000		5.0		
\$60,000-80,000		5.0		
Prenatal Reflective Functioning	3.09 (1.41)		47	0-7
Low		40.4		
Moderate		44.7		
High		14.9		
Postnatal Reflective Functioning	3.81 (1.49)		47	2-7
Low		23.4		
Moderate		48.9		
High		27.7		
Attachment Anxiety	2.41 (1.13)		47	1-4.72
Attachment Avoidance	2.45 (1.15)		47	1-4.56
Parity				
First Child				
Yes		58.5	41	
No		41.5		

Table 2

*Correlation Matrix of Study Variables of Interest*

	1	2	3	4	5	6
1 Mom's Age						
2 Annual Income	.337*					
3 Prenatal RF	.080	.073				
4 Postnatal RF	.241	.178	.717**			
5 Attachment Anxiety	.076	-.227	.033	-.117		
6 Attachment Avoidance	-.001	-.186	.029	-.034	.801**	
7 Cumulative Risk	-.307*	-.216	-.037	-.090	.012	.092

Note: \*  $p < .05$ , \*\* $p < .001$



Table 3

*Frequency of Risks*

Number of Risk Factors	Frequency	Percentage
0	2	4.5
1	9	20.5
2	19	43.2
3	12	27.3
4	2	4.5

Table 4

*Frequency of Prenatal Reflective Functioning Scores- Continuous*

RF Score	Frequency	Percent of Sample
0	1	2.1
1	2	4.3
2	16	34.0
3	12	25.5
4	9	19.1
5	4	8.5
6	2	4.3
7	1	2.1

Table 5

*Frequency of Postnatal Reflective Functioning Scores- Continuous*

RF Score	Frequency	Percent of Sample
2	11	23.4
3	11	23.4
4	12	25.5
5	4	8.5
6	7	14.9
7	2	4.3

Table 6

*Frequency of Prenatal Reflective Functioning Scores- Categorical*

RF Score	Frequency	Percent of Sample
Low	19	40.4
Moderate	21	44.6
High	7	14.9

Table 7

*Frequency of Postnatal Reflective Functioning Scores- Categorical*

RF Score	Frequency	Percent of Sample
Low	11	23.4
Moderate	23	48.9
High	13	27.7

Table 8

*Frequency of Change in Reflective Functioning Score from Prenatal To Postnatal Time Points*

RF Change Score	Frequency	Percent of Sample
-2	2	4.3
-1	1	2.1
0	19	40.4
1	13	27.7
2	10	21.3
3	2	4.3

Table 9

*Frequency of Change in Reflective Functioning Category from Prenatal to Postnatal Time Points*

Category Change	Frequency	Percent of Sample
Decrease	2	4.3
Same	29	61.7
Increase	16	34.0

Table 10

*Crosstabs for Categorical Change of Reflective Functioning Scores from Pregnancy to Postpartum*

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	Low	Moderate	High
Low	9	10	0
Moderate	2	13	6
High	0	0	7

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**ABSTRACT****A STUDY OF STABILITY: MATERNAL REFLECTIVE FUNCTIONING FROM PREGNANCY TO SEVEN MONTHS POSTPARTUM**

by

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This study examined the stability of parental reflective functioning from the third trimester of pregnancy to seven months postpartum, as well as possible factors that impact stability. The current sample included a subsample of 47 mothers who participated in a larger study examining fetal brain connectivity and infant outcomes. Parental reflective functioning was assessed using the Pregnancy Interview-Revised (Slade, Grunebaum, Haganir, & Reeves, 1987; Slade, 2011) and the Parent Development Interview-Revised Short form (Slade et al., 2003). Additional measures assessed parity, adult romantic attachment, and demographic factors. Stability of reflective functioning was assessed in two ways, continuously and categorically. Findings indicate that indeed, reflective functioning remained stable in the current sample from pregnancy to postpartum. This finding was regardless of parity, romantic attachment avoidance or anxiety, or demographic risk. Significant differences in prenatal reflective functioning were found based on mothers' education and marital status. There were also differences in the relationship between prenatal and postnatal reflective functioning scores for mothers who had varying levels of cumulative risk, and education. Findings from the current study support the need for more research to examine the stability and change of reflective functioning over time, as

they have important implications for understanding intervention effects. Future research in this area can aid in establishing the degree of change in reflective functioning scores which results in a meaningful change in parenting behavior which positively impacts on infant behavior and development.

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### Selected Research Presentations:

**Wong, K.** & Stacks, A.M., & Beeghly, M. (2015). Understanding reflective functioning during the transition to parenthood. Presented at the International Attachment Conference, New York City, New York, August 4-6, 2015.

**Wong, K.**, Stacks, A.M., Rosenblum, K. & Muzik, M. (2014). Reflective Functioning as a Moderator in the Relationship between Infant Temperament and Later Behavior Problems. Presented at the World Association for Infant Mental Health Biennial Conference, Edinburgh, Scotland, June 14-18, 2014.

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