

The Role of Parental Reflective Functioning in Promoting Attachment for Children of
Depressed Mothers in a Toddler-Parent Psychotherapeutic Intervention

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In 11th grade of high school I participated in a unique summer science research program, hoping to merge my interest in child development with the scientific pursuit of knowledge. Placed in the lab of Professor Nikki Crick at the University of Minnesota's Institute of Child Development, I had no idea (at the time) just how fortunate this opportunity truly was. There I was, a young, eager, "scientist" learning about child psychology surrounded by the very leaders of the field. I also had no idea that my academic journey would eventually lead me back to the very same ICD hallways as graduate student. It is those who guided me along my journey that I owe tremendous thanks.

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Dedication

Family starts with two...and then there were three. I dedicate this to my greatest blessing and that which I am most proud.

Abstract

Parental reflective functioning (PRF) refers to a parent's ability to interpret and reflect upon her child's mental states (e.g., thoughts, feelings, emotions, desires) and underlying behaviors, and relate them to her own thoughts, feelings, and behaviors (Slade, Bernbach, Grienenberger, Lev, & Locker, 2005a). The purpose of the present study was to explore the potential role of maternal reflective functioning in promoting attachment security among depressed mothers and their toddlers involved in a toddler-parent psychotherapy (TPP) intervention program. Children of depressed mothers have an increased likelihood of negative developmental outcomes, including disrupted attachment relationships with their primary caregivers (Cicchetti, Rogosch, & Toth, 1998). Toddler-parent psychotherapy has been demonstrated to significantly improve attachment security among this vulnerable population (Cicchetti, Toth, & Rogosch, 1999); however the mechanism underlying its efficacy is unclear.

This study examined PRF and attachment status of 160 mother-toddler dyads. Among dyads, participant groups included: non-depressed control (NC) mothers (n = 62), depressed control (DC) mothers (n = 52), and depressed intervention (DI) mothers (n = 46) who participated in an 18 month TPP intervention program. Results showed no differences in PRF among the subject groups at either baseline or follow-up (post intervention) periods, suggesting no effect of TPP on PRF. Furthermore, results show that PRF does not account for the efficacy of TPP in improving attachment among toddlers of depressed mothers. PRF was, however, associated with educational attainment of mothers, regardless of participant group status.

Research examining the construct of PRF is relatively new and therefore limited. Results of the present study are presented in light of previous research findings. The potential benefits and limitations of PRF as a construct, particularly for examining attachment and other developmental processes, are discussed.

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Introduction

A parent's ability to interpret, reflect upon, and respond to their young child's mental states and emotional needs, is an integral component of the early parent-child relationship (Cicchetti, Ganiban, & Barnett, 1991; De Wolff & van Ijzendoorn, 1997). Infants rely on their caregivers for early emotion-regulation (Bowlby, 1969; Cole, Michael, & Teti, 1994; Cassidy, 1994). Over time, the child builds upon early caregiving experiences to develop self-regulation skills (Waters, Virmani, Thompson, Meyer, Raikes, & Jochem, 2010; Zimmerman, 1999). These skills in turn provide a foundation for numerous aspects of social and emotional development, guiding interpersonal functioning throughout the life course. The capacity for caregivers to interpret the mental states of their young child and consider how such mental states affect behavior, may therefore serve as a central feature of positive early care. This ability, referred to as *parental reflective functioning*, is an emerging area of research deserving further understanding and consideration.

The construct of parental reflective functioning (PRF), developed by Arietta Slade and colleagues (Slade, Bernbach, Grienenberger, Lev, & Locker, 2005a), may potentially provide insight into developmental processes associated with the parent-child relationship and subsequent developmental trajectories of the child. PRF evolved from the construct of *reflective functioning* (RF), developed by Peter Fonagy and colleagues (Fonagy, Steele, Moran, Steele, & Higgitt, 1991a; Fonagy, Target, Steele, & Steele, 1998). While RF involves the general capacity to understand behaviors and their underlying mental states, PRF specifically addresses a parent's ability to interpret and conceptualize her child's mental states and underlying behaviors, and relate them to

her own thoughts, feelings, and behaviors. PRF can therefore be considered a subtype of RF, where the reflective functioning concerns the parent-child relationship specifically. PRF may provide a useful lens through which to explore processes involved in successful parent-child functioning, such as attachment. Conversely, it may also serve to elucidate the process by which attachment is negatively impacted by factors such as maternal mental health.

PRF theory postulates that a parent's (typically mother's) capacity to reflect insightfully upon her child's mental world allows her to better interpret the child's needs and behavioral cues, and thus regulate her child's internal world (Slade, 2005). In contrast, impaired maternal reflective functioning (e.g., misattribution, distortion, or lack of awareness of the child's mental states) disrupts caregiving behavior, ultimately interfering with the safety and consistency that must develop in order for the child to view the caregiver as a safe, stable source of care and comfort. To this end, PRF may serve as a mechanism to better understand the relationship between parental functioning (including adult attachment and maternal psychopathology) and child developmental outcomes (including infant attachment and child maladjustment).

In the present dissertation, I begin by describing PRF theory, reviewing the research in this area to date, and considering additional areas of research that may benefit from a PRF perspective. More specifically, I will introduce theory from which the construct of PRF evolved, along with PRF and its assessment. A review of the PRF literature is presented, including the postulated role of PRF in the intergenerational transmission of attachment for both normative and at-risk samples.

I next turn to the unique population of depressed mothers and their children, in order to consider the effects of maternal psychopathology on child developmental outcomes more specifically. In particular, the potential contributing role of PRF in this process is considered. Intervention programs aimed at improving PRF and attachment outcomes for at-risk samples (including depressed mothers and their children) are reviewed.

Expanding upon the current body of literature, this study will examine the role that PRF plays in changes in attachment patterns for children of depressed mothers involved in a toddler-parent psychotherapeutic intervention study. Research has demonstrated in-home, toddler-parent psychotherapy (TPP) to be effective in improving the attachment status of toddlers as well as the reflective capacities of mothers (Cicchetti, Toth, & Rogosch, 1999; Toth, Rogosch, & Cicchetti, 2008); however, these independent benefits of TPP have been found to be unrelated (Toth et al., 2008). Utilizing the construct of *parental* reflective functioning instead, this study will explore the mechanism involved in improved attachment among offspring of depressed mothers involved in TPP.

Mentalization and Reflective Functioning

In order to better understand parental reflective functioning, one must first understand the theoretical constructs from which it developed. *Reflective functioning* concerns the more general capacity to understand the nature and function of mental states in self and others. First described by Fonagy, Steele, Moran, Steele, and Higgitt (1991a), reflective functioning, sometimes called *mentalization*, refers to the ability to

understand, anticipate, and interpret one's own and other's behaviors in light of underlying mental states. Reflective capacities provide individuals with the ability to represent the internal experiences and mental states of others, thus allowing them to anticipate and interpret behaviors, rather than just respond to behaviors in isolation (Fonagy & Target, 2002).

Mental states refer to inner cognitive processes, including thoughts, feelings, beliefs, desires, attitudes, and intentions. Understanding how mental states directly affect our social behaviors is the core of reflective functioning. RF is closely related to (and perhaps overlaps with) the concept of *theory of mind*, which refers to the ability to ascribe thoughts, feelings, intentions, and ideas to others (Baron-Cohen, Leslie, & Frith, 1985; Premack & Woodruff, 1978). In contrast, while RF also involves reflection upon mental processes, it emphasizes one's ability to recognize that behavior is driven by those mental processes.

Reflective capacities can vary among individuals. Someone with average or moderate RF tends to have a well-integrated model of the mind in which behavior is consistently conceptualized in terms of mental states. Someone with high or sophisticated RF might also recognize that mental states can be complex, dimensional, transactional (bi-directional influence), and/or dynamic (changing over time). Conversely, someone with low RF may misattribute, distort, exaggerate, or otherwise ignore altogether mental states and their role in interpersonal exchanges.

Attachment Theory and Reflective Functioning

Reflective functioning was first developed with an eye to attachment theory, in an attempt to understand how attachment styles were transmitted from one generation to the next (cf. Fonagy et al., 1991a). Research of the effect of other parental behaviors, such as sensitive caregiving, is unclear, and to date there is no consensus on how attachment may be transmitted from parent to child (Van Ijzendoorn, 1995). In the following section, attachment theory is reviewed, followed by a discussion of the putative relationship between attachment and RF.

According to Bowlby's (1969, 1973, 1980) seminal attachment theory, caregivers (primarily mothers) provide their infants with a sense of security from which infants learn to explore their surroundings confidently and trust that their emotional and physical needs will be met. When an infant becomes distressed, both parent and infant engage in behaviors that serve to regulate the activated attachment system. Specifically, the infant will display behavioral signals to the caregiver, including proximity seeking behaviors (e.g., crying, reaching, crawling), while parents in turn respond to the infant's needs by reducing the child's arousal (e.g., providing comfort, soothing the infant, redirecting his or her attention). The parental behaviors in turn allow the infant to return to a state of equilibrium from which he/she can again explore his/her surroundings (Ainsworth & Wittig, 1969; Bowlby, 1969). Caregivers with consistent, sensitive, and responsive parenting behaviors promote a secure attachment from which infants trust that their needs will be met. Conversely, infants with an emotionally unavailable, unresponsive, insensitive, or hostile caregiver will develop an insecure or

disorganized attachment, in which they learn to avoid or distrust their caregiver in anticipation that their needs will not be met.

This process leads to the development of an *internal working model*, or a representation of social relationships, which the child uses to anticipate the caregiver's behaviors (Bowlby, 1973). An internal working model develops and evolves as a function of cumulative past experiences, particularly influenced by formative experiences with the caregiver. The internal working model is generalized to subsequent social relationships throughout life, and serves as the foundation to either promote or impair successful interpersonal functioning by guiding one's social behavior in accordance with their expectations about the world (Bretherton, 1999).

The measurement of attachment security was first operationalized by Mary Ainsworth and colleagues (Ainsworth, 1967; Ainsworth, Blehar, Waters, & Wall, 1978) using the *Strange Situation Paradigm*. During this laboratory assessment, infants are introduced to a series of increasingly stressful events, including the presence of a stranger, and repeated reunions and separations with their caregiver. These events are intended to heighten the infant's arousal and elicit attachment behaviors from both parties to reduce this distress. Based on a qualitative assessment of caregiver and infant behavioral response to separations and reunions, infants are classified as either securely attached, insecurely attached (anxious-avoidant or anxious-resistant), or disorganized in their attachment (Ainsworth et al., 1978; Main & Solomon, 1990).

Research has established extensive and varied developmental sequelae associated with infant attachment. For example, securely attached infants display more self-efficacy, positive affect, and greater social competence in later childhood

(Kockanska, 2001; Schneider, Atkinson, & Tardif, 2001; Sroufe, Egeland, Carlson, & Collins, 2005). There is also ample evidence of the long-term correlates of insecure attachment patterns in infancy. Children with a history of insecure or disorganized attachment in infancy are more likely to exhibit greater levels of emotional and behavioral problems, poorer psychosocial functioning, and are at risk for psychopathological disorders in adolescence and adulthood (Carlson, 1998; Greenberg, DeKlyen, Speltz & Endriga, 1997; Sroufe et al., 2005).

Attachment theory also extends to adult attachment, which involves the representation of past attachment relationships in adulthood (Main, Kaplan, & Cassidy, 1985). According to theory, childhood attachment relationships combined with the development of internal working models shape one's capacity to organize coherent memories and reflect upon past experiences insightfully (including past attachment relationships).

Attachment in adults can be measured using the *Adult Attachment Interview* (AAI; George, Kaplan, & Main, 1984). Adults are classified as secure/autonomous or insecure (dismissive or preoccupied) based on the coherence and organization of responses to questions regarding their past attachment relationships. Adults can also be classified as unresolved/disorganized based on disorganized and incoherent representations of experiences involving trauma, loss, or abuse. Adults classified as secure/autonomous tend to be more open, organized, consistent, and coherent when discussing their past experiences. Presumably, they are able to do so because of a foundation of stable, predictable care from their own attachment histories. Conversely, reports from adults classified as insecure (preoccupied or dismissive) have narratives

characterized by guarded, distorted, inconsistent, or incoherent representations of past relationships. Attachment theory suggests that these distorted response styles are due to defenses which develop as a function of inconsistent, disrupted care during childhood (Main et al., 1985).

Some prospective studies involving low-risk samples have found a link between infant attachment and later AAI adult attachment security across the same individuals (e.g., Waters, Merrick, Treboux, Crowell, & Albersheim, 2000); however, findings in support of such lifespan continuity are inconsistent. A prospective study of high-risk individuals found no connection between Strange Situation infant classification and AAI attachment at age 19, with the exception of a modest link between infant disorganized attachment and nonautonomous AAI classification (Weinfield, Sroufe, & Egeland, 2000). Preliminary results indicate that when these same individuals were re-administered the AAI at age 26, however, the association with infant attachment classification became significant (Sroufe et al., 2005). The authors postulate that the change in continuity may be a reflection of early representations of care becoming more established post-adolescence.

Adult attachment status in the caregiver has been linked to the attachment status of her own infant among a variety of populations (e.g., Dozier, Stovall, Albus, & Bates, 2001; Fonagy, Steele & Steele, 1991b; Main et al., 1985; Pederson, Gleason, Moran, & Bento, 1998; van Ijzendoorn, 1995; Ward & Carlson, 1995), in what is often referred to as the *intergenerational transmission of attachment*. This relationship, however, has not consistently been demonstrated. Slade and colleagues, for example, found only a moderate, non-significant correlation between maternal adult attachment and the

attachment status their infants ($r = .23$, $p = .07$; Slade, Greienenbergen, Bernbach, Levy & Locker, 2005b). Despite some contrary evidence, a meta analysis of 18 studies examining adult to infant attachment relationships by van Ijzendoorn (1995) found there to be strong, compelling evidence in support of the predictive validity of the AAI to infant attachment status (effect size $d = 1.06$).

While the concordance between adult and infant attachment status has been demonstrated, the exact mechanisms involved in the proposed transmission are largely unknown. In theory, a mother with an insecure, unresolved representation of her past relationships may present as psychologically unavailable and withdrawn with her own child. This psychological unavailability may lead to distorted perceptions, impaired parenting and subsequent disruptions in the attachment system between parent and child. Conversely, a mother with a coherent, well-integrated representation of her attachment history may be better able to identify and respond to her infant's needs, in turn promoting secure infant attachment.

Empirical evidence has demonstrated that maternal capacity to organize thoughts and feelings about past attachment relationships on the AAI (i.e., secure adult attachment) is associated with responsive, sensitive, and predictable caregiving in response to the child's needs for comfort, proximity, and safety (e.g., Carlson & Sroufe, 1995; van Ijzendoorn, 1995; Ward & Carlson, 1995). In a meta analytic review of studies exploring associations between adult attachment, parental sensitivity, and infant attachment, van Ijzendoorn (1995) conducted an exploratory mediational analysis of maternal sensitivity on the relationship between adult and infant attachment. Although none of the studies directly assessed a mediational relationship, van Ijzendoorn used

findings from the studies to derive a speculative mediational assessment. Results indicated that maternal sensitivity only accounted for a small portion (23%) of the variance between adult and infant attachment. The author thus concluded that other factors must be responsible for the intergenerational transmission of attachment. A later study by Pederson and colleagues (1998) directly tested a mediation model on a sample of mothers and infants and similarly found that maternal sensitivity accounted for only a small portion (17%) of the relationship between AAI classification and infant attachment classification. In sum, maternal sensitivity only partially explains how attachment is transmitted; therefore, alternative mechanisms continue to be studied.

It is even unclear, for example, by what mechanism(s) maternal sensitivity plays its role. While seeming to be a primarily causal environmental influence, the mother-child relationship is confounded by the close genetic relationship between them, such that maternal sensitivity and attachment may be driven by similarity in genotypes.

Perhaps surprising to the behavior genetics literature, measures of the parent-child relationship in at least one sample of 9-month-old twins had a very small genetic component ($h^2 = .01$; Roisman & Fraley, 2006). The majority of the variance was attributable to shared (.40) and non-shared environment (.59). Other measures of infant temperament were heritable (.61) with smaller shared environmental effects. At 9 months of age, one might expect interactions with mother, which are measurements that directly depend on a large and important shared environmental influence (the mother), to be among the most salient of human environments. At this unique developmental stage, infants are remarkably dependent on others (parents) with limited skill and independence to determine their own experiences. However, even at 24 months,

variance in the parent-child relationship was largely due to shared (.53) and unshared environment (.30), with a relatively small heritability component ($h^2 = 0.17$; Roisman, & Fraley, 2008). Heritability of attachment was low even while heritability of temperament was high ($h^2 = .61$), suggesting that attachment depends more on parenting than on infant temperament.

Research on the parent-child relationship has also been studied from a population genetic perspective. While limited in its scope, candidate genes have been implicated, such as DRD4 in a sample of 85 mother-child dyads (van Ijzendoorn & Bakermans-Kranenburg, 2006). Even the epigenome has been researched, with van Ijzendoorn and colleagues finding that methylation level moderated the relationship between the serotonin transporter and unresolved grief in a sample of 143 individuals (van Ijzendoorn, Caspers, Bakermans-Kranenburg, Beach, & Philibert, 2010). This result is interesting, because the rationale for testing the serotonin transporter was its link to a GxE interaction with depression and life events. The authors do not test whether methylation is relevant for this interaction, but only whether methylation moderates the relationship between unresolved loss and 5HTTLP, with depression as a covariate.

While a promisingly useful avenue of research, any population genetics result should be interpreted with extreme caution. Results often do not replicate, for multiple possible reasons. Perhaps of central importance is that individual common genetic variants are expected to account for only small proportions of variance in complex phenotypes of interest (e.g., $R^2 = .0005$).

Questions of genetic versus environmental etiology aside, the psychological construct of reflective functioning has been proposed as one such possible link between adult and infant attachment. Fonagy and colleagues (Fonagy et al., 1991a) conjectured that RF was a crucial component of an adult's ability to organize and reflect upon past attachment relationships, as well as to foster and promote her own attachment relationship with her child. In a prospective study of parents and infants, they found that parents who demonstrated high reflective capacities on the AAI were more likely to be classified as secure/autonomous and have infants with secure attachment, while parents with low reflective capacity were more likely to demonstrate insecure adult attachment patterns, and have infants with insecure attachment. The authors concluded that parental reflective capacity serves as an important process underlying the intergenerational continuity of attachment patterns. Fonagy acknowledges, however, that research in this area is limited, and that no published studies have yet attempted to replicate these findings using RF as measured with the AAI (Fonagy & Target, 2005).

Of course, it is also possible (and perhaps likely) that contrary evidence has gone unpublished, as is often the case with negative results that do not support popular findings. As will be described in a later section of this dissertation, however, subsequent studies have found an association between related forms of parental mentalization and child outcomes (e.g., Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002; Meins, Fernyhough, Fradley, & Tuckey, 2001).

Despite the few findings by Fonagy and colleagues supporting a link between maternal RF and infant attachment, an intervention study of depressed mothers and their toddlers by Toth, Rogosch, and Cicchetti (2008) did not find a relationship between

changes in maternal RF and infant attachment across a psychotherapeutic intervention (this study is described in greater detail in a later section of this dissertation). In sum, very little research has been published on the association between RF and infant attachment. Clearly, more research is necessary in order to support and confirm this association.

Although the capacity to engage in RF serves as a potential lens to better understand the relationship between adult and infant attachment, the more specific capacity to reflect upon one's own mental states and behaviors and those of their child (namely PRF), may provide further insight into the development of attachment relationships and other developmental outcomes.

Parental Reflective Functioning

Fonagy and colleagues (1998) first formally measured RF with a coding scheme developed for use with AAI responses. Recall that the AAI, a semi-structured, qualitative interview, asks adults to reflect upon memories, thoughts, and feelings regarding their formative attachment relationships. Fonagy and colleagues developed their coding scheme to examine AAI responses for RF by assessing the quality of the subject's responses to *retrospective* questions about past experiences with their caregivers. The reflective functioning measure thus relies upon the subject's report of long past relationships and experiences. Therefore, factors such as age/time, memory function, and recall biases may interfere with capturing subjects' true reflective abilities. In contrast, Slade and colleagues developed PRF assessment to be used with interviews of recent parents assessing their *current* attachment relationships (Slade et

al., 2005a). Interviews that directly assess the ongoing context of the parent-child dyad allow researchers to evaluate the reflective functioning of parents with respect to the context of the active, developing relationship they have with their child. Slade et al. (2005a) hypothesized that directly assessing the parent's reflective functioning regarding her current attachment with her child would provide more direct assessment of mechanisms underlying the intergenerational transmission of attachment, as opposed to measuring this phenomenon with narratives of adults reflecting upon their past attachment relationships.

The PRF coding system was originally developed by Slade and colleagues (2005a) to be used with Parent Development Interview data (PDI; Aber, Slade, Berger, Bresgi, & Kaplan, 1985; PDI-R; Slade, Aber, Bresgi, Berger, & Kaplan, 2004). The PDI is a semi-structured, qualitative interview, which asks parents (again, typically mothers) to reflect upon their relationship with their child, and to describe examples of their child's thoughts, behaviors, and feelings within the context of daily interpersonal conflicts and experiences. Items elicit narrative descriptions and specific examples of parent-child interactions and experiences. Sample questions include: "do you ever feel angry as a parent?", "how do you think those feelings affect your child?", "when your child is upset what does s/he do?", and "what are separations like for your child?" These and other interview items are designed to promote responses that require some reflection upon interpersonal experiences, thus offering insight into maternal representations of the parent-child relationship.

While the PDI has been the most widely used instrument with which PRF is coded, other interviews have been developed to examine the context and quality of the

current parent-child relationship. These include the Parent Attachment Interview (PAI; Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989) and the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995), with which researchers have also used to assess PRF (e.g., Grienenberger, Kelly, & Slade, 2005; Gravener, Vrieze, Cicchetti, Rogosch, & Toth, March, 2009). By using the PDI and similar attachment interviews to measure PRF, researchers are able to elicit responses from caregivers that assess their ability to reflect upon the active parent-child relationship, including the impact that their thoughts, behaviors and feelings can have upon their child and vice versa. These responses can then be coded successfully to measure PRF.

The core of PRF theory involves the parent's ability to interpret and reflect upon the internal mental experiences of the child within the context of development; therefore, parents of infants and toddlers have been the target subjects of PRF research to date (Slade, 2005). Unlike older children who are able to verbalize their thoughts and feelings to varying degrees, infants and toddlers depend upon their caregivers to interpret their feelings and needs and respond appropriately based on such interpretations (Bowlby, 1969, 1973, 1980). According to Slade (2005), the measurement of PRF is therefore best assessed within the developmental context of formative attachment relationships.

Given that the core of PRF examines the parent's ability to attend and respond to her child's needs and cues (attachment behaviors that are also related to the parent's own attachment history), PRF may be a relevant construct with regards to clarifying the relationship among maternal adult attachment and attachment development with her own child.

Attachment, Mentalization, and Parental Reflective Functioning

Bowlby (1969, 1973, 1980) first acknowledged that similar attachment patterns can manifest from parent to child, one generation to the next. The mechanisms underlying this transmission, however, are largely unknown. The most common proposal has been that maternal sensitivity may be responsible for the link. Securely attached mothers are more responsive and sensitive to their infants, thus leading to a securely attached infant. As previously discussed, van Ijzendoorn (1995) provides a speculative review based on meta-analytic results suggesting that maternal sensitivity accounts only weakly for parent-child attachment transmission. As noted, research has since sought to explore alternative possible mechanisms underlying the transmission of attachment.

The parent's capacity to mentalize about her child has also been proposed as a potential mechanism related to attachment development. A number of studies have attempted to explore the relationship between maternal mentalization or reflectiveness and infant attachment (e.g. Koren-Karie, et al., 2002; Meins, et al., 2001; Slade, et al., 2005b). Similar to PRF, these studies all explore constructs related to the caregiver's ability to conceptualize the child as a separate psychological agent, and more specifically, to reflect upon the child's internal experiences. However, these studies use variable methods to assess the reflective capabilities of mothers and it is not clear how these related constructs differ from each other, if at all (see Bouchard, Target, Lecours, Fonagy, Tremblay, Schachter, et al., 2008; and Sharp & Fonagy, 2008 for reviews).

For example, one form of mentalization that has been studied in relation to infant attachment is maternal *insightfulness*. A study by Koren-Karie and colleagues (2002), examined the relationship between maternal insightfulness, maternal sensitivity, and infant attachment. In this study, mothers-infant dyads were videotaped during a play session. Mothers then reviewed the footage and were interviewed about their thoughts and feelings experienced during the play session as well as those of their children. Maternal insightfulness was defined as providing explanations for the motives underlying their infants' behaviors and emotional experiences during the play session. Findings demonstrated that mothers classified as positively insightful demonstrated greater sensitivity, and were more likely to have securely attached infants. Furthermore, they found that insightfulness accounted for variance in attachment status over and above maternal sensitivity. The authors contend that insightfulness underlies sensitive caregiving and serves as a mechanism in fostering secure attachment.

Another form of parental mentalization that has been studied in relation to infant attachment is *maternal mind-mindedness* (MMM). MMM refers to a parent's ability to recognize that her infant has a mind of its own, as opposed to some entity with physical needs that must be met (Meins et al., 2001). It is assessed by identifying mothers' verbal comments for appropriate mental state attributions made during an active play session with their child. Meins argues, and provides evidence, that MMM is a specific type of maternal sensitivity, and is related to infant attachment. Specifically, Meins and colleagues (2001) found that attachment security at 12 months was associated with mothers who displayed appropriate mind-related comments about their 6 month-old infants during a joint play session (e.g., comments reflecting awareness of mental states

without misinterpretation or inappropriate attribution). Furthermore, this ability was not associated with another measure of maternal sensitivity, the maternal sensitivity scale (Ainsworth, Bell, & Stayton, 1971), suggesting a process unrelated to traditional conceptualizations of maternal sensitivity. Additionally, it has been demonstrated that prenatal maternal AAI attachment classification is associated with MMM (Arnott & Meins, 2007). This finding, the authors argue, may indicate the role of MMM in the intergenerational transmission of attachment, although the direct mediational relationship has not yet been tested.

Maternal mind-mindedness does not explicitly explore the bi-directional relationship between the mental states and behaviors of both parent and child, which is central to PRF; however, the constructs do overlap. Maternal mind-mindedness could possibly be conceptualized as a kind of “reflective functioning in action” (Rosenblum, McDonough, Sameroff, & Muzik, 2008). In fact, Rosenblum and colleagues (2008) found that maternal reflective capacity and MMM were highly correlated ($r = .39$). The authors hypothesized that the ability of a parent to attribute mental states to her infant during active engagement may be in part a function of her greater proclivity to engage in reflective thinking. Again, it is not quite clear how competing constructs related to parental mentalization (i.e., PRF, MMM, maternal insightfulness, etc.) differ from each other or even from other potentially confounding variables (e.g., intelligence or verbal fluency). More research is necessary to clarify the degree to which these constructs may be capturing identical processes.

Parental reflective functioning explores parents’ general capacity to reflect upon the internal experiences of their child, not just within the context of an active play

session. For this reason, PRF may provide further insight into mechanisms related to attachment development. A preliminary study by Slade, Greienenbergen, Bernbach, Levy and Locker (2005b) served to establish the link between PRF, parent attachment, and infant attachment. In their study of 40 mothers and their infants, Slade et al. found that maternal attachment classification on the AAI (measured during pregnancy) was significantly associated with maternal reflective functioning (PRF assessed using the PDI when infants were 10 months). That is, the mother's ability to cohesively organize representations of her own childhood attachment relationships (secure/autonomous AAI classification) was significantly associated with her ability to reflect upon her own and her child's mental states (PRF). Conversely, insecure adult attachment status was related to lower levels of PRF. Furthermore, maternal reflective functioning was found to be significantly associated with infant attachment security measured at 14 months via the Strange Situation paradigm (Ainsworth et al, 1978). Mothers demonstrating high PRF were more likely to have infants with secure attachments. Infants of mothers with lower reflective capacity were more likely to demonstrate insecure attachment patterns.

Finally, in a preliminary effort to demonstrate the possible role of PRF in the parent-child transmission of attachment, Slade and colleagues (2005b) found PRF to mediate the relationship between adult and infant attachment. After the mediator was entered into the model essentially no association remained between adult and child attachment status. It is important to note, however, that adult and infant attachment were not significantly correlated to begin with in this sample ($r = .23$, $P = .065$), and thus the validity of this mediational link is somewhat questionable. The researchers contend that results still indicate a trend in the predicted direction, but may be weaker as a result

of their small sample size ($N = 40$). They conclude that it is the parent's capacity to understand the nature and function of her own and her child's mental states, which fosters attachment security. Furthermore, parents with high PRF may be better able to identify and interpret their child's needs, thus affecting their parenting behaviors in such a way as to allow her to respond more sensitively and appropriately to her child's emotions and needs.

Grienenberger, Kelly and Slade (2005) sought to explore which parenting behaviors may be associated with maternal reflective functioning and attachment. They found that disrupted affective communication (e.g., laughing when the infant is crying, mocking or criticizing the infant's affective expression, demanding a show of affection) between mother and infant at times of distress during the Strange Situation paradigm was negatively correlated ($r = -.48$) with maternal reflective functioning, and was also associated with insecure attachment patterns (standardized effect size of .72). Furthermore, such maladaptive affective communication was found to mediate the relationship between PRF and infant attachment. Unlike mediation results in Slade et al. (2005b), mediations reported here were partial, and insufficient information is given to judge the effect. Results suggest that maternal capacity to reflect on the child's emotional experiences may play a direct role in parenting behaviors associated with secure attachment (e.g., ability to respond with appropriate affect during times of infant distress). These findings further support the role of PRF in the development of attachment in infancy.

Maternal Maladjustment, Psychopathology, and Parental Reflective Functioning

The parent's reflective capacity has been demonstrated to be an important component of maintaining and fostering developmental processes (e.g., attachment). Conversely, impaired reflective capacity has been associated with maladaptive parenting behaviors and, at the extreme, maternal psychopathology (Grienenberger et al., 2005; Schechter, Coots, Zeanah, Davies, Coates, Trabka, et al., 2005). In the more severe case of psychopathology, it has been proposed that disturbed parents are unable to reflect upon their child's internal experiences mindfully due to their own distorted projections and representations (Fonagy, Gergely, Jurist, & Target, 2002). These parents may find their child's negative affect overwhelming and subsequently misattribute basic cues in light of their own negative experiences. As a result, parents are not only unable to engage in sensitive parenting behaviors, but might also be psychologically unavailable (e.g., withdrawn, apathetic) or demonstrate frightening (e.g., harsh or abusive) behavior. Infants might then internalize frightening experiences, subsequently framing the internal working models of their parent as unpredictable and dangerous, ultimately disrupting the development of secure attachment with their caregivers.

Research has only begun to explore the role that reflective functioning plays in maternal psychopathology. In a clinical inpatient population, Fonagy and colleagues demonstrated a relationship among RF, early traumatic experiences, and later psychopathology (Fonagy, Steele, Steele, Leigh, Kennedy, Mattoon, et al., 1995). It was found that reflective capacities moderated the relationship between early trauma and the development of borderline personality disorder. That is, adults with a traumatic

and abusive history were more likely to develop borderline personality disorder if they also demonstrated poor RF. A highly reflective capacity for representing attachment relationships may thus serve as a protective factor for at-risk populations. The association between maternal psychopathology and parental reflective capacities has also been explored using the newer model of PRF within the parent-child context more specifically.

The relationship among PRF, trauma-related psychopathology, and mental representations of the child and the parent-child relationship were examined by Schechter and colleagues (2005). In their study, inner-city mothers with a history of trauma (approximately half of whom met diagnostic criteria for posttraumatic stress disorder-PTSD) were administered the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995). This narrative interview, similar to the PDI, was coded for both PRF as well as maternal representations of the child and parent-child relationship, using categories corresponding to AAI attachment classifications. Categories included “balanced,” or a propensity to describe both positive and negative things about the child, with an emphasis on the positive; and two self-explanatory categories called “disengaged” and “distorted.” Findings demonstrated a link between PTSD symptom severity and distorted representations of the parent-child relationship (odds ratio = 2.4). Furthermore, balanced and disengaged maternal representations of the parent-child relationship were associated with higher levels of PRF (odds ratios of 4.5 and 10.7, respectively). Maternal reflective functioning and PTSD symptom severity, however, were not significantly correlated. Findings suggest that higher PRF may serve as a

protective factor for women at risk for distorted (but not disengaged) representations of their attachment relationships, particularly for women with traumatic histories.

The studies described above provide findings with conflicting associations between reflective functioning and maternal psychopathology. Clearly there is very little research clarifying such associations, and even fewer studies examining these associations in relation to child outcomes more specifically. Research exploring the role of PRF in alternative forms of maternal psychopathology, such as depression, is called for. Further research in this regard may be particularly warranted given the high prevalence of depression and established negative effects of maternal depression on developmental sequelae. The following section of this dissertation details the effects of maternal depression on child developmental outcomes, and considers the potential contributing role of PRF in this process.

Maternal Depression and Reflective Functioning

Maternal psychopathology and the subsequent impairment that mental illness imposes on parental behavior have been shown to be detrimental to child developmental outcomes (Cicchetti & Toth, 1995; Downey & Coyne, 1990; Goodman & Gotlieb, 1999; Hipwell, Goossens, Melhuish & Kumar, 2000). One group of at-risk parent-child dyads that has increasingly received attention in the literature is depressed mothers and their children. Research has extensively demonstrated the risk that maternal depression imposes on successful child development, including attachment security (e.g., Cicchetti, Rogosch, & Toth, 1998; Field, 1992; Downey & Coyne, 1990). Given the prevalence of depression and clearly established effects of maternal depression on child development,

this is an area of research that is much needed. PRF may serve as a vehicle to better understand the association between maternal depression and disturbances in the parent-child relationship, as well as provide an opportunity for interventions designed for children at-risk for disrupted attachments. The associations among depression, RF, and parent-child outcomes, however, have only recently been considered.

Depression is a debilitating syndrome, characterized by a persistent sad mood, anhedonia (diminished interest in enjoyable activities), disruptive physical symptoms (e.g., fatigue, psychomotor agitation/retardation, weight loss/gain), cognitive changes (e.g., impaired concentration), and distressing feelings and emotions (e.g., worthlessness, guilt, suicidal ideation). Clinical depression, or major depressive disorder (MDD; American Psychiatric Association, 2000), is one of the most common forms of psychopathology in America. According to the U.S. National Comorbidity Survey, an epidemiological study of psychopathology rates in America, the lifetime prevalence of MDD is approximately 17% for Americans (Kessler, 1994). Women are even more prone to depression than men, with MDD rates twice as high among women compared to men. The lifetime prevalence rate of MDD among women is slightly more than 20% nationally. Among community samples, rates of depression among women are even greater, with estimates as high as 25% (APA, 2000). The common occurrence of depression among women is particularly concerning when considering the established effects of maternal depression on child developmental outcomes.

The negative developmental outcomes of children of depressed mothers are vast and have been extensively demonstrated. Children of depressed mothers are at heightened risk for a myriad of adjustment problems in infancy, throughout childhood,

and into adulthood. In particular, the effects of maternal depression on infants have been demonstrated with respect to disrupted attachment relationships (Atkinson, Paglia, Coolbear, Niccols, Parker, & Guger, 2000). In accordance with attachment theory, depressed mothers may become overwhelmed and physically and/or emotionally unavailable to their children, thus impeding the development of a secure attachment between parent and child. Research has demonstrated that infants and toddlers of depressed mothers are more likely to develop insecure attachments compared to controls (Cicchetti et al., 1998; Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Teti, Gelfand, Messinger, & Isabella, 1995). In addition to higher rates of insecure attachment patterns, infants of mothers with more severe or chronic depression have been found to demonstrate greater instances of disorganized attachment, and preschoolers of these mothers have been found to demonstrate impaired patterns of attachment on developmentally appropriate measures of childhood attachment (Teti et al., 1995). These findings are cause for concern, especially given the established association between insecure attachment in infancy and later negative developmental outcomes (Carlson, 1998; Sroufe et al., 2005; Greenberg et al., 1997).

Maternal depression not only affects infant development, but has also been linked to maladjustment among older children, with potentially lasting affects into adulthood. Children of depressed mothers are at risk for a variety of problems including maladaptive cognitive styles, poor social functioning, and academic deficits (see Cicchetti & Toth, 1995; Downey & Coyne, 1990; and Gelfand & Teti, 1990 for reviews). Offspring of depressed mothers are also at greater risk for problems in psychological functioning including more emotional dysregulation and higher levels of

both internalizing and externalizing symptoms. Furthermore, children of depressed mothers are at greater risk for developing psychopathology themselves. Longitudinal and cross-sectional studies have found significantly higher rates of affective disorders among offspring of depressed mothers compared to controls, specifically depression (Cicchetti & Toth, 1995; Cicchetti & Toth, 1998; Downey & Coyne, 1990). Given the prevalence of depression and the associated negative developmental outcomes, it is important to consider possible mechanisms underlying the relationship between maternal depression and child maladjustment.

Depression has been demonstrated to compromise psychological functioning in a variety of ways, including reducing the quality of affective and cognitive discourse among mothers who experience depression. Specifically, mothers who are depressed display significantly less positive affect, exhibit greater negativity, including hostility and irritability, and view themselves as less competent parents (Gelfand & Teti, 1990; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). These characteristics are closely associated with the diagnostic symptoms of MDD and reflect the disruptions in social, cognitive, and affective functioning that depression inflicts. These impairments have further been shown to disrupt parenting behaviors, compromising parents' ability to provide sensitive, consistent care to their children.

Diminished parenting skills may be one possible mechanism linking maternal depression and child maladjustment. Depressed mothers may be particularly prone to respond in maladaptive ways to their children, especially given the impairments in social and cognitive discourse associated with depression and the heightened demands of raising a young, reactive, dependent child. In addition to impairments in maternal

affective and behavioral discourse, maternal depression has a significant effect on the quality of caregiving. Depression is associated with disengaged parenting behaviors, including the absence or reduction of responsive, active, sensitive care (Lovejoy et al., 2000). For example, depressed mothers have been shown to be less vocal with their infants, less responsive, more distant and rejecting, more prone to withdrawal in the face of conflict and affective dysregulation, and to exhibit decreased sensitivity to infant cues of distress (Downey & Coyne, 1990; Gelfand & Teti, 1990; Sameroff, Seifer, & Zax, 1982). Furthermore, maternal depression has been associated with an increase in hostile and maladaptive parenting behaviors. Depressed mothers are more likely than non-depressed mothers to administer poor discipline, and express hostility and irritability towards their children (Downey & Coyne, 1990; Gelfand & Teti, 1990).

Another aspect of maternal functioning that may be compromised by depression is the capacity to engage in reflective functioning. A study by Toth, Rogosch and Cicchetti (2008) examined the role of maternal RF in the attachment security of depressed mothers and their toddlers across a psychotherapeutic intervention. In this intervention study, the reflective capacity of depressed mothers was assessed prior to and following the intervention using Fonagy et al.'s (1998) RF coding system on the adult attachment interview (AAI). Depressed mothers exhibited significantly lower levels of RF compared to controls at baseline. RF was found to increase significantly from pre to post-intervention for depressed mothers, while RF capacities remained unchanged for non-depressed mothers. Furthermore, significant improvements in infant attachment (from predominantly insecure to secure classification) were found post-intervention for the depressed intervention dyads. However, improvements in maternal

RF and improvements in infant attachment were statistically independent; that is, changes in RF were not responsible for the changes in infant attachment. The authors hypothesized that perhaps no significant relationship emerged because maternal RF (assessed using the AAI), as opposed to PRF (assessed using a parent-child attachment interview), was used to measure the mother's reflective capacity. Measuring PRF within the context of the mother's active attachment relationship with her child may reveal a more direct relationship between maternal reflective functioning and attachment outcomes for depressed dyads, as opposed to measuring the mother's capacity to reflect upon her own caregiving history.

A study by Rosenblum, McDonough, Sameroff and Muzik (2008), which did use an attachment interview (the WMCI) to assess parental reflectivity, found only a marginal, non-significant correlation between maternal reflective functioning and depressive symptom scores ($r = -.19, p < .10$). They did not use a clinical sample however. The authors also examined the degree to which maternal reflectivity contributed to appropriate mind-minded comments and sensitive maternal behaviors during an active play session with their 7 month-old infants, beyond the maternal characteristics of education level and depression symptomatology. Using hierarchical multiple regression analyses, the authors found that maternal reflectivity contributed to both mind-minded comments and sensitive maternal behavior beyond the variance explained by education level and depression symptomatology.

The studies described above provide a preliminary assessment of RF/PRF, maternal depression, and parent-child outcomes. Continued research exploring these associations is necessary to better understand if and how PRF is related to maternal

depression, and furthermore, how such associations may contribute to child outcomes including attachment. Such clarification could potentially contribute to the research and development of intervention programs aimed at improving the reflective functioning of depressed mothers and the attachment security of their children.

PRF and Psychotherapeutic Intervention Programs

While the concept of PRF is still quite new, compelling findings have linked the reflective capacities of mothers with positive child development outcomes, such as attachment. On the basis of these preliminary findings, some have called for the research and development of intervention programs aimed at improving PRF and promoting attachment security, particularly for at-risk parent-child dyads. Due to suggested associations in the literature between PRF and positive child outcomes, substance abuse and mental health treatment intervention programs have already begun to include a PRF component to enhance their treatment models (e.g., Jenkins & Williams, 2008; Pajulo, Suchman, Kalland, & Mayes, 2006; Suchman, DeCoste, Leigh, & Borelli, 2010).

Intervention programs aimed at promoting attachment security for children of mothers at risk for poor reflective functioning may be particularly warranted. It has been well established in the literature that infants with insecure and disorganized attachment patterns are at greater risk for a variety of negative developmental outcomes including poor social development, later academic difficulties, and compromised behavioral functioning (e.g., Carlson, 1998; Greenberg et al., 1997; Kochanska, 2001; Sroufe, et al., 2005). With these considerations in mind, PRF intervention programs

have been developed specifically with the goal of fostering successful parent-child attachment relationships.

Slade and colleagues have also been frontrunners in the development of reflective parenting intervention programs for high-risk families (Slade, 2006). Attachment researchers have demonstrated that, due to disruptions in early care, infants raised in high-risk environments are particularly prone to disrupted attachments (Sroufe et al., 2005).

Slade (2006) proposes to use what she refers to as a “traditional psychoanalytic” approach to psychotherapy (see, e.g., Fraiberg, 1980), coupled with empirically-based knowledge, to modify PRF in the parent and thus attachment in the child. In particular, reflective parenting interventions have attempted to promote productive attachments by means of improving parental insight into, and attunement with, the infant’s mental states, needs, and behaviors. It should be noted at this juncture that the development of these programs has been largely theory-based and theory-driven, as empirical evidence regarding the efficacy of such programs is still on-going. Indeed, there exists no published intervention research, and only vague descriptions of the specific therapeutic methods exist.

One such intervention program, developed by Slade and colleagues, is titled *Minding the Baby* (Slade, Sadler, de Dios-Kenn, Webb, Ezechick & Mayes, 2005c; Slade, Sadler, & Mayes, 2005d), has been investigated. This intervention program, driven by psychoanalytic theory, was developed to enhance maternal mentalizing capacities and promote attachment security in high-risk, urban mothers through a home-based nursing/mental health visiting program. Subjects included first-time,

impoverished, predominantly minority teen mothers, with significant histories of emotional and/or physical trauma. Mothers in the intervention group were visited by nurses and clinical social workers trained in mental health intervention practice weekly throughout the first year of their child's infancy, and bi-weekly throughout the second year; mothers in the control group received routine prenatal, pediatric and primary care for mother and child, as did the intervention group.

Minding the Baby used a relationship-based model of psychotherapy, influenced by infant-parent psychoanalytic approaches (Fraiberg, 1980). Specific intervention strategies focused on encouraging mothers to explore and process their own early trauma and attachment history, with the idea that developing a reflective stance in the face of such affectively charged subject matter is crucial to maternal mental health (Slade et al., 2005c). Mothers were thus encouraged to address any distorted, non-cohesive representations of their own attachment histories. Furthermore, through supportive techniques, mothers were guided in using a reflective stance in conceptualizing their child as possessing, purpose driven mental states. Using non-didactic approaches, mothers learned how to better understand their infant's cues, conceptualize the internal mental world of their infants, and meaningfully link them together. Therapeutic techniques included encouragement, empathetic comments, reflection and narration of the infants' behaviors and plausible mental states, and other unstructured, psychodynamic techniques.

Preliminary findings on the success of the *Minding the Baby* reflective parenting intervention program suggest that supportive services centered on promoting a reflective stance in at-risk mothers is beneficial to both mother and infant mental health

(Slade et al., 2005c). Specifically, early analyses indicated a trend towards decreased levels of maternal depressive symptoms, PTSD symptoms, and evidence that generally low maternal reflective capacities measured during pregnancy had improved significantly by 18 months. Furthermore, of the strange situations assessed, the majority (76%) of infants had been classified as secure in their attachments by 18 months. Findings suggest a trend towards improvements in maternal mental health, as well as secure infant attachment for the majority of parent-child dyads assessed. These findings are of course preliminary, and to date there has been no further empirical research published on the efficacy of the *MTB* program. Furthermore, as a criticism of this design, it should be noted that there was no control group involving weekly nurse/social worker visits with a non-therapeutic component. With no intervention control group, there is no way rationally to attribute the success of the intervention group to the particular psychotherapy over and above the effects of weekly support and education from trained staff (i.e., medical care, instruction, and coordinate services provided by the nurse and social worker).

Another group of at-risk parent-child dyads that will benefit from intervention programs aimed at improving infant attachment includes depressed mothers and their children. Given the established relationships among maternal depression, insecure attachment, and negative developmental trajectories, research-driven interventions targeted to this vulnerable population are particularly warranted.

Research using a parent-child psychoanalytic intervention model, similar to that used by Slade and colleagues (2005c, 2005d), has demonstrated the effectiveness of such intervention approaches in improving attachment security among toddlers of

depressed parents (Cicchetti et al., 1999; Toth, Rogosch, Manly, & Cicchetti, 2006). Specifically, Toth and colleagues (2006) found that infants of mothers with a recent history of major depression who participated in a toddler-parent psychotherapy (TPP) intervention, demonstrated significant improvement in attachment status at 36 months of age compared to their pre-intervention attachment, measured at 20 months. Furthermore, rates of secure attachment were found to be greater among parent-child dyads in the intervention sample compared to both a non-intervention control group of depressed mothers and their children, and a control group of mothers with no history of depression and their children.

While the intervention model used by Toth and colleagues (2006) did not specifically target the reflective functioning of depressed mothers, the psychotherapeutic techniques used in this intervention were grounded on work from the same infant-parent psychotherapeutic model used by Slade and colleagues (2005c, 2005d) for their PRF intervention (Fraiberg, Adelson, & Shapiro, 1975). In both cases, intervention techniques sought to improve the mother's ability to understand, interpret, and respond to her child's emotional needs and experiences. Therefore, changes in maternal RF across intervention time points would be expected for depressed mothers in the intervention program as well.

In another study of the same sample (described earlier in this dissertation), Toth, Rogosch, and Cicchetti (2008) explored the relationship between changes in maternal reflective functioning on the AAI and infant attachment status across the toddler-parent psychotherapeutic intervention. The intervention revealed improvements in maternal RF and infant attachment security independently; however, maternal RF was not found

to account for changes in child attachment. The authors hypothesized that perhaps no significant relationship emerged because maternal RF was assessed using narrative interviews that required mothers to reflect upon their past attachment relationships (namely, the AAI). Measuring PRF (using narratives that more relevantly require mothers to reflect upon the active attachment relationship with their child) may reveal a more direct relationship between maternal reflective functioning and attachment outcomes for depressed dyads, as opposed to measuring the mother's capacity for reflection upon her own caregiving history.

Present Study Aims and Hypotheses

Expanding on the discussion points considered by Toth and colleagues (2008), the present study examines the role that PRF plays in changes in attachment patterns, using the same sample of depressed mothers and children involved in a toddler-parent psychotherapeutic intervention (Cicchetti et al., 1999; Toth et al., 2006; Toth et al., 2008). More specifically, this study aims to assess changes in PRF for depressed mothers, changes in child attachment, and the potential mediating effect of PRF on changes in child attachment status across the therapeutic intervention. Results will clarify the role that PRF plays in the promotion of secure attachment for depressed mothers and their children involved in psychotherapeutic intervention programs. Furthermore, this research may bring to light differences between RF and PRF, as no other research has attempted to measure both within the same sample. Consideration of differences in attachment outcomes as a function of maternal RF vs. PRF will serve to fill a gap in the literature. Preliminary results of Toth and colleagues (2008) did not

find RF to significantly mediate changes in attachment status. Therefore, further examination of the mechanisms involved in the promotion of attachment security for depressed mothers and children in preventive intervention is warranted.

Informed by results of the Toth et al. (2008) study, the present investigation examines the following hypotheses: First, it is hypothesized that depressed mothers will exhibit lower PRF compared to non-depressed mothers prior to the toddler-parent psychotherapeutic intervention program (i.e., at baseline). Second, it is hypothesized that the parental reflective functioning of depressed mothers will significantly increase following participating in the psychotherapeutic intervention program (i.e., at follow-up). No change in PRF over time is expected for non-depressed mothers or depressed mothers not participating in the intervention. Additionally, it is predicted that following the intervention, depressed mothers in the treatment group will exhibit PRF comparable to non-depressed mothers and significantly higher PRF than depressed mothers not in the intervention group. Lastly, for the intervention group, it is hypothesized that improvement in parental reflective functioning will account for changes in child attachment status across the psychotherapeutic intervention.

Method

Participants

Participants recruited for this study included mothers with a child of approximately 20 months of age ($N = 160$). Mothers with a recent history of major depressive disorder (MDD) were targeted for participation. Specifically, inclusion criteria required that mothers meet the Diagnostic and Statistical Manual of Mental

Disorders (3rd ed., rev.; DSM-III-R; American Psychiatric Association, 1987) criteria for MDD at some point since the birth of their participating child. Mothers were recruited throughout the community via mental health professional referrals, newspaper and community publication advertisements, and notices distributed in medical offices and on community bulletin boards. Depressed mothers were then randomly assigned to either the depressed intervention (DI) or depressed control (DC) groups using a randomized blocks procedure based on family demographic characteristics in order to ensure balanced representation among group participants (DI: $n = 46$, DC: $n = 52$).

A third sample of mothers was recruited to serve as the non-depressed control group (NC: $n = 62$). Inclusion criteria required that they have no current or past history of a major psychiatric disorder. Mothers in the NC group were recruited by directly contacting families with a toddler of appropriate age as indicated by birth records. Depression status and psychiatric disorder history were determined for all participants using the Diagnostic Interview Schedule (DIS-III-R; Robins, Helzer, Orvaschel, Anthony, Blazer, Burnam et al., 1985).

Additional inclusion criteria required all participants to have at least a high school education and not be of low socioeconomic status (i.e., not reliant on public assistance), with the intent to minimize the effects of co-occurring risk factors that may accompany depression (Coyne & Downey, 1991). Mothers were not restricted from participation based on the number of children they had, or birth order of participating child (i.e., the participating child did not necessarily have to be an only-child or first born). Depressed mothers were not restricted from involvement in other mental health

intervention or treatment during the duration of the study (e.g., individual psychotherapy, medication management, marriage and family therapy).

Research team members (assessment administrators, coders, etc.) were blind to participant group membership.

Participant Demographics

Average maternal age was 32 years, with a range of 22 to 41 years ($M = 31.64$, $SD = 4.5$). The majority of mothers were White (93.1%), followed by Black (3.8%), Hispanic (1.9%), Pacific Islander (0.6%) and unspecified ethnicity (0.6%). As determined by the inclusion criteria, participants were at least high school educated. The majority of participants obtained some education beyond high school (67.8%). A significant percentage of mothers had completed 4-years of postsecondary education (37.5%), and a sizable group had pursued additional graduate study beyond (16.9%). The majority of participants were employed (83.9%). Most mothers were currently married (87.5%). Participants had on average two children ($M = 1.94$, $SD = 1.08$).

At the time of initial assessment, participating toddlers were on average 21.75 months of age ($SD = 2.58$). A comparable number of male and female children were represented (males: $n = 81$, females: $n = 79$). Most children had attended some daycare (60.6%).

Subject groups were demographically similar across many background variables (e.g., ethnicity, number of children, age of participating toddler, years of education, number of times married, number of hours/week of work). There were some notable differences among subject groups. Specifically, mean maternal age at baseline differed

among groups; Mothers of the non-depressed control group were approximately 2-3 years older than mothers in the depressed control group ($F(2,159) = 3.76, p < .05$). Group differences were also found for marital status, with a greater proportion of currently married women in the non-depressed group compared to depressed groups ($\chi^2(6) = 18.88, p < .01$), which is consistent with research that has linked increased marital problems and depression (Coyne & Downey, 1991). Per inclusion criteria, families were not of low SES; however, the distribution of family income level differed significantly among subject groups ($\chi^2(10) = 25.74, p < .01$), with 78% of families in the NC group making \$40K or more annually, compared to 50% and 30% in the DI and DC groups, respectively. Finally, as would be expected, subject groups differed significantly in terms of depression symptom counts, assessed using the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Demographic information is summarized below in Table 1.

Table 1
Descriptive Statistics of Participant Demographic Information

	Depressed Intervention (DI) n = 46		Depressed Control (DC) n = 52		Non-depressed Control (NC) n = 62		Comparison Statistics
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Maternal age	31.63	4.73	30.38	4.87	32.69	3.91	$F(2,159) = 3.76, p < .05^*$
Child age (BL)	21.37	2.18	21.69	2.50	22.08	2.88	$F(2,154) = .99, ns$
Yrs of education	15.24	1.51	14.96	1.67	14.84	1.66	$F(2,159) = .82, ns$
# Times married	1.12	0.40	1.17	0.38	1.11	0.32	$F(2,149) = .30, ns$
Hours work/wk	25.42	12.42	26.07	16.97	25.23	13.86	$F(2,105) = .03, ns$
# of Children	1.80	.93	1.79	0.80	2.16	1.33	$F(2,159) = 2.21, ns$
BDI depression	16.2	9.68	16.85	9.00	2.34	3.03	$F(2,159) = 67.56, p < .01^{**}$

	%	n	%	n	%	n	
Race							$\chi^2(8) = 7.02, ns$
White	96	44	88	46	95	59	
Black	2	1	6	3	3	2	
Marital Status							$\chi^2(6) = 18.88, p < .01^{**}$
Married	80	37	81	42	98	61	
Income Range							$\chi^2(10) = 25.74, p < .01^{**}$
15K or less	9	4	8	4	2	1	
15-25	15	7	16	8	2	1	
25-40	26	12	39	20	18	11	
40-60	35	16	25	13	51	31	
60-100	15	7	8	4	21	13	
100+	0	0	4	2	6	4	

* $P < .05$, ** $P < .01$ significance level

Baseline and Follow-up Assessments

Participants in all subject groups were administered a series of interviews and questionnaires in their homes during the baseline assessment. To assess for depression status mothers were administered the DIS-III-R (Robins et al., 1985). Depression symptom counts were assessed using the Beck Depression Inventory (BDI; Beck et al., 1961). The Parent Attachment Interview (PAI; Bretherton et al., 1989) was administered to obtain a qualitative assessment of the parent-child relationship. Demographic information was also obtained. In a laboratory session, subsequent to the initial interview, mothers and their toddlers participated in the Strange Situation procedure to assess attachment status (Ainsworth et al., 1978).

Following completion of the psychotherapeutic intervention for the DI group, families in all subject groups were revisited in their homes for a follow-up assessment. Children, during follow-up, were approximately 36 months of age ($M = 36.69$, $SD = 1.87$). Demographic information was reassessed, and the DIS-III-R and PAI interviews were re-administered for all participants. Attachment status was also re-assessed during a laboratory-based follow-up session using the Strange Situation procedure.

Psychotherapeutic intervention

The toddler-parent preventive intervention was based upon Selma Fraiberg's infant-parent psychotherapy model (Fraiberg, 1980; Fraiberg et al., 1975). Fraiberg's model, built upon the framework of attachment theory, was developed with the aim of addressing unresolved emotional barriers from the mother's past, which may hinder the development of the evolving parent-child relationship. Therapeutic techniques utilized in the current study were guided by a modified approach to the Fraiberg model for use with older toddler-parent dyads (Lieberman, 1992). As consistent with the aims of infant-parent psychotherapy, this intervention did not specifically target improvement in maternal mental health but rather sought to improve the quality of the attachment relationship between depressed mothers and their children.

Utilizing a relationship-based approach to psychotherapy, supervised clinically-trained therapists applied intervention techniques in accordance with the manualized toddler-parent psychotherapy (TPP) procedures. Toddlers and their mothers were jointly visited on a weekly basis beginning when the toddlers were approximately 20 months of age until approximately 36 months.

The main focus of the intervention was to explore the affective experiences of mother and child, both as described by the mother and as observed during natural interactions between parent and child as they occurred during joint therapy sessions. Therapists provided mothers with a corrective emotional experience in which mothers could explore unresolved feelings of anger or ambivalence directed towards the child, the therapist, or past attachment figures. Mothers were encouraged to reconstruct

representations of self in relation to others by recognizing how experiences of prior relationships can affect current feelings and behaviors directed towards their child. They were encouraged to reduce distortions, misperceptions, or negative attributions assigned to the child's motives and behaviors. Specific intervention strategies focused on improving maternal representations of experiences with her child through the use of empathetic comments, respect, concern, accommodation, positive regard, and related techniques. Together, these methods assisted the mother in recognizing how her representations affected interactions with her toddler, thus allowing for opportunities to alter distorted perceptions. Therapeutic techniques used in TPP do not utilize more directive approaches such as teaching, modeling, or didactic instruction in order to modify parenting behaviors.

The goal of the intervention is to allow mothers to internalize new experiences as they are re-framed and provide mothers with a corrective attachment experience, such that quality of subsequent interactions with the child will improve as a result of changes in maternal representations. For more detailed descriptions of the psychotherapeutic intervention techniques and guiding principles employed, please see Cicchetti et al. (1999) and Lieberman (1992).

Measures

DIS-II-R (Robins et al., 1985). The DIS-III-R is a structured clinical interview that assesses for psychiatric disorders according to the DSM-II-R (APA, 1987) diagnostic criteria. The interview asks yes/no questions regarding a person's history of symptoms for various Axis I disorders. Interviews are scored by computer, and

diagnoses are rendered according to item/symptom endorsement as they pertain to specific diagnostic criteria.

Strange Situation (Ainsworth et al., 1978). The attachment status of toddlers at baseline was assessed using the standard Strange Situation Paradigm. During this videotaped laboratory assessment, toddlers were introduced to a series of increasingly stressful events, including the presence of a stranger, and repeated reunions and separations with their caregiver. Toddlers were classified as either secure (B), insecurely-avoidant (A), insecure-resistant (C), or disorganized (D) in their attachment according to Ainsworth et al.'s (1978), and Main and Solomon's (1990) coding criteria. Additionally, attachment classification coding was supplemented using a developmentally appropriate modified coding scheme for children ages 18 to 24 months (Gersten, Coster, Schneider-Rosen, Carlson, & Cicchetti, 1986).

The attachment status of toddlers at follow-up (post-intervention for DI dyads) also was assessed using the Strange Situation procedure. To derive attachment classifications in this older sample of toddlers (36 months), the developmentally appropriate MacArthur coding system was used (Cassidy & Marvin, 1992). See Toth et al. (2006) for a more detailed description of the attachment classification procedure used in this sample.

PAI (Bretherton et al., 1989). The PAI is a semi-structured interview with 22 questions. The hour long interview asks parents to reflect upon their relationship with their child, to describe their experiences as a parent, and provide examples of their child's behaviors and feelings within the context of daily interpersonal conflicts and interactions. Questions elicit narrative descriptions of specific examples of parent-child

interactions and experiences. Sample items include: “describe some of the times when you feel really close to your child,” “please describe a few situations when your child is sad or upset,” “when your child has made you angry what does s/he do?,” and “what are your child’s reactions when you leave for a weekend or longer?” These and other interview items are designed to foster responses that require some reflection upon interpersonal experiences.

Assessment of Parental Reflective Functioning

Parental reflective functioning is assessed and operationalized according to Slade et al.’s (2005a) parental reflective functioning coding system (for brevity, PRF-CS). The PRF-CS measures four putative categories of reflective functioning, which caregivers can demonstrate via their interview responses. The following section summarizes these categories and provides hypothetical narrative examples to illustrate.

The first category assessed by the PRF-CS involves 1) *parents’ awareness of the nature of mental states*. This category assesses the parent’s awareness of the characteristics of emotions and mental states within themselves and their child. Within this category a parent may acknowledge that either her child’s or her own emotions can be difficult to discern (e.g., “I am not sure if I was really sad, I think I was just more disappointed;” “He seemed grumpy, but he may have just been tired”). A parent may also recognize that mental states can be susceptible to disguise or suppression (e.g., “I really try not to show him my anger, especially if it’s not about him, and usually I don’t think he picks up on it”). This category also includes the recognition that mental states may be developmentally appropriate (e.g., “I know she’s too young to understand why I

don't want her to do that"). Finally, within this category parents might express recognition of defensive processes associated with mental states (e.g., "I just felt numb at the time; I was trying not to think about it.").

The second category of reflective functioning, assessed by the PRF-CS is 2) *parent's explicit effort to tease out mental states underlying behavior*. This category captures the parent's ability to recognize the causal relationship between behaviors and mental states. Within this category, a parent may recognize that behavior may be a function of underlying mental states (e.g., "He was throwing his toys across the room and stomping his feet, so I knew he was really mad;" "She gets anxious when she sees me putting on my coat; she'll whine and reach for me to pick her up."). A parent may also recognize that mental states can impact other mental states of self or child (e.g., "I was just feeling so frustrated with her and that was making her even more upset;"). A parent might also recognize that her emotions may be unrelated to aspects of the present situation (e.g., "I was so cranky and tired, yelling at him to cooperate, but I know I was really just stressed about work and was taking it out on him."). A final example of reflective functioning within this category is recognizing that the parent and child may have diverse perspectives regarding a situation (e.g., "Even though he loves bath time, I find it stressful").

The third category assessed by the PRF-CS involves the parent's ability to 3) *recognize developmental aspects of mental states*. Within this category, parents demonstrate a capacity to recognize that mental states can change over time. Specifically, a parent may take an intergenerational perspective, relating emotional experiences across family members (e.g. "my mom always worried about us and now I

find that I too worry about every little thing”). A parent may also acknowledge that mental states are susceptible to change over time, across developmental stages or even day to day (e.g., “I used to feel nervous about becoming a mother, but now that I am one, I feel so much more fulfilled in life;” “At first he was really upset when we got to the store, but by the time we left he was happy.”). A final example within this category of reflective functioning is when a parent revises thoughts and feelings about childhood as a result of understanding gained over time (e.g., “Now that I’m older, I realize that my father really did love me, he just showed his love in a way that I didn’t understand back then.”).

The final category of reflective functioning assessed by the PRF-CS is 4) *awareness of mental states in relation to the interviewer*. A parent’s recognition of mental states may also be observable in their recognition of the separate perspectives between themselves and the interviewer (e.g., “You may think it sounds strange, but I still get upset when I drive past that old house.”). They might also demonstrate a reflective capacity by considering that the interviewer might not have access to certain knowledge. This would be demonstrated, for example, through spontaneous clarification, or acknowledgement of ambiguities presented in a narrative response.

Assessment of the four aforementioned PRF-CS categories is used to derive passage scores for responses to each of the pertinent questions from the narrative interview. These passage scores are then used to derive an overall reflective functioning score, which is measured using an 11-point ordinal scale (describing a range from “negative” to “high”), and represents the quality of a parent’s reflective functioning. The overall PRF scale score thus quantifies one’s reflective capacity,

representing the quality of PRF demonstrated by subjects within their narrative responses. For the purposes of this dissertation, the overall score and quality of PRF that parents may demonstrate along this ordinal scale are described below more generally in terms of *low*, *moderate*, and *high* reflective functioning (see Slade et al., 2005a for a more detailed description of the 11-point scale and the pertinent anchor point descriptions).

Low parental reflective functioning broadly describes parents who are limited in their ability to reflect upon the inner world of their child, and fail to use their own internal experiences to guide their parental behaviors. A parent with low reflective functioning may, for example, respond dismissively to interviewer's questions, failing to acknowledge their own feelings and how such feelings might affect their child (e.g., "I never get angry."). This parent may often use excessive behavioral or personality descriptions, or canned/cliché responses to questions about their child, failing to identify feelings or acknowledge the emotional capacity of their child (e.g., "he's cute;" "she's a good baby;" "she's always playing with blocks and running around."). Parents with slightly more (but still low) reflective capacity may identify the feelings and mental states of their child, but fail to reflect upon the child's internal experience or how these experiences affect behaviors or the parent-child relationship (e.g., "he likes blocks," "she was sad."). Parents with low reflective functioning do not make explicit efforts to tease out the mental states underlying behavior, and thus may not be as capable to respond sensitively to the needs of their child (which they often fail to identify).

Parents demonstrating moderate PRF are generally able to demonstrate that they possess a model of their child's internal experiences and reflect upon the interplay between their own and their child's mental states and behaviors. These parents are able to explicitly demonstrate any number of the reflective functioning categories described above with little or no inference necessary from an external rater. These parents, however, may fail to demonstrate an understanding of the more complex aspects of interpersonal relationships such as ambivalence or causal associations between the parent and child's internal experiences.

Finally, parents with high PRF are consistently and explicitly able to reference the complex and dynamic interplay between their own and their child's internal experiences and the effects that these experiences have on behaviors and subsequent mental states. Highly reflective parents may express awareness of the ambiguity of certain feelings regarding a situation. They may acknowledge the complexities of emotional experiences such as ambivalent feelings or the fact that feelings may be susceptible to disguise. These parents understand that feelings can be temporal, evolving over time. Furthermore, highly reflective parents are able to use such awareness to guide their parenting behaviors and may thus be better equipped to respond sensitively to their child's needs.

Coding for Parental Reflective Functioning

For the present investigation, participants' parent attachment interviews (PAI) were audio recorded and verbatim transcriptions were obtained directly from these audio recordings. Several interviews were unable to be used due to poor audio

recording quality/unintelligibility of subjects. In total, 95% ($n = 152$) of baseline interviews and 92.5% ($n = 148$) of follow-up interviews were coded. There were no differences among the participant groups with respect to number of unusable interview tapes at either baseline ($\chi^2(2) = 1.29, ns$) or follow-up ($\chi^2(2) = 3.71, ns$).

PAI interviews from both baseline and follow-up assessments were coded for maternal PRF using the procedures outlined above (Slade et al., 2005a). As mentioned previously, the PRF coding system was originally designed for use with the Parent Development Interview (PDI; Aber et al., 1985); however, the PAI is a comparable interview with numerous overlapping questions, and was deemed to be an acceptable interview from which to code PRF by the developers (i.e., Slade and colleagues).

In accordance with the PRF coding procedure, mothers' transcribed interviews were assessed for instances of reflective functioning across the four aforementioned reflective categories: (1) awareness of the nature of mental states; (2) the explicit effort to tease out mental states underlying behavior; (3) recognizing developmental aspects of mental states; and (4) mental states in relation to the interviewer. Reflective statements across categories were qualitatively analyzed to derive an overall reflective functioning score for each mother's interview as a whole. Overall PRF scores, measured using an 11-point ordinal scale ranging from -1 (negative PRF) to 9 (exceptional PRF), represent the quality of a parent's reflective functioning. The overall PRF scale score thus quantifies one's reflective capacity, representing the quality of PRF demonstrated by subjects within their narrative responses.

I, along with another graduate student from the University of Rochester, received PRF coding and reliability training from Dr. Arietta Slade. As independent

raters, the two of us, unaware of the intervention group status of mothers, coded all baseline and follow-up interviews for PRF. To ensure coding reliability across raters, a random portion (20%) of interviews from baseline and follow-up were assessed; inter-rater reliability was determined to be satisfactory using widely accepted standards for intraclass correlation coefficients (baseline: $r = .70$, follow-up: $r = .77$).

Data Analyses

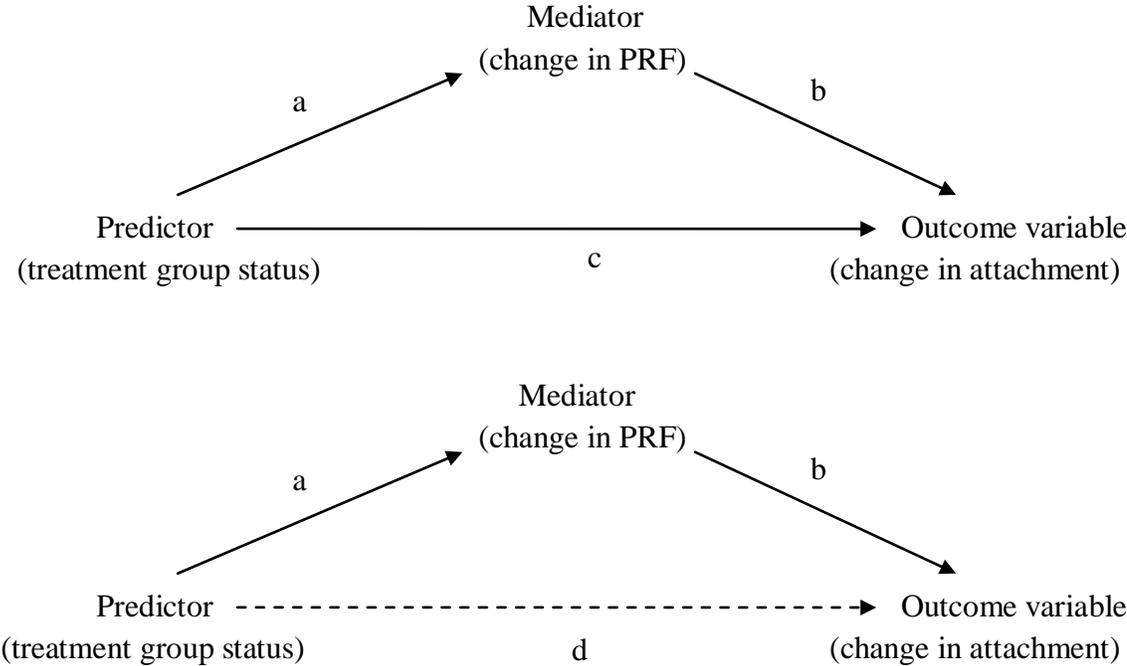
Because the subsample used in the present study differs slightly in number from the sample used in the Toth et. al. (2006) study, a series of χ^2 means comparisons were conducted to ensure that attachment findings in the present sample were consistent with those of Toth and colleagues.

To address main hypotheses, one-way analysis of variance and pairwise t-tests were used to assess group differences in parental reflective functioning both pre and post-intervention.

Finally, a mediation test was conducted to determine if change in parental reflective functioning was responsible for the observed treatment effect on attachment classification. To do this, a metric was constructed to evaluate change in attachment status from baseline to follow-up. Change in attachment classification from secure to insecure was rated as 0, maintaining insecure classification was rated as 1, and improvement from insecure to secure, or maintenance of secure attachment was rated as 2. This score was then used as the outcome variable in regression analysis. Treatment status was the predictor variable (Depressed Intervention vs. Depressed Control). Change in PRF was the mediator variable. In this way, one can test whether change in

PRF was responsible for the treatment effect on attachment status. *Figure 1* below illustrates the mediation model tested using the aforementioned variables.

Figure 1
Model for Testing Mediation of Change in Parental Reflective Functioning on Attachment



In order for a mediation to occur, path “a” and “b” of *Figure 1* must be significant (Shrout & Bolger, 2002). If these pathways are significant, then mediation would be demonstrated if the regression coefficient for treatment group status tends to zero while the regression coefficient for change in PRF remains significant.

Results

Baseline and Follow-up Toddler Attachment Classification

Consistent with the sample used by Toth and colleagues (2006), significant baseline (pre-intervention) differences in attachment organization, measured using the *Strange Situation* assessment, were found among toddlers of the depressed intervention (DI), depressed control (DC), and non-depressed control (NC) groups ($\chi^2(6) = 31.17, p < .01$). Specifically, a greater percentage of securely attached toddlers (54.8%) were found among the NC group compared to the DI (13%) and DC (17.3%) groups, while a larger percentage of toddlers with disorganized attachment were found among the DI (36.9%) and DC (48.1%) groups compared to the NC group (19.4%). Similar patterns held when avoidant, resistant, and disorganized attachment groups were collapsed into a single group representing “insecure attachment,” such that, significant group differences emerged with respect to secure vs. insecure attachment classification at baseline ($\chi^2(2) = 28.14, p < .01$). With the vast majority of toddlers classified as insecure among the DI (87.0%) and DC (82.7%) groups compared to the NC (45.2%) group. Toddlers of DI and DC mothers did not differ significantly with respect to secure and insecure attachment frequencies ($\chi^2(1) = .34, ns$). Table 2 summarizes group percentages among each of the respective attachment classifications.

Again, consistent with the Toth et. al. (2006) sample, distributions of toddler attachment classifications shifted substantially ($\chi^2(6) = 31.66, p < .01$) among subject groups at follow-up (i.e., post toddler-parent psychotherapy intervention). Whereas DI and DC attachment distributions were comparable at baseline, the DI group became more similar to the NC group following intervention. Specifically, the majority of DI

toddlers were found to have secure attachment following the intervention (67.4%), compared to a small percentage of DC toddlers at follow-up (13.5%). Disorganized attachment rates significantly decreased among the DI group post-intervention (10%) compared to the majority of DC toddlers with disorganized attachment at follow-up (42.3%). Notably, the rates of disorganized attachment were even smaller among the DI group compared to the NC group (20.9%) at follow-up. Significant group differences remained when insecure attachment categories were collapsed into a single category ($\chi^2(2) = 30.16, p < .01$). More specific contrasts revealed that significantly more DI toddlers were classified as securely attached (67.4%) compared to DC toddlers (13.5%) ($\chi^2(1) = 29.90, p < .01$). Attachment security was greater among the DI group compared to the NC group at follow-up ($\chi^2(1) = 4.56, p < .05$). Among the DI group at follow-up, 67.4% of toddlers were securely attached and 32.6% were insecurely attached). In contrast, 46.8% of NC control toddlers demonstrated secure attachment vs. 53.2% with insecure attachment. Table 2 summarizes distribution percentages across subject groups and attachment classifications at both baseline and follow-up.

Table 2

Baseline and Follow-up Attachment Classification Distribution among Treatment

Groups

Attachment Classification	Depressed Intervention (DI) n = 46		Depressed Control (DC) n = 52		Non-depressed Control (NC) n = 62	
	%	n	%	n	%	n
Baseline						
Avoidant (A)	41.3	19	26.9	14	20.9	13
Secure (B)	13.0	6	17.3	9	54.8	34
Resistant (C)	8.7	4	7.7	4	4.8	3
Disorganized (D)	36.9	17	48.1	25	19.4	12
Secure	13.0	6	17.3	9	54.8	34
Insecure	87.0	40	82.7	43	45.2	28
Follow-Up						
Avoidant (A)	17.4	8	36.5	19	25.8	16
Secure (B)	67.4	31	13.5	7	46.8	29
Resistant (C)	4.3	2	7.7	4	6.4	4
Disorganized (D)	10.9	5	42.3	22	20.9	13
Secure	67.4	31	13.5	7	46.8	29
Insecure	32.6	15	86.5	45	53.2	33

Baseline and Follow-up Parental Reflective Functioning

Baseline (pre-intervention) parental reflective functioning was assessed for all three subject groups (DI, DC, and NC). Across the entire sample, baseline PRF scores ranged from 3 to 7 (on a rating scale from 0 to 11). In contrast to hypothesized group differences at baseline, a one-way analysis of variance indicated no significant difference in PRF for the three participant groups ($F(2,149) = 1.19, ns$), as subject groups had comparable average PRF scores (Depressed Intervention: $M = 5.00, SD = 1.05$; Depressed Control: $M = 4.88, SD = 1.12$; Non-depressed Control: $M = 4.68, SD =$

1.04). Additionally, no differences were found when comparing non-depressed controls to a collapsed sample of all depressed mothers (DI + DC) ($t(150) = 1.451, ns$).

Follow-up (post-intervention) parental reflective functioning was also assessed among subject groups. PRF scores again ranged from 3 to 7 at follow-up across the entire sample. Post-intervention parental reflective functioning did not differ among DI, DC, and NC subject groups ($F(2,143) = .26, ns$), with all groups again found to have comparable PRF averages at follow-up (DI: $M = 4.85, SD = 1.15$; DC: $M = 4.75, SD = 1.06$; NC: $M = 4.70, SD = 0.87$).

Baseline and follow-up PRF scores were compared among each subject group using paired-sample t-tests. No differences were found between baseline and follow-up PRF for any of the subject groups. That is, PRF among the DI group remained consistent ($t(36) = .79, ns$), as well as among the DC ($t(48) = .84, ns$), and NC groups ($t(50) = -.27, ns$). Similarly, no differences among subjects groups PRF across time was found using a repeated-measures analysis of variance ($F(1,134) = .90, ns$).

Finally, change in PRF across time was further assessed by creating a within-subject change score (pre-intervention PRF score subtracted from post-intervention PRF score). Using this change variable, still no differences in PRF change overtime were found among subjects groups ($F(2,138) = .27, ns$). Table 3 summarizes PRF scores among subjects groups across assessment time points.

Table 3

Baseline and Follow-up Parental Reflective Functioning among Treatment Groups

	Depressed Intervention (DI)		Depressed Control (DC)		Non-depressed Control (NC)		Comparison Statistics
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Baseline PRF	5.00	1.05	4.88	1.12	4.68	1.04	$F(2,152) = 1.19, ns$
Follow-up PRF	4.85	1.15	4.75	1.06	4.70	0.87	$F(2,143) = .26, ns$
PRF Change (follow-up score – baseline score)	-0.19	1.45	-.026	1.51	-0.06	1.24	$F(2,138) = .27, ns$

Mediational Effects of Parental Reflective Functioning on Changes in Attachment

To test the mediation model, an initial regression was run to test the relationship between treatment group status and change in attachment (step c in *Figure 1*). Results show that treatment group status significantly predicts change in attachment, as expected ($\beta_0 = 1.02, p < .01, \beta_1 = .66, p < .01$). The second regression tested the relationship between change in attachment and change in PRF (step b in *Figure 1*); however, change in PRF did not significantly predict change in attachment ($\beta_0 = 1.32, p < .01, \beta_1 < .01, ns$). A third regression was run to test the relationship between treatment group status and change in PRF (step a in *Figure 1*). Treatment group status, however, did not significantly predict change in PRF ($\beta_0 = -.26, ns, \beta_1 = .07, ns$). Finally, change in attachment was regressed onto both change in PRF and treatment group status (step d in *Figure 1*). Results show that change in PRF does not mediate the

effect of treatment on improvement in attachment ($\beta_0 = 1.02, p < .01, \beta_{\text{PRF}} < .01, ns, \beta_{\text{group}} = .71, p < .01$).

As previously mentioned, in order for a mediation to occur, path “a” and “b” of *Figure 1* must be significant (Shrout & Bolger, 2002). Neither path, however, was significant, precluding the possibility of mediation. Assuming these pathways had been significant, mediation would have been demonstrated if the regression coefficient for treatment group status had tended to zero while the regression coefficient for change in PRF remained significant (which was not demonstrated). However, because pathways “a” and “b” (i.e., relationship between treatment group and change in PRF, and between change in PRF and change in attachment) were non-significant, the test of mediation is invalid and the hypothesis falsified.

Supplementary Analyses: Education and Parental Reflective Functioning

Supplementary analyses examined the relationship between years of education and parental reflective functioning among the groups. Separate correlations showed no relationship between baseline PRF and education for each of the three individual subject groups (DI: $r = .12, p = .50$, DC: $r = .07, p = .63$, NC: $r = .21, p = .11$); however, the relationship between education and baseline PRF became marginally significant ($\beta_{\text{edu}} = .09, p < .10$), when a more powerful regression analyses was run. Group status did not have a significant effect in this relationship ($\beta_{\text{group}} = .06, p = .75$).

The relationship between education and PRF at follow-up was also assessed. This relationship was significant for the DC and NC groups ($r = .33, p = .02$ and $r = .29, p = .04$, respectively), but not for the DI group ($r = .06, p = .70$). Again using

regression, PRF at follow-up was found to be significantly related to education ($\beta_0 = 2.46, p < .01$), regardless of group membership ($\beta_{\text{group}} = .06, p = .76$). Table 4 illustrates the correlations between PRF and education for subject groups at baseline and follow-up.

Table 4

Education and Parental Reflective Functioning Correlations for Subject Groups

Subject Group	Baseline	Follow-up
	Education and PRF	Education and PRF
	<i>r</i>	<i>r</i>
Depressed Intervention (DI)	$r = .12, p = .50$	$r = .06, p = .70$
Depressed Control (DC)	$r = .07, p = .63$	$r = .33, p = .02$
Non-depressed Control (NC)	$r = .21, p = .11$	$r = .29, p = .04$

Supplementary Analyses: Correlations

Correlational analyses were run to test the relationship between continuous variables of interest (e.g., maternal education, socioeconomic status, and depression symptom count score, PRF, and RF at baseline and follow-up, attachment classification, etc.). Results showed a significant correlation between PRF score at baseline and follow-up ($r = .27, p = .00$). A moderately significant relationship between PRF maternal educational attainment was found at baseline ($r = .15, p = .07$); this relationship was significant at follow-up ($r = .26, p = .00$). Although maternal education and maternal SES ($r = .70, p = .00$), and maternal education and family SES were significantly correlated ($r = .60, p = .00$), no significant relationship emerged among

PRF and SES at either time point. Additionally, no significant correlation findings emerged among depression symptoms counts, PRF, RF, or strange situation classification at either time point.

Discussion

The research of Toth, Rogosch, Manly, and Cicchetti (2006) demonstrated the efficacy of a toddler-parent psychotherapeutic intervention in reorganizing and improving the attachment system of depressed mothers and their offspring. The same intervention was also shown to improve the capacity of depressed mothers to recognize and reflect upon the mental experiences of self and others; namely, *reflective functioning* (RF) (Toth et al., 2008). Positive changes in maternal RF, however, were not shown to account for the effectiveness of the intervention in improving attachment. The authors posited that perhaps improvements in the *parental reflective functioning* (PRF) of depressed mothers (i.e., their capacity to recognize and reflect upon the mental experiences of self and child, specifically within the context of the parent-child relationship) would more appropriately and successfully account for positive attachment reorganization post intervention. The purpose of the present study was to address this question directly.

Hypotheses for this study were threefold. First, this study sought to address the question of whether depressed and non-depressed mothers demonstrate differing abilities to reflect upon the mental states of their child and themselves within the context of the parent-child relationship (PRF). Because non-depressed mothers have been found to demonstrate superior general reflective functioning (i.e., reflecting upon

mental states while considering the context of their own developmental experiences using the Adult Attachment Interview) compared to depressed mothers (Toth et al., 2008), it was predicted that non-depressed mothers would also demonstrate higher levels of parental reflective functioning. Results of this study, however, show no differences between the PRF of depressed and non-depressed mothers.

Second, this study compared the PRF of depressed mothers following participation in a toddler-parent psychotherapy intervention, to both non-depressed mothers and depressed mothers who did not participate in the intervention. Based on previous findings related to general reflective functioning of the same sample (Toth et al., 2008), it was predicted that depressed mothers in the intervention group would demonstrate an increase in PRF following the intervention, and that non-depressed mothers and depressed controls would not demonstrated changes in PRF over time. Furthermore, it was predicted that post-intervention, depressed mothers in the treatment group would exhibit PRF comparable to non-depressed mothers and significantly higher PRF than depressed mothers not in the intervention group.

Findings revealed no changes in PRF from baseline to follow-up among any of the three groups. Furthermore, all three groups demonstrated comparable levels of PRF at follow-up. In other words, parental reflective functioning remained equivalent and stable across time for all subject groups.

Third and finally, this study examined whether the efficacy of the toddler-parent psychotherapeutic intervention (in improving attachment) could be explained by changes in parental reflective functioning. Specifically, it was predicted that improvement in PRF (from baseline to follow-up) among the intervention group would

account for (mediate) improvement in child attachment status following the intervention. However, no change in PRF was found over time for the intervention group, demonstrating that PRF cannot be attributed to the efficacy of the intervention on improving attachment.

Limitations and Future Considerations

There are a number of limitations regarding both the theory of parental reflective functioning and the research attempting to test that theory, including the present study. First and foremost, it is important to note that the area of PRF is a new field of research in need of further validation and support. There have been no studies to date, beyond those of the developers of PRF (Arietta Slade and colleagues), replicating the original research findings linking PRF with adult and infant attachment security (Slade et al., 2005b). Replication is absolutely crucial to validating a finding, especially when those findings are as complex and context dependent as mediation. Furthermore, no known formal outcome studies have been published demonstrating the efficacy of PRF intervention programs. Again, replication (especially by independent labs) is essential to validate psychotherapeutic interventions (see, e.g., Nathan & Gorman, 2007).

In order to justify continued research and intervention program development in this area, it is imperative for a body of research to develop in support of both the construct and predictive validity of PRF. For example, structural analyses of the parental reflection functioning coding system (PRF-CS; Slade et al., 2005a) would uncover the different factors of the PRF-CS. The factor analytic results could be compared to the four RF categories posited by the coding system's developers. Failure

to fit a four-factor solution may undermine the theoretical justification underlying the coding system. It also remains unclear as to how or why the four categories of the RF/PRF coding system were selected (e.g., were they theory or research based?). For example, the PRF coding system was modified from the RF system in order to specifically target reflective stances within the context of the parent-child relationship; however, the fourth coding category (i.e., *awareness of mental states in relation to the interviewer*), which captures the parent's recognition of diverse perspectives between themselves and the interviewer, was retained in the new PRF coding system. This fourth category appears to assess the general reflective capacity of the parent instead of specifically focusing on the parent-child relationship. Thus, the purpose of the different coding system categories is confusing. Furthermore, it may be useful to determine the incremental validity of each of the PRF-CS's putative categories. Findings of incremental validity for each category would support the developers' theoretically-derived scales; lack of incremental validity would falsify those derivations.

The relationship between RF and PRF also needs to be clarified. While theoretically the two may be related, this has never been formally explored in the literature. Prior to the present study, no other research has assessed RF and PRF in the same subject sample. It would be helpful to clarify if and how the two constructs present within individuals. It may be the case that individual differences between RF and PRF are not substantial and that the two constructs are measuring the same ability. That is, the capacity to reflect upon mental status may generalize beyond the particular relationship context in which it is assessed.

Another concern regarding PRF research is the likely confounding contribution of intelligence, verbal fluency, and educational attainment to parental reflective functioning capacities. In accordance with the PRF-CS coding manual (Slade et. al., 2005a), PRF is assessed by coding the content and quality of verbatim responses to interview questions. Although the PRF-CS instructs coders not to penalize mothers who are brief or less articulate with their responses, the nature of the coding system tends to reward more loquacious and articulate mothers with higher PRF scores. Therefore, the contribution of PRF to attachment status over and above maternal verbal intelligence must be established. Although Fonagy and colleagues (1991a) found no significant correlation between RF and education, verbal IQ, or SES, others have found otherwise. For example, Rosenblum and colleagues (2008) attempted to distinguish the relationship among maternal education status, PRF, and parenting behavior. They found that PRF was significantly correlated with maternal education, such that mothers with higher levels of education engaged in greater reflective functioning ($r = .46$). They did find that PRF contributed to interactive parenting behavior significantly beyond the contribution of educational attainment; however, the increase in model R^2 was small ($\leq .06$) for all parenting behavior outcome variables (e.g., mind-minded comments, maternal sensitivity). In other words, very little variance was explained by PRF over and above maternal education. The authors hypothesized that the ability to attribute mental states to behaviors may involve psychological processes beyond purely intellectual abilities. If Rosenblum et al.'s (2008) results hold, then proponents of reflective function would be hard-pressed to argue that it has any incremental validity over maternal education.

The present study explored this question further. Although intelligence was not directly assessed, educational attainment was used as a proxy for intelligence, as the two have been demonstrated to be highly correlated. Specifically, the relationship between PRF and education attainment among depressed and non-depressed mothers was explored. Results showed PRF to be marginally correlated with education at baseline, and significantly correlated with education at follow-up, regardless of treatment group status. In other words, higher levels of parental reflective functioning are associated with higher levels of educational attainment (and likely intelligence) among this sample of depressed and non-depressed mothers. This finding may offer clarification as to why change in PRF was not found among the intervention group, as the intervention would have unlikely affected any marker of intelligence.

With further regard to criticisms, PRF theory primarily focuses on the parent's contribution to developmental outcomes via their capacity to regulate and influence the parent-child dyad. PRF theory fails, however, to recognize and address the role of the infant and contribution of endogenous factors such as child temperament. Research has shown that child temperament plays a significant role in influencing the parent-child relationship as well as the psychosocial development of the child (e.g., Van den Bloom, 1994). It is possible that difficult infant temperament may disturb the dynamics of the parent-child relationship in part by disrupting the parent's capacity to effectively engage in reflective functioning, thus impairing her ability identify and respond to the needs of her child. The bi-directional influence between child temperament and parental reflective functioning has yet to be explored.

Furthermore, RF has been proposed as a possible link between maternal psychopathology and maladaptive development (Fonagy et al., 1995; Toth et al., 2008). The association between maternal psychopathology and child maladjustment must also consider the influence of genetics and other endogenous factors in the development of psychological maladjustment from one generation to the next. Psychopathological development is a heterogeneous process, with numerous endogenous and environmental factors contributing to the onset, persistence, and desistance of mental illness (Cicchetti & Rogosch, 1996).

Using the example of maternal depression, maternal reflective processes may partially contribute to child maladjustment, but must be considered as only a small piece of a larger host of contributing factors including genetic effects. Of course, genetic factors only partially account for the developmental outcomes of children with a depressed parent (Cadoret, O'Gorman, Heywood, & Troughton, 1985), and major depression is less heritable than other serious and persistent mental illness ($h^2 = .37$, Kendler, Gatz, Gardner, & Pedersen, 2006). Unfortunately, heritability does not offer information about the effect sizes of individual genetic variants, nor does it give information about the existence of gene-environment interactions, as a particular gene may be more or less expressive depending on environmental influences (i.e., gene by environment interaction). For example, Caspi, Sugden, Moffitt, Taylor, Craig, Harrington, et al. (2003) found that stressful life events more validly predicted depression onset only in individuals heterozygous or homozygous for the short allele 5-HTTLPR promoter polymorphism, and not for those homozygous for the long allele. This result has not replicated (Risch, Herrell, Lehner, Liang, Eaves, Hoh, et al., 2009)

5-HTTLPR has been less studied in children. In one such study, Cicchetti, Rogosch, and Sturge-Apple (2007) also did not replicate the Caspi et al. finding directly, but did find an interaction between sexual maltreatment (as opposed to general maltreatment) and 5HTTPLR. In the same study, Cicchetti et al. also found an interaction between MAO-A and maltreatment for depressive symptomatology. While replication is elusive in GxE studies, it is clear that heritability main effects, while useful, can be quite limited in understanding the relationship between genetic variants and human behavior. With this in mind, it may be that PRF is much more (or much less) genetically mediated in depressive samples compared to normal samples. Research must nonetheless make concerted efforts to consider the contributions of various heterogeneous factors when considering maternal psychopathology and child outcomes.

In sum, while PRF offers a potentially promising avenue to better understand the dynamic relationship between caregiver and child, further research is necessary in order to both establish the validity of the construct and to clarify the role that PRF plays in child developmental outcomes. Clearly there are large gaps and weaknesses in the present literature and further research is called for.

Conclusion

Parental reflective functioning, a relatively new area of research, offers a potential lens through which we can better understand attachment and the earliest psychosocial foundations of interpersonal interaction. Evolved from the construct of reflective functioning (Fonagy et al., 1991a; Fonagy et al., 1998), PRF was developed to

more directly capture the reflective capacity of the parent while considering the parent-child relationship context more specifically (Slade, 2005). PRF regards the parent's ability to identify and conceptualize her own and her child's mental states (e.g., thoughts, feelings, beliefs, desires), and understand how such mental states impact behavior. One's reflective capacity can be considered dimensional, with individuals ranging from poor or low reflective functioning, to higher more sophisticated reflective stances.

Bowlby and Ainsworth's pioneering work demonstrated that infant attachment develops during the formative years as a function of a parent's behavioral response to their infant's needs and cues, particularly during times of distress (Ainsworth, 1969; Bowlby, 1969, 1973, 1980). To this end, researchers proposed that RF/PRF may play a role in the development of attachment relationships, in that mothers with greater reflective capacities may be better able to identify the needs and interpret the cues of their infants. Furthermore, it was proposed that RF/PRF may be involved in the intergenerational transmission of attachment from parent to child. That is, reflective functioning might account for the relationships between secure adult attachment (i.e., mothers who demonstrate integrated, coherent representations in narratives regarding past attachment relationships) and secure infant attachment. In preliminary research, Slade et al. (2005b) found some support for a mediating link between maternal attachment and infant attachment, although their sample lacked a statistically significant relationship between adult and infant attachment in the first place. One might therefore argue that, in that sample, the RF mediating variable was responsible for a relationship that did not exist in the first place. However, Slade et al.'s finding may still hold

promise, as previous work has linked RF to adult and infant attachment, and adult and infant attachment to each other (Fonagy et al., 1991a; Fonagy et al., 1991b). No other independent research labs have replicated these tentative results, perhaps justifying some skepticism regarding the certainty of these relationships.

Alternative constructs related to RF have linked mentalizing capacities with attachment (e.g., Koren-Karie et al., 2002; Meins et al., 2001); however, it is not clear if or how these constructs differ from PRF, or if they may be capturing the same thing (Rosenblum et al., 2008). A potential area for future research would be to clarify the associations among these possibly overlapping constructs, and to replicate the original PRF/RF findings linking adult and infant attachment using independent samples.

PRF research has also been proposed as a means to provide insight about the developmental trajectories of at-risk parent-child dyads. Again, while very little research has been conducted in this area, preliminary studies have explored the link among maternal psychopathology, PRF/RF and child outcomes. For example, RF has been found to be a risk factor for the development of borderline personality disorder (Fonagy et al., 1995), but has not been found to be related to PTSD (Shechter et al., 2005), or depression (Rosenblum et al., 2008), although effects trended toward statistical significance in the latter studies. Toth and colleagues (2008) found that changes in child attachment status across a psychotherapeutic intervention were not related to changes in maternal RF for depressed women. These studies illustrate the point that the relationships among maternal psychopathology, maternal RF, and child outcomes are unclear, and likely small.

The assumptions underlying RF/PRF theory suggest that maternal reflective functioning is disrupted by psychopathology, which in turn leads to disrupted attachment patterns in children (Fonagy, 2002). Clearly, research findings inconsistently support this hypothesis, including the present study.

Even still, the preliminary and tenuous research linking PRF and infant attachment has initiated the development and research of parental reflective functioning intervention programs aimed at improving parent-child attachment patterns in at-risk dyads (e.g., e.g., Jenkins & Williams, 2008; Pajulo et al., 2006; Slade et al., 2005c; Suchman et al., 2010). Intervention programs may be particularly warranted for these dyads given the detrimental developmental outcomes associated with maternal psychopathology, as well as the negative sequelae associated with insecure infant attachment (e.g., Cicchetti et al., 1998; Sroufe et al., 2005). Although promising, the development of these intervention programs is currently premature. Continued research is therefore necessary to establish and confirm the link between improvements in maternal reflective functioning and infant attachment for both normative and at-risk samples.

In summary, parental reflective functioning is a promising new area of research with potential to provide the field with greater insight into the parent-child relationship and subsequent developmental trajectories of the child. PRF may also enhance research involving at-risk parent child dyads in particular, as a means to better understand the relationship between maternal mental health and functioning, and child development. There remains opportunity for future research to validate this construct, confirm

previous findings, and fill gaps in the literature regarding the parent's capacity to insightfully reflect upon the mental world of her child.

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