

Maternal reflective functioning, attachment, and the transmission gap: A preliminary study

ARIETTA SLADE¹, JOHN GRIENENBERGER², ELIZABETH BERNBACH³,
DAHLIA LEVY³, & ALISON LOCKER³

¹*The City University of New York, Yale Child Study Center, ²Wright Institute, Los Angeles, and*

³*The City University of New York, USA*

Abstract

The notion that maternal reflective functioning, namely the mother's capacity to hold her baby and his mental states in mind, plays a vital role in the intergenerational transmission of attachment is investigated (Fonagy, Gergely, Jurist, & Target, 2002; Fonagy et al., 1995; Slade, this volume). A parent's capacity to understand the nature and function of her own as well as her child's mental states, thus allowing her to create both a physical and psychological experience of comfort and safety for her child, is proposed. In this study of 40 mothers and their babies, maternal reflective functioning is measured using the Parent Development Interview (PDI; Aber, Slade, Berger, Bresgi, & Kaplan, 1985), and scored for reflective functioning using an addendum to Fonagy, Target, Steele, & Steele's (1998) reflective functioning scoring manual (Slade, Bernbach, Grienenger, Levy, & Locker, 2004). The relations between maternal reflective functioning and both adult (measured in pregnancy) and infant attachment (measured at 14 months) are examined. The findings indicate that relations between adult attachment and parental reflective functioning are significant, as are relations between parental reflective functioning and infant attachment. A preliminary mediation analysis suggests that parental reflective functioning plays a crucial role in the intergenerational transmission of attachment.

Keywords: *Maternal reflective functioning, attachment, transmission gap, intergenerational transmission*

Introduction

In a report published 20 years ago, Mary Main and her colleagues (Main, Kaplan, & Cassidy, 1985) documented strong links between a mother's "state of mind in relation to attachment", and the quality of her own child's attachment to her at 1 year. Numerous investigators have replicated these findings in the intervening years, confirming time and again that a mother's capacity to regulate and organize her own thoughts and feelings about relationships with her primary caregivers is linked to her capacity to regulate, organize, and sensitively respond to needs for comfort, proximity, and safety in her child (see Carlson & Sroufe, 1995; Main, 1995, 2000; van IJzendoorn, 1995 for reviews).

The mechanism underlying the intergenerational transmission of attachment remains elusive however (van IJzendoorn, 1995). How is a mother's state of mind in relation to attachment transmitted from mother to child? Researchers had for many years assumed that maternal behavior served as the primary mechanism of transmission. It was widely believed

that mothers who were secure in relation to attachment would be able to respond to their children's needs for comfort and proximity in a sensitive fashion. By contrast, those who were insecure in relation to attachment would reject, overwhelm, or fail to regulate their children's need for proximity. These patterns of maternal behavior would, in turn, predict attachment outcomes in children. Efforts to document this link empirically have been largely unsuccessful, however, and only weak links between maternal attachment quality, maternal behavior, and infant attachment quality have been found (van IJzendoorn, 1995).

In this, and in a companion paper (Grienenberger, Slade, & Kelly, this volume), the notion that maternal reflective functioning, namely the mother's capacity to hold her baby and his mental states in mind, plays a vital role in the intergenerational transmission of attachment is investigated (Fonagy et al., 2002, 1995; Slade, this volume). It is proposed that it is her capacity to understand the nature and function of her own as well as her child's mental states that allows her to create both a physical and psychological experience of comfort and safety for her child. In this paper, the relations between maternal reflective functioning and attachment outcomes are examined (for reviews, see Fonagy et al., 2002, Slade, this volume). In the companion paper (Grienenberger et al., this volume), the relations between maternal reflective functioning and caregiving behavior is investigated. Their separate and joint roles in the intergenerational transmission of attachment are addressed.

In the sections that follow, the emergence of the construct of reflective functioning within attachment research is described, as well as its relation to the central constructs of attachment theory. A series of analyses aimed at testing the hypothesis that maternal reflective functioning is linked to both adult and infant attachment organization is presented, and may serve to mediate the link between the two.

The intergenerational transmission of attachment

Mary Ainsworth's groundbreaking research, first published in 1978 (Ainsworth, Blehar, Waters, & Wall, 1978), changed the way developmental psychologists think about emotional development, and confirmed much of what psychoanalysts believed about the relational origins of an individual's basic capacity to form and maintain relationships. Following Bowlby's assumption that early experience contributes in direct ways to differences in the organization and function of attachment bonds, Ainsworth was able to document that children whose mothers responded to them in a sensitive and responsive fashion during the first year of life were more likely to openly express both their anger and fear as well as their need for mother when observed in a laboratory separation procedure at 1 year of age (Ainsworth et al., 1978). These children saw their mothers as a secure base, as someone invariably available to them in times of distress. These findings (which were later replicated by a number of other researchers) confirmed a link between maternal behavior during infancy and the quality of a child's attachment at 1 year of age. Ainsworth's assumption that attachment security would pave the way toward later positive outcomes was also confirmed by later research, which documented that secure attachment predicted a number of positive developmental, relational, and social outcomes across infancy and childhood (see Carlson & Sroufe, 1995 for a review).

A decade later, Mary Main was to once again redefine the field of developmental psychology, and affirm many of the principles of psychoanalytic developmental theory. Main became interested in the parents of the children she had followed longitudinally from 1 to 6 years of age, and was specifically curious about links between parental attachment experiences and their children's attachment organization, measured at 1 year. In order to explore this complex question, she developed the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984, 1988, 1996), a deceptively straightforward interview that

asks adults to describe their early attachment experiences, including separation, loss, trauma, and rejection. Main had initially expected that the events of parents' lives would be linked to their capacity to respond sensitively to their infants, and would thus predict infant attachment; it was, however, the degree to which parents had *integrated* and made sense of their own early childhood experiences that determined their child's security (Main et al., 1985). Such integration was revealed in the quality and organization of their narratives, specifically their capacity to coherently describe memories, thoughts, and feelings in relation to attachment when the attachment system was activated. Mothers and fathers who were able to tell a coherent, fresh, believable, undistorted, and integrated story of their early relationships (regardless of the degree of hardship they had experienced in these relationships) were those whose children were more likely to be secure in relation to attachment at 1 year of age. These parents had "secure" internal working models of attachment, marked by the capacity to access a range of thoughts and feelings in relation to attachment without distortion.

Main defined both security and various forms of insecurity largely in cognitive terms; that is, in terms of the integrity and organization of representational models. This was most obvious in her thinking about metacognitive monitoring, which she saw as crucial to adult attachment security (Main, 1991). This term refers to the capacity to monitor one's complex and often conflictual thoughts, feelings, and discourse in relation to attachment without having to resort to denial, distortion, or other defensive processes. Thus, coherence in discourse signals the capacity to flexibly deploy one's attention to a range of thoughts and feelings in relation to attachment. Conversely, incoherence and lapses in metacognitive monitoring signal the disruption of thinking under the press of defensive processes. When memories, thoughts, and feelings cannot be integrated into a singular, coherent internal working model, incompatible experiences are split off. Multiple, fragmented internal working models are the result. It is these models that are manifest in the disjointed, contradictory, and incoherent narratives of insecure or disorganized adults.

The transmission gap

Main's description of a link between the organization and quality of adult attachment narratives and infant attachment status provided powerful evidence for what came to be known as the intergenerational transmission of attachment. But how, the question remained, was a mother's state of mind in relation to attachment *conveyed* to her child? In line with Ainsworth's original findings (Ainsworth et al., 1978), Main and her colleagues (Main et al., 1985) proposed that such states of mind were conveyed from mother to child through behavior; thus, mothers who were able to coherently represent their own thoughts and feelings in relation to attachment would be able to recognize and respond sensitively to the attachment needs for comfort, safety, and proximity in their children. Interestingly, however, as noted by van IJzendoorn (1995), researchers have consistently failed to clearly document that maternal sensitivity and responsiveness is what links adult and infant attachment, leading him to suggest that the mechanisms underlying such intergenerational processes have yet to be understood. In the sections that follow, the notion originally proposed by Fonagy and his colleagues (Fonagy et al., 1995) that the reflective function may help to explain what van IJzendoorn refers to as the "transmission gap" is examined.

The London Parent–Child Project: The reflective function

Fonagy, Steele, and Steele (1991) began the London Parent–Child Project with the aim of replicating Main's study, but with an important modification: the prenatal assessment of

adult attachment. They assessed mothers' and fathers' attachment security during the third trimester of pregnancy, and evaluated their children's attachment organization at 1 year of age. Like Main and her colleagues, Fonagy, Steele, and Steele found that mothers whose attachment narratives were rated as secure were more likely to have children who themselves were secure in relation to attachment, *even when adult attachment was assessed before the baby was born*. These findings have since been replicated by Benoit and Parker (1994) and Ward and Carlson (1995).

More important, however, in terms of broadening developmental study and psychoanalysis, was that Fonagy and his colleagues used their research to reframe the notion of attachment security, in general, and metacognitive monitoring, in particular (Fonagy, Steele, & Steele, 1991; Fonagy et al., 1995). This reframing was based in part upon psychoanalytic notions of affect regulation and intersubjectivity, as well as upon cognitive theorists' notions of intentionality. Whereas Main had concentrated primarily upon cognitive appraisal processes in the development of thinking about one's own thinking, Fonagy and his colleagues shifted the emphasis to the interpersonal and intersubjective mechanisms inherent in thinking about one's own and others' internal, mental, and explicitly affective experience (Fonagy et al., 1995). It was not adequate, they suggested, to think of intergenerational transmission primarily in terms of cognitive processing and representational models. Rather, because attachment relationships evolve and revolve around the regulation of intense, often negative affects, any notion of the internal processes inherent to security of attachment and intergenerational transmission must include a consideration of the capacity to think about *feelings* and their relation to behavior. These mechanisms for processing intersubjective and interpersonal experience were referred to under the general rubric of the "reflective function" (RF) (Fonagy et al., 2002).

As described more fully in the paper that introduces this special issue (Slade, this volume), the reflective function refers to an adult's capacity to understand one's own or another's behavior in terms of underlying mental states. Fonagy and his colleagues (Fonagy et al., 1995) suggest that the mother's capacity to "hold" complex mental states in mind is what will allow her to hold her child's internal affective experience in mind; even more important, it will allow her to understand her child's behavior in light of mental states such as feelings and intentions (i.e., intentions are mental states). By giving meaning to his affective experience, and "re-presenting" this experience to him in a regulated fashion, the mother sets the stage for the development of a sense of security, authenticity, and safety in the child (Fonagy et al., 1995). From this perspective, RF is the core capacity that allows parents to flexibly and coherently access the emotions and memories relevant to their own early attachment experiences, and to provide a secure base for their child. In effect, then, reflective functioning may well play a critical role in linking adult and infant attachment, and in explaining the "transmission gap". It may also be crucial in predicting maternal behavior.

Parental reflective functioning

In order to examine the hypothesized role of RF in the intergenerational transmission of attachment, it is necessary to first establish a relationship between RF, adult attachment organization, and infant attachment organization. Fonagy's research has already established these links using the AAI as a measure of both RF and adult attachment organization. In the present study, a separate measure to assess RF is used, namely the Parent Development Interview (PDI; Aber et al., 1985). PDI is used for two reasons. First, it was felt to be important that RF be assessed by means that were independent of those used to assess of adult attachment security. Second, the PDI was developed specifically to assess parental

representations of the child, the parent–child relationship, and oneself as a parent. It was speculated that the parent’s capacity to reflect upon the internal experience of her child, and upon her own internal experience as a parent, would be more relevant in understanding intergenerational transmission than would be their capacity to reflect upon their experience vis a vis their own parents, as provided by the AAI. That is, as described more fully in Slade (this volume), it was believed that the assessment of *parental* reflective functioning (as opposed to the more general construct of reflective functioning) was most relevant to our research questions. Once a relationship has been established between parental RF and attachment, the mediating role of RF will then be assessed. The relation between RF and maternal behavior, and their joint and separate contributions to predicting infant attachment, will be addressed in a companion paper (Grienenberger et al., this volume).

Methods

Sample

This study was carried out in a large metropolitan area. First time pregnant women were recruited through flyers left in maternity stores and obstetricians’ offices, advertisements placed in local newspapers, and direct recruitment via Lamaze classes. Women were an average of 31.8 weeks pregnant when they joined the study; the mean subject age was 31.4. All of the subjects were cohabiting and in stable relationships; all but three were married. The sample was overwhelmingly White (94%); of the remaining subjects, three were African-American, and one was of mixed racial background. Half of the sample (50%) had studied at the graduate level, 41% had completed college, and the remaining 9% had completed some college. Nearly all of the subjects (94%) were working prior to conception and 83% planned to work after the birth of the child. Thus, this was a highly educated, stable middle class population.

Prior to the index pregnancy, 18% of the sample reported prior miscarriage or abortion, and 24% reported medical complications during the current pregnancy. All but two babies were born healthy and at term. One was premature, and one was placed in intensive care briefly at birth. None of the mothers or infants had enduring medical problems. The sample was evenly divided between boys and girls, and nearly all of the babies (91%) were breastfed.

Of the 78 women who volunteered for the study, 5% ($n=4$) dropped out before completing any of the measures, and 4% ($n=3$) dropped out in the middle of the pregnancy assessments. Six percent ($n=5$) dropped out after the birth of their child, and another 6% ($n=5$) dropped out before the 14 month assessment. The bulk of the dyads who dropped out after completing one or more of the postbirth assessments did so because they moved out of the city. Thus, a total of 21% ($n=17$) of the women who volunteered for the study dropped out before their baby turned 1 year old.

Procedures

Women were seen twice during pregnancy, and four times following the birth of their baby. During the first pregnancy visit, data were collected on parental background, work, and educational status, and the like. Baseline levels of psychopathology were assessed using the Brief Symptom Inventory (SCL 90; Derogatis, 1979, 1993) and the Vocabulary, Similarities and Block Design subtests of the WAIS (Wechsler, 1981) were administered. At the second visit, the Adult Attachment Interview (George et al., 1984, 1988, 1996) was administered. Mothers and babies were seen again when the baby was 4 months for a videotaped free play

assessment. At 10 months, mothers were interviewed using the Parent Development Interview (Aber et al., 1985). At 14 months, mothers and babies returned to the lab for the administration of the Strange Situation (Ainsworth et al., 1978). They returned for a final visit when the children were 28 months of age. The present report will include data from the AAI, the PDI, and the Strange Situation.

Measures

Adult Attachment Interview (George et al., 1984, 1996). This is a 16 question interview that takes 1–2 hours to administer. The interviewer asks subjects to describe their early childhood relationship with their parents; to provide adjectives and examples to describe this relationship; and to recall early separations, losses, and means of comfort seeking. It also asks subjects to reflect on the reasons behind their parents' behavior, and to describe changes in the parental relationship over time.

Scoring of the AAI is based on both categorical and continuous variables. Adults first receive ratings based assessing reported experiences with their parents (degree to which they felt loved, rejected, etc.); they are then rated on variables assessing the state of mind with respect to attachment (coherence, present anger, etc.). Based on these ratings, as well as upon an overall reading of the interview, a rating of secure, dismissing, or preoccupied is assigned to the transcript. Interviews in which there is evidence of unresolved mourning, trauma, or abuse are rated as unresolved; they are then assigned a secondary score of secure, dismissing, or preoccupied. AAIs were scored by Dr. Judith Crowell and her associates. This research group has established reliability on the AAI with Dr. Mary Main and, having published widely using the AAI, are considered expert coders.

The Parent Development Interview (PDI) (Aber et al., 1985). This is a semi-structured clinical interview containing 45 questions that take approximately 90 minutes to administer. It was designed to assess a mother's representations of her child, herself as a parent, and her relationship with her child. The PDI elicits representations derived from a current and ongoing relationship with a specific child. The interview includes questions that ask the mother to describe times when the child may have felt distressed or rejected; it also asks the mother for five adjectives to describe the child, and then the reasons a given adjective was chosen. Other questions focus more directly on the mother's relationship with her child, including what makes it pleasurable or difficult. Next, she is asked to describe herself as a parent, stating strengths and weaknesses as well as answering questions regarding specific feeling states such as happiness, neediness, guilt, anger, and joy. The mother is asked about her thoughts and feelings relating to separations from her child. There are also several questions that ask about how she has been impacted as a parent by experiences with her own parents.

PDI's were scored for maternal reflective functioning using The Addendum to the Reflective Functioning Scoring Manual (Slade et al., 2004). The addendum is a companion to the RF coding manual developed by Fonagy and colleagues for use with the AAI (Fonagy et al., 1998) and was developed for specific use with the PDI. RF on the PDI is assessed under the following four broad 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. It is an 11-point scale ranging from –1 (negative RF) to 9 (full or exceptional RF), and is best understood as distinguishing between Negative-Limited RF (–1 to 3) and Moderate to High RF (5 to 9). Scores under 5 indicate either negative, absent, or low (and not fully

realized) RF, whereas scores of 5 and above indicate clear evidence of mentalizing capacities. Scoring is based on a thorough reading of verbatim transcripts made from audiotapes of the PDI. Individual passage scores are derived for responses to 21 questions on the PDI. In addition to the individual passage scores, an overall score is determined for each interview as a whole. This score is based on the pattern of RF that has been demonstrated across a range of different domains. Therefore, in order to obtain a high overall score, the mother must be able to reflect on her own mental states, those of her child, and the complex interactions between mental states and behavior that occur within the context of the continually developing parent–infant relationship.

The four judges who coded RF on the PDI were advanced doctoral candidates in clinical psychology. All of the judges were among the original authors of the RF coding manual for the PDI. Inter-rater reliability of the RF scale was achieved for both the individual passage scores and the overall interview scores using intraclass correlation coefficients. The ICC (2, k) ranged from .78 to .95 with a mean of .88 for individual passage scores within each of the 14 interviews that were checked for reliability. The ICC (2, k) for overall RF across these same interviews was .87.

The Strange Situation

The Strange Situation (Ainsworth et al., 1978) is a standardized videotaped experimental paradigm that includes eight segments that are each approximately 3 minutes in length. The infant is exposed to a number of stressors that are designed to elicit his or her attachment behavioral system. The sequencing of the Strange Situation is arranged so that the infant experiences increasingly stressful situations. The stressors include being introduced to an unfamiliar setting and an unfamiliar adult, separation from the mother while in the presence of the stranger, reunion with the mother, being left alone in the playroom, re-exposure to the stranger, and finally, reuniting with the mother after being left alone.

The Strange Situation has been widely regarded for its reliability and validity as an assessment measure of infant attachment. The present study utilized the Strange Situation coding procedures (Ainsworth et al., 1978; Main & Solomon, 1990) in order to determine the quality of the infant's attachment to his or her mother. Infants were assigned to one of the four primary attachment classifications: secure, avoidant, resistant, or disorganized. Within each of these four groups, further subgroups could also be assigned, however data analysis in the present study will be based only on the primary classifications.

Jude Cassidy, Ph.D., and her research team determined Strange Situation classifications. Dr. Cassidy is an internationally recognized attachment expert who has published numerous papers that have utilized the Strange Situation. Dr. Cassidy trained all coders to reliability. The average rate of agreement was 77%.

Results

Maternal reflective functioning and adult attachment

It was hypothesized that maternal attachment classification would be linked to maternal reflective functioning, and so compared women across the four AAI categories in level of RF. In our sample, no significant differences were found between AAI groups in SES and other demographic variables, intelligence, or marital adjustment. Maternal reflective functioning was normally distributed in the subsample of 40 women for whom AAI, PDI, and Strange Situation classifications were available.

In order to test our first hypothesis, two one-way ANOVAs were conducted (see Tables I & II), one that assessed RF levels across all four attachment classification groups, free/autonomous, dismissing, preoccupied, and unresolved, and one that compared secure and insecure mothers in relation to RF. The four group ANOVA was significant at the $p < .001$ level ($F=6.46$, $df=3,36$). Post hoc tests revealed that free/autonomous moms had significantly higher RF scores than dismissing ($p < .023$), preoccupied ($p < .043$), and unresolved moms ($p < .000$), and that both dismissing ($p < .077$) and preoccupied ($p < .032$) moms had higher RF scores than unresolved moms.

Results of two group ANOVA were also highly significant at the $p < .001$ level ($F=13.164$, $df=1,38$), and had a large effect size of 1.01. These results indicate that maternal reflective functioning, as measured using the PDI when the baby is 10 months old, is highly predicted by the mother's prebirth attachment status.

Maternal reflective functioning and infant attachment

In order to test our second hypothesis that infant attachment status would be predicted by maternal reflective functioning, two one-way ANOVAs were conducted (see Tables I & II), one that assessed RF levels across all four infant attachment classification groups (secure, avoidant, resistant, and disorganized), and one that compared secure and insecure infant attachment in relation to RF. Both ANOVAs revealed powerful relationships between maternal RF during the baby's 10th month and infant attachment security at 14 months. Results of the four-group analysis were significant, $p < .007$ ($F=4.769$, $df=3,36$). Post hoc tests revealed that the mothers of secure infants had significantly

Table I. Parental reflective functioning and adult attachment classification: Four-way comparison.

	Autonomous ($n=23$)		Dismissing ($n=6$)		Preoccupied ($n=8$)		Unresolved ($n=3$)		F ratio
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Parental RF	5.74	1.51	4.33	1.51	4.63	1.19	2.67	.58	6.460**

Post hoc tests:

Secure vs. dismissing $p < .023^*$.

Secure vs. preoccupied: $p < .043^*$.

Secure vs. unresolved: $p < .000^{**}$.

Dismissing vs. unresolved: $p < .077$.

Preoccupied vs. unresolved: $p < .032^*$.

* $p < .05$.

** $p < .001$.

Table II. Parental reflective functioning and adult attachment: Two-way comparison.

	<i>n</i>	Mean	<i>SD</i>	<i>F</i> ratio	Effect Size
Secure	23	5.74	1.32		
Insecure	17	4.18	1.38		
Total	40	5.08	1.54	13.164**	1.01

* $p < .05$.

** $p < .001$.

Table III. Parental reflective functioning and infant attachment classification.

	Secure (<i>n</i> = 22)		Avoidant (<i>n</i> = 5)		Resistant (<i>n</i> = 3)		Disorganized (<i>n</i> = 10)		<i>F</i> ratio
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Parental RF	5.64	1.14	5.40	1.36	3.0	.00	4.3	1.57	4.769**

Post hoc tests:

Secure vs. resistant: $p < .003^*$.

Secure vs. disorganized: $p < .014^{**}$.

Secure vs. avoidant: NS.

* $p < .05$.

** $p < .01$.

Table IV. Parental reflective functioning and infant attachment: Two-way comparison.

	<i>n</i>	Mean	<i>SD</i>	<i>F</i> ratio	Effect Size
Secure	22	5.64	1.36		
Insecure	18	4.39	1.50		
Total	40	5.08	1.54	7.567**	.81

* $p < .05$.

** $p < .01$.

higher RF scores than those of either resistant ($p < .003$) or disorganized children ($p < .014$). The RF scores of the mothers of secure children could not be distinguished from those of the mothers of avoidant infants.

The two group ANOVA was also significant $p < .009$ ($F = 7.567$, $df = 1,38$), with a large effect size of .81. Thus, the mother's capacity to reflect on her child's internal affective experience predicts strongly to the quality of her infant's attachment organization.

A preliminary test of mediation

In this sample of 40 mothers and babies, adult and infant attachment were weakly positively correlated ($r = .24$), just missing significance with a $p < .065$ using a one-tailed test of significance. This small effect size becomes moderate when an odds ratio is used to compute effect size; this measure is more appropriate for use with dichotomous variables. However, given (1) the fact that the use of dichotomous variables necessarily suppress the strength of a correlation, (2) the size of our sample, (3) the strength of the relations between adult attachment and maternal RF, and (4) between maternal RF and infant attachment, it was felt justified to explore the possibility that maternal reflective functioning mediates the link between adult attachment organization (measured in pregnancy) and infant attachment organization (measured at 14 months). Because of the size of our sample and the modesty of the correlation between AAI and SS, these results can only be considered preliminary, and require further examination in a larger sample.

In order to test this mediational hypothesis, a LISREL analysis was conducted. It was found that (when the effects of RF were factored in) the correlation between maternal and infant attachment disappeared completely (see Figure 1). The LISREL analysis indicated an indirect effect of .22 which was significant at the $p < .05$ level. In other words, the effects of

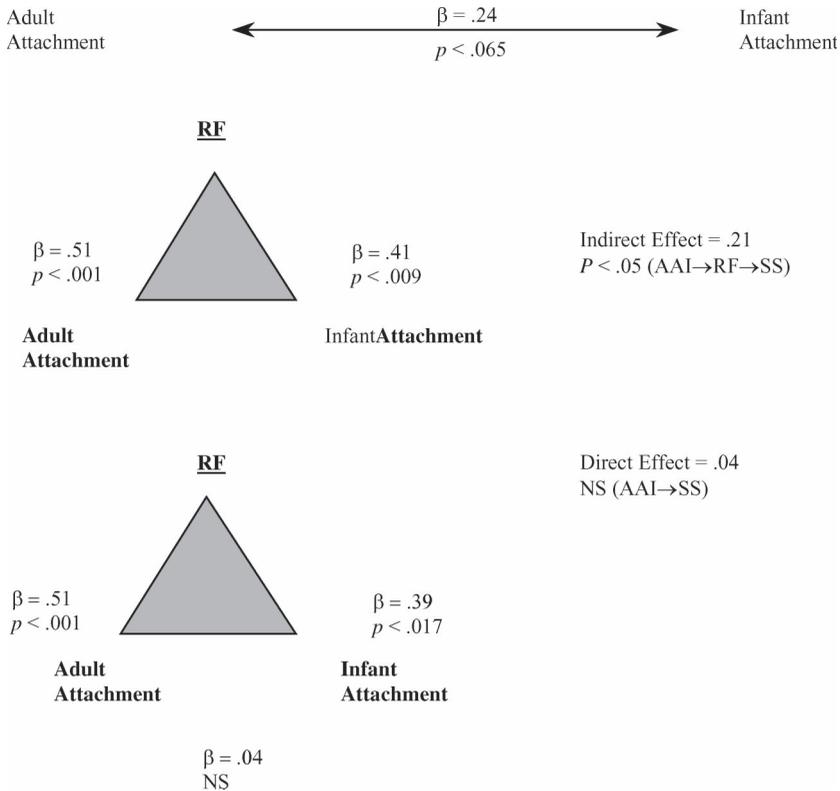


Figure 1. Test of mediational model (LISREL analysis).

maternal RF largely account for the modest link between adult attachment and infant attachment security in our sample.

In spite of the relatively weak link between the adult and infant security in our sample, the prospects of maternal RF as a mediator seem quite promising. The size of the influence of maternal RF on infant security was equivalent to a correlation of about .41. This is higher than the correlation of .32 between maternal sensitivity and infant security that was reported in van IJzendoorn’s meta-analysis (1995). Furthermore, the beta of .51 between adult security and RF is well above the .34 correlation between the AAI and maternal sensitivity reported in that same meta-analysis. Therefore, we are quite hopeful regarding the possibility of demonstrating that RF has a mediating function if we were to apply this same design to a sample that had the usual levels of concordance between adult and infant attachment status.

Discussion

This is the first study to examine the relationship between parental reflective functioning, measured using the Parent Development Interview (Aber et al., 1985), and attachment outcomes in mothers and children. To date, the construct of *parental* reflective functioning (Slade, this volume) has not been measured directly; rather reflective functioning has been measured using the AAI. This study suggests that parental (in this case, maternal) reflective functioning can be assessed using the PDI, and scored using our adaptation of Fonagy

et al.'s (Fonagy et al., 1998) RF scoring system (Slade et al., 2004). As described above, it was believed that there is particular value in directly examining reflective functioning within the specific context of (1) the parent–child relationship, and (2) an ongoing, developing, “live” relationship, as opposed to a prior, memorialized relationship. As described elsewhere (Slade, this volume), it is believed that a parent’s capacity to describe and contain complex mental states within the context of a relationship that is full of *current* feeling (not all of which is positive) is particularly crucial for a range of later developments in the child. The results of this study also provide validation for the construct of parental reflective functioning, which was related in predictable ways to the primary variables studied, namely adult and infant attachment.

Our first correlational analysis reveals that adult attachment, as measured by the AAI during pregnancy, is strongly linked to maternal reflective functioning, measured at 10 months using the PDI. Secure mothers had higher levels of parental reflective functioning than organized insecure (dismissing, preoccupied) mothers, who in turn had higher levels of parental reflective functioning than disorganized-insecure (unresolved) mothers, who had the lowest levels of RF of all insecure mothers. Thus, both the quality and organization of maternal working models were linked to levels of parental reflective functioning. What this means is that mothers who were able to coherently describe their own childhood attachment experiences were more likely to be able to make sense of their children’s behavior in light of mental states. They understood the intentions and feelings underlying their children’s behavior, and in particular their tendencies to seek proximity, closeness, and comfort.

It is important to note at this juncture that even the most reflective mothers are not reflective all of the time, and that disequilibrium and dysregulation are normal occurrences even in individuals who are high in reflective functioning. This is apparent in the spread of individual item scores on the PDIs of mothers who received high overall RF scores. The parent–child relationship is obviously a prime example of one that is naturally disrupted by high intensity affects. What RF provides is a model for the regulation and modulation of experience, a model that in times of stress or high emotional intensity may need to readjust, but that will ultimately serve its regulating and organizing functions effectively. This brings to mind Winnicott’s “good enough mother” (1965).

Fonagy and his colleagues (Fonagy, Steele, Moran, Steele, & Higgitt, 1991; Fonagy et al., 1995) documented a relation between an adult’s capacity to reflect upon the mental states and intentions underlying her own parents’ behavior and adult attachment organization. The present study establishes a link between an adult’s capacity to think reflectively about her child, and adult attachment organization. The documentation of this link represents a crucial step in understanding the processes underlying the intergenerational transmission of attachment, for it suggests a relation between adult attachment organization and the way a parent thinks about her child’s emotional experiences, and makes meaning of her child’s attachment behaviors and states of mind.

The next step in understanding the intergenerational transmission of attachment involves determining whether maternal reflective capacities have any impact upon the infant’s attachment status. Indeed, our second correlational analysis reveals that maternal reflective functioning, measured at 10 months, is likewise linked to infant attachment security, measured at 14 months using the Strange Situation (Ainsworth et al., 1978). As was the case in the analyses of adult attachment, higher levels of maternal RF were associated with secure attachment status in children, whereas lower levels of maternal RF were associated with insecure attachment status in children, with the mothers of resistant and disorganized children having the lowest levels of RF. The avoidant children could not be distinguished from the secure children in level of maternal RF. While this is in some sense a surprising

finding, it seems in keeping with the general view of avoidance as a more adaptive and productive strategy than the resistant and disorganized organizations. This finding also suggests that RF may play a less significant role in lower-risk dyads, with avoidance being an example of a lower risk adaptation. Maternal RF may matter more in protecting against the development of disrupted attachments. It may also be that the avoidant strategy results when mothers are in some way rejecting, but not necessarily as a function of limitations in reflective capacity. This possible contradiction requires further investigation.

The documentation of a link between maternal RF and infant attachment provides confirmation of Fonagy and his colleagues' suggestion that a mother's capacity to make sense of her child's behavior in light of internal, affective experience is linked to her child's feeling of safety and security in that relationship. This result also extends Meins' finding that maternal mind-mindedness and infant security are linked (Meins, Fernyhough, Russell, & Clark-Carler, 1988). This position echoes the thinking of theorists and clinicians such as Winnicott (1965) and Stern (1985), who suggest in somewhat different terms that the mother's capacity to give voice to the child's inner experience allows her to make these experiences real and manageable for him, thus leading both to the development of coherent internal working models as well as the emotional balance and flexibility that is intrinsic to child security.

Taken together, these findings indicate that a mother's reflective capacities are related not only to her state of mind in relation to attachment, but also to her child's attachment status. This led us to consider whether the correlation between adult and infant attachment (documented in our own research as well as in numerous other studies) might be viewed as indirect effects, with parental reflective functioning itself the variable that more directly links the two. That is, could the variance in infant attachment classification that has heretofore been explained by adult attachment classification be better explained by parental reflective functioning? Could a parent's capacity to think in a reflective way about her child be one way that internal working models of attachment are transmitted from one generation to the next? The strong associations between adult attachment and RF and infant attachment and RF led us to consider whether RF might be mediating the relationship between adult and infant attachment in our sample. Indeed, a preliminary mediational analysis revealed that when RF is controlled for, the relationship between adult and infant attachment disappears. This suggests that maternal RF may be a central mechanism in the intergenerational transmission of attachment, and may well shed light on the "transmission gap" described by Van IJzendoorn (1995).

There are numerous theoretical and research implications that derive from thinking about RF as the core capacity that differentiates secure and insecure states of mind. One of the primary implications has to do with measurement. RF is scored using a continuous scale, whereas adult attachment scoring is categorical. Attachment research has become heavily reliant upon the use of categories to describe stylistic differences in attachment organization; this presumes that each of the categories is inherently different from the others. However, the research presented here suggests that attachment categories may, in essence, be proxies for a more basic and organizing psychological capacity, namely the reflective function.

From this perspective, AAI categories offer a way of describing the *dimensions* of high and low reflectiveness, with security linked to high reflectiveness, with dismissing, preoccupied, and unresolved states of mind indicative of varying types of failures to mentalize. But, what is intrinsic to all insecure categories is the inability to envision mental states. The dismissing individual rejects mental state reasoning, the preoccupied individual cannot think about mental states but rather is buffeted by them, and the unresolved individual is profoundly dysregulated by mental states. Nevertheless, the classification of an adult as "secure" or "insecure" in relation to attachment serves as a kind of shorthand for the presence or absence of a more basic capacity to make sense of and thus regulate powerful intersubjective

and interpersonal experiences. Figure 2 depicts a consideration of the differences in adult attachment organization in light of differences in the level of parental reflective functioning.

From a research perspective, the use of a continuous scale offers a great deal more statistical flexibility and breadth than does the primary use of categories to assess qualities of affect regulation and internal organization. Category to category predictions within insecure groups are often unsuccessful; it is often the case that, for statistical as well as conceptual reasons, insecure categories are collapsed into a single secure/insecure category. The degree to which the various insecure categories represent distinct modes of processing emotional and memorial experience remains open to question (Slade, 2000, 2004). A continuous scale preserves degrees of difference among subjects, degrees that are lost when categories are used. Also, subtypes on the RF scale can be used to capture differences in narrative or reflective style, as there are ways of being reflective that are more avoidant and dismissing, and others that are more preoccupied and undifferentiated. Thus, the clinical richness of attachment classification is not lost, with the great advantage being an increase in statistical power and diversity. In addition, in its attempt to describe the essence of relational capacities, the RF construct, though clinically rich and descriptive, is inherently simple and parsimonious. The suggestion of a “core” construct is by its nature simplifying as well as powerful.

In closing, several points can be made. First, because of our small sample size, and the modest correlation between AAI and Strange Situation in our sample, these findings can only be presented as a series of questions and directions for future research. At the very least, our findings begin to outline the phenomena that underlie and flow from adult attachment organization and that may well serve as critical mechanisms in the intergenerational transmission of attachment. Future research is necessary to assess how closely RF on the AAI

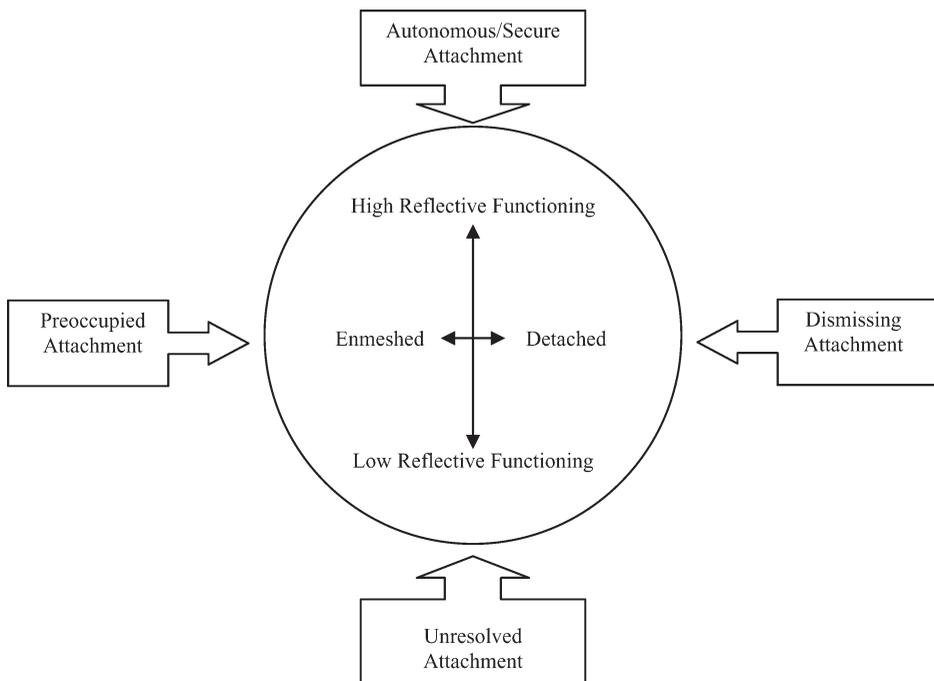


Figure 2. Adult attachment and parental reflective functioning.

and RF on the PDI are linked; to what extent is a parent's capacity to think reflectively about her child and his mental states linked to her capacity to think reflectively about her parents? It can be assumed that these variables to be closely correlated, but only further research can address this crucial question. In addition, because this was an entirely volunteer sample, whether these findings would hold in a larger, more randomly selected sample cannot be assured. Indeed, analyses of our subjects' scores on a psychiatric screening inventory during pregnancy (BSI; Derogatis, 1979, 1993) indicated elevated levels of distress across all nine subscales of the inventory, which include, among others, depression, anxiety, psychoticism, and global distress. All of the BSI scores were within one standard deviation of Derogatis' norms for psychiatric inpatient populations, indicating that our sample may be more high-risk than initially expected. These elevated rates may also have to do with the vagaries of pregnancy, which is known to increase moodiness and lability. Our base rates of parental and infant security and insecurity were consistent with low-risk middle class norms.

Our final point concerns the clinical implications of suggesting that the reflective function is a core capacity that determines an individual's attachment security and the quality of her capacity to provide care and comfort to her child. If reflective functioning in a parent is indeed key to a child's socioemotional adaptation, then clinical interventions need to address the development of this capacity. Efforts to modify parental behavior have been variously successful (Stern, 1994), largely because one of the most common approaches (focusing on parenting skills) has been largely ineffective. The reflective model, which is geared toward helping mothers read intentions and mental states, helps mothers *think* about behavior rather than *change* behavior (although changes in behavior often follow from changes in thinking and representation). Also, as is suggested by the data presented here, reflective functioning may well bridge the gap between behavior and representation, and thus be a potent agent of change. Indeed, it could be argued that many successful mother–infant interventions, notably infant–parent psychotherapy, aim to change maternal representations of the child by helping her see the child's internal life as separate from her own. In line with this thinking, a range of “mentalization based” treatments have recently been developed (Bateman & Fonagy, 2004), which are specifically geared toward enhancing reflective functioning in parents (Grienberger et al., 2004; Slade, 2002; Slade, Sadler, de Dios-Kenn, Webb, Currier-Ezepchick, & Mayes, in press; Slade, Sadler, & Mayes, 2005; see also Baradon, Broughton, Gibbs, James, Joyce, & Woodhead, in press). These interventions are an effort to put theory into practice in transforming developing relationships between mothers and their infants.

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