



Published in final edited form as:

Child Dev. 2009 ; 80(1): 192–208. doi:10.1111/j.1467-8624.2008.01254.x.

Maternal Depression, Children's Attachment Security, and Representational Development: An Organizational Perspective

Sheree L. Toth*, Dante Cicchetti**, Fred A. Rogosch*, and Melissa Sturge-Apple*

* Mt. Hope Family Center, University of Rochester

** Institute of Child Development, University of Minnesota

Abstract

Relations among maternal depression, child attachment, and children's representations of parents and self were examined. Participants included toddlers and their mothers with a history of Major Depressive Disorder ($n=63$) or no history of mental disorder ($n=68$). Attachment was assessed at 20 and 36 months and representations of parents and self were assessed at 36 and 48 months. Depressive symptoms were assessed at all three time points. While early occurring maternal depression had a negative impact on children's negative and positive representations of parents, attachment security mediated the relation between depressive symptoms and negative representations. Attachment security served as an intervening variable between maternal depression and changes in children's negative representations of self. Implications for prevention are highlighted.

Children who are exposed to maternal depression during the early years of life are at heightened risk for subsequent socioemotional difficulties and psychopathology (Cicchetti & Toth, 1998; Goodman & Gottlib, 1999, 2002; Murray, Halligan, Adams, Patterson, & Goodyer, 2006; Radke-Yarrow, 1998). Despite documented associations between early-occurring maternal depression and child maladaptation, the mechanisms whereby depression contributes to future functioning in offspring need to be ascertained. In particular, early difficulties in children's abilities to develop a secure attachment relationship with depressed caregivers may contribute to the emergence of subsequent maladaptation, including increases in negative representations of caregivers and of self (Cicchetti & Toth, 1995; Cummings & Cicchetti, 1990). Specifically, the influences of the mother-child attachment relationship may facilitate or impede children's abilities to develop and integrate positive representations of primary caregivers and of the self (Steele, Steele, & Johansson, 2002).

Taken in tandem, empirical work on maternal depression, the quality of attachment in offspring, and children's representations of parents and of the self suggest that maternal depression may initiate a developmental process whereby negative adaptation in one domain may adversely affect functioning in another domain. This conceptualization is consistent with an organizational perspective, wherein development is seen as consisting of a hierarchically organized series of stage-salient tasks that become increasingly differentiated over time (Cicchetti & Sroufe, 1978; Sroufe & Rutter, 1984; Waters & Sroufe, 1983). At each point of reorganization, prior developmental structures are incorporated into subsequent ones. Thus, the effects of being reared by depressed parents are likely to be carried forward within the existing organization of systems. As such, previous vulnerabilities or strengths are expected to remain present and to influence future adaptation. Building upon this conceptual base, the current investigation was designed to examine the relations among early occurring maternal depression, child attachment security, and child representations of parents and of self.

Maternal Depression and Quality of Attachment in Offspring

A significant body of research has been directed toward investigating the quality of attachment relationships in the offspring of parents with mood disorders (see, for example, Campbell, Brownell, Hungerford, Spieker, Mohan, & Blessing, 2004; Cicchetti, Toth, & Rogosch, 1999; DeMulder & Radke-Yarrow, 1991; Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Teti, Gelfand, Messinger, & Isabella, 1995). In general, maternal depression has been associated with higher rates of insecure attachment (Campbell, Cohn, Meyers, Ross, and Flanagan, 1993; Goodman & Gotlib, 2002; Lyons-Ruth, Connell, Grunebaum, & Botein, 1990; Martins & Gaffan, 2000; Murray, 1992; Teti et al., 1995). For example, Murray (1992) reported that attachment insecurity was more prevalent among toddlers of postnatally depressed mothers than among toddlers of well mothers. However, considerable heterogeneity in the findings within this body of research remains. Overall, meta-analytic investigations of the relation between maternal depression and attachment insecurity have suggested only modest associations (Atkinson, Paglia, Coolbear, Niccols, Parker, & Guger, 2000; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999).

A number of factors have been proffered as potentially accounting for the variability found among investigations (cf. Campbell et al., 2004; Lyons-Ruth, Lyubchik, Wolfe, & Bronfan, 2002). Perhaps most importantly, characteristics of the sample must be considered. For example, the severity of depressive symptoms in a hospitalized versus a community sample may affect results. However, it is important not to equate a community sample with sub-clinical depression, as depression may meet diagnostic criteria in non-patient samples recruited from the community. In addition, not all depressed mothers are affected similarly and depression is not a proxy for inadequate parenting. Thus, although offspring of depressed mothers are at increased risk for having insecure attachments, not all children of depressed mothers will be affected adversely or similarly.

Attachment and Representational Development

The emergence of self-awareness is a crucial, stage-salient task of toddlerhood. As toddlers begin to develop a sense of themselves as autonomous, they become increasingly able to identify their causal roles in events. This attainment of an autonomous self corresponds with the transition from sensorimotor to representational abilities. As toddlers become more able to utilize language and play to represent relationships and the self, they accordingly become better able to communicate their needs and feelings (Bretherton & Beeghly, 1982; Kagan, 1981).

Attachment theorists have posited that because internal working models of parents and of self develop out of dyadic transactional patterns, it follows that these working models should be complementary (Bowlby, 1969, 1973, 1980; Bretherton, 1990; Crittenden, 1990; Sroufe, 1979). Thus, if a child has experienced rejection from the primary caregiver, then the child's working model of the rejecting parent is likely to be related to a working model of the self as unlovable. Conversely, a child who has had a supportive relationship with the primary caregiver is likely to represent the parent in a positive manner and to develop a working model of the self as worthy of love (Bretherton, 1990).

During infancy and toddlerhood, the quality of the attachment relationship with the primary caregiver typically is assessed through coding the organization of behaviors such as proximity seeking, contact maintenance, avoidance, and resistance. However, as children become increasingly able to verbalize aspects of their internalized attachment relationships that arise from their interactional histories, assessments of their representational worlds via narration are possible.

In normative populations, both continuity and change have been found in children's narrative representations. Oppenheim, Emde, and Warren (1997) reported that at the group-level, important developments occurred between the ages of 4 and 5 years, with the narratives of 5 year olds containing more positive and fewer negative representations of mothers. These group-level developmental changes may be explained in a number of ways. First, they may be the result of normative changes in parenting that occur during this time frame. As children become more self-sufficient, fewer parental control strategies are likely to be invoked and parenting may be more positive. It also may be that older children are more cognizant of social guidelines and thus are more likely to describe their mothers according to normative expectations. In addition, because the narratives of 5-year-olds have been shown to involve more differentiation and detailed depictions of caregivers than those of 3-year-olds (Bretherton, Prentiss, & Ridgeway, 1990), this developmental trend may explain the increase in positive maternal representations. However, none of these explanations can account for the decrease in negative maternal representations.

An alternate explanation may stem from social-cognitive advances in children's capacities to integrate positive and negative aspects of the self and other (Fischer & Ayoub, 1994), which undergo developmental transformations during the preschool years. Specifically, a positivity bias develops during the third year of life and becomes prominent in evaluations of the self. Over the course of development and with supportive environments, individuals become increasingly able to integrate the split between positive and negative and to recognize that both themselves and others can be good or bad simultaneously (Ayoub, O'Connor, Rappolt-Schlichtmann, Fischer, Rogosch, Toth, & Cicchetti, 2006). When examining individual differences in representation, however, moderate stability in children's maternal representations have been reported (Oppenheim et al., 1997). Thus, children's representations reflect group-level developmental change as well as stability with respect to individual differences.

In turning to atypical populations, empirical research has shown that toddlers of depressed mothers are at heightened risk for experiencing difficulties in self-development. In an investigation of self-recognition and linkages with cognitive and affective development, toddlers with depressed caregivers were more likely than were children of nondepressed mothers to exhibit negative or neutral affect upon recognizing themselves (Cicchetti, Rogosch, Toth, & Spagnola, 1997). Moreover, toddlers of depressed mothers who evidenced difficulties in self-recognition and affective instability had lower attachment security and had mothers with less positive affective characteristics than other toddlers. Although providing support for relations among maternal depression, insecure attachment, and self-development, these data are based on non-verbal assessments of self (Cicchetti et al., 1997).

Significant gaps in the literature remain with respect to the degree to which young children's perceptions of parental figures and of the self are related to their early attachment relationships. Studies with normative and high-risk samples have suggested that children do enact narratives in accord with their experiences (Kochanska, Padavich, & Koenig, 1996; Oppenheim, 2006; Zahn-Waxler et al., 1994; Zahn-Waxler, Cole, Welsh, & Fox, 1995). Moreover, in normative populations, narrative representations of relationships are associated with children's attachment classifications (Bretherton, Ridgeway, & Cassidy, 1990; Cassidy, 1998; Oppenheim, 1997). In general, children who are classified as securely attached produce narratives where the importance of the relationship with the mother is emphasized, whereas children with insecure attachment classifications tend to exclude parental figures from their narratives. More recently, relations between children's attachment security at early school-age and aspects of their representations and behavior in middle childhood have been reported (Moss, Bureau, & Beliveau, 2007). Despite posited linkages between caregiving, attachment, and representations of parental figures and of the self, we are not

aware of any longitudinal investigations that have sought to examine children's security of attachment as a possible mediating process between maternal depression and offspring's representations of parents and of the self.

Drawing from an organizational perspective and the extant empirical literature, the current longitudinal investigation was designed to examine the prospective relations among early occurring maternal depression, quality of attachment in offspring, and children's developing internal representations of parents and of the self. We posited that: (1) early occurring maternal depression would be related to children's attachment insecurity and to changes in internal representations of parents and self; and (2) that the security of attachment organization would serve as a mediating process in the relation between maternal depression and the positive versus negative valence of subsequent representations of parents and of self.

To provide a rigorous test of our process model, we utilized a multi-method measurement battery (e.g., observations, interview assessments, self-report) across three waves of data collection. Our ability to model mediation within a three-wave longitudinal design provides a particularly powerful test of mediational paths through the analysis of each element of the theoretical model at different time points (i.e., putative predictor, mediator, and outcome). In addition, autoregressive designs, which control for prior levels of the proposed mediators and outcomes, are especially effective tools for reducing the likelihood that identified mediational paths are due to the operation of third variables or the effects of the proposed outcome on the putative mediator or predictor (Cole & Maxwell, 2003; Davies, Dumenci, & Windle, 1999). Therefore, the use of three assessment points affords the opportunity to examine whether maternal depression predicts subsequent children's attachment security after controlling for prior levels of attachment security which, in turn, is associated with ensuing changes in children's internal representations.

Method

Participants

Mothers and their toddlers were recruited as part of a longitudinal investigation on the effects of maternal depression on child development. Mothers provided informed consent for participation prior to the initiation of data collection. Participants included mothers with a history of Major Depressive Disorder (MDD) that had occurred since the birth of their child ($n = 63$), as well as mothers with no current or history of major mental disorder ($n = 68$). Families who were not of low socioeconomic status were recruited in order to minimize co-occurring risk factors commonly associated with maternal depression (Downey & Coyne, 1990). Families could not be reliant on public assistance and parents were required to have at least a high school education.

A community sample of mothers with a history of MDD and their toddlers was recruited through referrals from mental health professionals and through notices placed in newspapers and community publications, in medical offices, and on community bulletin boards. The Nondepressed mothers and their toddlers were recruited by contacting families who resided in the vicinity of the residences of the Depressed mothers. Names of potential families with a toddler-age child were obtained from birth records.

In addition to having a child who was approximately 20 months of age, diagnostic inclusion criteria for mothers in the Depressed group required meeting *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., DSM-III-R; American Psychiatric Association, 1987) criteria for a MDD occurring since the birth of the mother's child. Diagnoses were determined by administration of the Diagnostic Interview Schedule (DIS-III-R) and severity of depressive symptoms was assessed over the course of the investigation. Mothers who met

criteria for bipolar disorder were not retained. Mothers recruited for the Nondepressed group also were interviewed with the DIS-III-R to ensure the absence of any current or prior mental disorder. Of the 89 mothers recruited for the Nondepressed group, 21 were excluded because of the presence of a prior or current psychiatric disorder.

Participants in the Depressed and Nondepressed groups were comparable on a range of demographic characteristics. Seventy-two percent of families were in the two highest social strata as determined by the Hollingshead Four Factor Index of Social Status (Hollingshead, 1975) and the majority of mothers (51.5%) were college graduates. Mothers were predominantly of European American race/ethnicity (91.7%) and the majority of the mothers were married at the time of initial recruitment (89.4%). Children in the Depressed ($M=104.0$, $SD=13.6$) and Nondepressed ($M=109.0$, $SD=13.9$) groups also did not differ significantly with respect to their verbal skills as assessed by the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981), $t(97) = 1.78$, ns.

With respect to features of their mental health history at the time of recruitment, 43.8% of depressed mothers met diagnostic criteria for MDD within the past month, while 78.1% met criteria within the past 6 months. The majority of mothers (71.9%) had experienced their first episode of MDD prior to the birth of their child; few mothers in the sample had only been depressed during the postpartum period (1.6%). Comorbid Axis I disorders were relatively common at the time of baseline assessments, with 28.1% of mothers having at least one comorbid disorder such as anxiety disorder, bulimia, or alcohol disorder during the past year. The presence of comorbidity, particularly with respect to depression and anxiety, is consistent with that reported in the literature (Kessler, 1994).

Participant retention—The current investigation focuses on data that were collected when offspring were 20, 36, and 48 months of age. As a result of moving out of the area or missing assessments at a particular follow-up period, age 3 data were not available for 14 families, and age 4 data were not available for an additional 18 families. In the longitudinal analyses to be presented, mother-toddler dyads were retained for statistical purposes if the mothers and children participated in all three waves of assessment ($n = 99$). The rate of retention did not differ significantly between the Depressed and Nondepressed groups ($p = .37$). Comparing the children in families that did ($n = 99$) versus did not ($n = 31$) participate in all three assessment waves indicated that those retained did not differ from those who were not retained in terms of child gender, baseline assessment age, Bayley MDI scores, or rate of secure attachment. Moreover, the two groups did not differ on maternal baseline age, maternal race, maternal or paternal education, family SES level, or maternal depressive symptoms (all $p > .05$, range of .17–.95). Thus, this lack of differences indicates that attrition was not selective. The level of attrition is understandable given the presence of depression in mothers, as well as the stress involved with parenting a young child.

Procedure

Following verification of maternal diagnostic status, 20-month-old toddlers and their mothers were observed in the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978). At 36-months of age, toddlers and their mothers were again observed in the Strange Situation. To ensure that follow-up assessments remained novel to the child, the 36 month Strange Situation was conducted in a laboratory that differed from that utilized for the 20-month assessment and an adult not previously seen by the child served as the stranger. Children's narrative representations were assessed via the MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, Emde, & the MacArthur Narrative Group, 1990) when children were 36 and 48 months of age. Maternal interviews were conducted in mothers' homes and all child assessments were conducted in a laboratory setting.

Measures

Diagnostic Interview Schedule-III-R (DIS-III-R; Robins et al., 1985)—The DIS-III-R is a structured psychiatric interview designed to assess diagnostic criteria for Axis I disorders of the DSM-III-R (American Psychiatric Association, 1987). The interview consists of a series of modules that probe for the history of symptoms present in different categories of DSM-III-R Axis I disorders. Questions require yes/no answers, which reduces the need for interviewer interpretation. As a result, clinically sophisticated interviewers are not required and trained nonprofessionals can conduct the interview. The DIS-III-R allows for the determination of 49 DSM-III-R diagnoses, which are generated by computer algorithms. This version of the DIS was utilized as it was the instrument available at the time this investigation was initiated. The DIS has been shown to be reliable and valid for use in psychiatric epidemiological field studies (Robins, Helzer, Croughan, & Ratcliff, 1981; Robins, Helzer, Ratcliff, & Seyfried, 1982). All interviewers were trained to criterion reliability in the administration of the DIS and computer generated diagnoses were utilized.

Beck Depression Inventory (BDI; Beck et al., 1961)—The BDI is a 21-item, extensively used, self-report measure of current affective, cognitive, motivational, and physiological symptoms of depression. Each item consists of four self-evaluative statements, scored 0 to 3, with three indicating the most intense symptom severity. The BDI correlates with psychiatric ratings of depression in both psychiatric and student samples (Beck, Steer, & Garbin, 1988). Test-retest reliabilities from .48 to .86 among psychiatric patients and from .60 to .83 among non-psychiatric subjects have been reported (Beck et al., 1988). In the current sample, internal consistencies were .92, .91, and .91 at Time 1, 2, and 3, respectively.

Peabody Picture Vocabulary Test-Revised (PPVT-R; L.M. Dunn & Dunn, 1981)—The PPVT-R, the version available at the inception of the investigation, was administered to all children to assess verbal skills.

Strange Situation Paradigm (Ainsworth et al., 1978)—The Strange Situation is a widely utilized and well-validated procedure that assesses the quality of the mother-infant attachment relationship. The standard Strange Situation was conducted with toddlers and their mothers at 20 and 36 months-of-age. Because the toddlers at the first assessment were under age two, the standard Strange Situation was deemed more appropriate than altered procedures utilized with children at older ages. Moreover, because we sought to examine attachment organization over time, we continued to use the standard Strange Situation at age 36 months, as suggested by the MacArthur Working Group on Attachment guidelines (Cassidy & Marvin, 1992). The Strange Situation was videotaped for subsequent coding. In the Strange Situation, reunion behavior is coded after two 3-minute separations from the mother and this information is integrated with observations obtained from the pre-separation and other episodes in order to derive attachment classifications (Sroufe & Waters, 1977). Attachment classifications include Type B (Secure), Type A (Avoidant), Type C (Ambivalent), and Type D (Disorganized/Disoriented).

Two independent raters coded all of the Strange Situation videotapes. Raters were unaware of the group status of the mother-child dyads. The first coder was trained and obtained reliability in the Ainsworth Strange Situation coding by Alan Sroufe and Everett Waters and in D coding by Mary Main. The second coder was trained by and obtained reliability with the first coder. Agreement on the Strange Situation classifications for the current sample was 90% ($\kappa = .86$). During the course of coding, conferencing occurred when either coder believed that the classification determination was unclear (19% of tapes). Ainsworth et al.'s (1978) criteria were supplemented by a developmental systems approach to classifying

attachment for children ages 18 to 24 months (see code in Gersten, Coster, Schneider-Rosen, Carlson, & Cicchetti, 1986, and Schneider-Rosen, 1990). Type D classifications were based on the Main and Solomon (1990) criteria.

The coding of the 36-month videotapes was completed by two independent raters, following the same approach as discussed above. The videotapes were coded several years following the coding of the 20-month videotapes and the coders were not aware of the original classifications or group status. The guidelines of the MacArthur Working Group on Attachment coding system (Cassidy & Marvin, 1992) were utilized to derive attachment classifications. The first coder was trained to reliability on the MacArthur system by Robert Marvin; the second coder was trained by and obtained reliability with the first coder. As an additional reliability check, 20% of the 36-month tapes were coded by an individual who had been trained on attachment coding by Dr. Ellen Moss and who had no prior involvement with the investigation. Agreement between this coder and the prior two coders was 94%. In addition to the secure-B, insecure-avoidant-A, and insecure-resistant-C classifications, children classified as insecure-controlling, insecure-disorganized, and insecure-other were included in an overarching insecure-disorganized-D classification.

From the attachment classifications, an attachment insecurity dimension was derived for analytic purposes. Secure classifications were coded 0, avoidant and resistant categories were assigned a score of 1, and children with Disorganized/Disoriented attachment classifications received a score of 2. This approach expands the variance beyond the secure/insecure dichotomy. The decision to combine Type A and Type C categories was based on the paucity of children who received Type C classifications. Moreover, this approach allows us to weight security from most secure (Secure) to least secure (Disorganized/Disoriented). The utilization of a dimensional approach for characterizing individual differences in attachment security has received prior support (e.g., Cummings, 1990; Fraley & Speiker, 2003).

MacArthur Story Stem Battery (MSSB, Bretherton, Oppenheim et al., 1990)—

Story-stems were selected from the MSSB. The ten stories utilized in the present investigation depicted moral dilemmas or conflicts and emotionally charged events in the context of parent-child and family relationships. The MSSB was designed so that different stories elicit different themes and representations (Von Klitzing, Kelsay, & Emde, 2006). Prior research has found the narrative story-stem completion paradigm to be a valid and reliable methodology for evaluating children's perceptions of parent-child relationships, as well as of self-system variables in normative and high risk samples (Emde, Wolfe, & Oppenheim, 2003; Oppenheim, 2006; Toth, Cicchetti, Macfie, & Emde, 1997).

Story-stems were administered individually to all children. The task was introduced by informing the child that s/he was going to be asked to tell some stories using a set of family dolls and that the experimenter would begin the stories and the child would be asked to finish the stories in any way s/he chose. Each narrative story-stem involved a combination of family dolls, including a mother, father, grandmother, and two same-sex children of different ages. Doll characters were of the same race and gender as the child participant. Household toy props were used to facilitate child enactment of stories. After introducing the task, a warm-up story describing a family birthday party was administered to facilitate rapport and to ensure child understanding of the task. The warm-up task was not coded. All story-stems were presented in a standardized order and, following each presentation, children were invited to "Show me and tell me what happens now." Standard probes were utilized to obtain clarification or to explore narrative content in more depth. The MSSB paradigm has been described in greater detail elsewhere (Toth et al., 1997). Assessments were videotaped for subsequent coding.

Narratives were coded according to the MacArthur Narrative Coding Manual –Rochester Revision (Robinson, Mantz-Simmons, Macfie, & MacArthur Narrative Working Group, 1996). This system involves a presence-absence method of coding child representations of parents and of self and it attends to both child verbalizations and behavioral enactments. Positive and Negative parent representations were coded depending on the child's enactment of parent figures in each narrative. Positive and negative parent representations were coded zero or one for each narrative and then summed across narratives. **Positive parent representations** included behavior that was protective, caretaking, affectionate, and helpful. **Negative parent representations** included behavior that was harsh, rejecting, or ineffectual. Positive and negative self-representations were similarly derived. **Positive self-representations** involved a child character described or portrayed as empathic or helpful, prideful, or feeling good about self. **Negative self-representations** were coded when a child figure was described or portrayed as aggressive toward self or other, experiencing feelings of shame or self-blame, or feeling badly about self. Positive and negative representations for parents and self were coded only once per narrative, yielding a maximum score of 10 for each variable. Twenty percent of the narratives were coded by two coders who were unaware of children's group status or of study hypotheses and adequate reliability was obtained for the variables of interest, including agreement of .94 ($\kappa = .75$) for Positive Parent Representations, .97 ($\kappa = .69$) for Negative Parent Representations, .94 ($\kappa = .63$) for Positive Self-Representations, and .97 ($\kappa = .64$) for Negative Self-Representations. Cases were assigned so that the same coder did not code the same child for both the 36 and 48 month assessments.

Results

Table 1 contains descriptive information for study variables for the sample, as well as contrasts between the Depressed and Nondepressed groups. Bivariate correlations between manifest variables in model analyses are shown in Table 2. At 20 months, the distribution of attachment classifications differed significantly between the Depressed and Nondepressed groups, $\chi^2(3, N = 99) = 18.55, p < .001$. The distribution in the Depressed versus the Nondepressed group was as follows: secure: 17.8% vs. 57.4%; avoidant: 26.7% vs. 22.2%; resistant: 6.7% vs. 3.7%; and disorganized: 48.9% vs. 16.7%. Similarly at age 36 months, the distribution of attachment classifications also differed significantly between groups, $\chi^2(3, N = 97) = 14.84, p < .002$. Differences again were primarily seen in lower rates of secure attachment in the Depressed group (13.6%) as compared with the Nondepressed group (49.1%). Higher disorganized attachment also was found for the Depressed group (40.9%) as compared to the Nondepressed group (20.8%). Rates for avoidant attachment were 38.6% and 22.6%, respectively for the Depressed and Nondepressed groups; resistant attachment evinced similar rates (6.8% vs. 7.5%). Table 1 also indicates that the Depressed and Nondepressed groups were significantly different on the attachment insecurity scale.

Model Testing Procedures

In order to examine our developmental process model, we employed a path analysis within a Structural Equation Modeling (SEM) framework (e.g., Kline, 2006). Path analysis provides for the testing of relationships among multiple manifest variables within longitudinal process models, allows for simultaneous assessment of multiple outcome variables, and produces evidence of model fit and misspecification. In the present study, path models were estimated using the weighted least square parameter estimator (WLSMV) through MPlus 4.2 statistical software (Muthen & Muthen, 2007). The WLSMV estimator uses the diagonal of the weight matrix to obtain parameter estimates and the full weight matrix to obtain standard errors and measures of model fit. This estimator has been demonstrated to provide optimum estimation when at least one ordered categorical dependent variable is present (Muthen, du

Toit, & Spisic, 1997). In the present study, five cases were missing single data assessments across different variables (i.e., one case was missing the Strange Situation at age 20 months and four cases were missing Time 2 assessments of representations, all due to equipment malfunction). To maximize inclusion of participants who had taken part in assessments over the course of the study, we utilized the missing data analysis in MPlus to impute this missing information. Finally, the fit of our path models was assessed using (a) the root mean square error of approximation (RMSEA), with values of .08 or less reflecting reasonable fit (Browne & Cudeck, 1993), and (b) the CFI statistic with values between .95 and 1.00 indicating acceptable fit (Bentler, 1990).

Evaluating the Moderating Effect of Depression Group

Given the potential moderating role of maternal depression group in process models, we initially examined whether the proposed links between maternal depression, attachment security and children's representations differed as a function of depression group by splitting the data and estimating models simultaneously using a multiple-group analysis. We estimated the multiple-group model with all process paths between maternal depression, attachment and children's representations constrained to equality for Depressed and Nondepressed mothers. Next, we estimated a model in which these parameters were allowed to freely vary. Comparisons of the constrained and free-to-vary model revealed no difference in fit, thus indicating that depression group did not moderate process pathways in our models. Therefore, all subsequent analyses were performed with the full sample.

Process Modeling

In accordance with a process-oriented perspective for testing mediational models outlined by Baron and Kenny (1986), who suggest that mediating analyses must first establish direct effects between a predictor and the mediator and outcome variables, structural equation model analyses were first conducted testing direct associations between severity of maternal depressive symptoms (hereafter called depressive symptoms) at Time 1 and subsequent changes in children's attachment insecurity from Time 1 to Time 2 and children's representations from Time 2 to Time 3. If significant paths were detected, we then proceeded with tests of mediation by examining how the prediction of changes in children's internal representations from Time 2 to Time 3 is mediated through children's attachment insecurity at Time 2. In order to model change in study variables, we incorporated autoregressive paths between time differentiated assessments of variables in all model analyses (e.g., Time 2 attachment insecurity regressed on Time 1 attachment insecurity). The modeling of autoregressive effects in causal models provides estimates of individual differences in change in rank ordering on values of a variable at a particular point from prior values of the variable at an earlier point in time (Cole & Maxwell, 2003; Gollob & Reichardt, 1987). Within the context of the present study, autoregressive parameters demonstrate the level of stability across time. However, path coefficients less than 1 in autoregressive paths reflect that there is change in the rank-ordering of individuals on particular variables over time. Furthermore, cross-lag paths between predictor variables and variables occurring later in time (e.g., maternal depressive symptoms at Time 1 and children's attachment insecurity at Time 2) model how early occurring constructs may predict change over time in individual rank-ordering in outcome variables. Finally, in order to examine that the effects of early maternal depressive symptoms on children's representations were not due to the levels of recent or concurrent depressive symptoms, we also included paths between maternal depressive symptoms at Time 3 assessments and children's representations at Time 3. If the paths between maternal depression at Time 1 and children's representations at Time 3 remained robust and significant, then this would suggest that recent or covarying levels of depression did not reduce the effects of early depression on children's representations of parents.

Children's Internal Representations of Parents

In accordance with our process-oriented perspective, we first explored a direct effects model that examined whether maternal depressive symptoms at Time 1 predicted subsequent changes in children's attachment insecurity from Time 1 to Time 2 and changes in children's internal representations of their parents from Time 2 to Time 3. A path model analysis with manifest constructs was conducted and the model provided an acceptable fit to the data, $\chi^2(9, N = 99) = 9.07$, CFI = .98, and RMSEA = .06. In examining the impact of maternal depressive symptoms on children's attachment security, results indicated that maternal depressive symptoms at Time 1 were significantly associated with attachment insecurity at Time 1 ($r = .37, p < .05$) and were a significant predictor of children's attachment insecurity at Time 2 ($\beta = .22, p < .05$), suggesting that higher maternal depressive symptomatology at Time 1 predicted an increase in children's attachment insecurity from Time 1 to Time 2.

Examination of the direct paths from maternal depressive symptoms to changes in children's internal representations of parents from age 3 to age 4 revealed an interesting pattern of findings. First, we found a significant cross-lag path between maternal depressive symptoms at Time 1 to children's negative representations of parents at Time 3 ($\beta = .29, p < .05$). In addition, we found a significant effect of maternal depressive symptoms on children's positive representations of parents at Time 3 ($\beta = -.27, p < .05$). In other words, higher levels of maternal depressive symptoms at Time 1 directly predicted increases in children's negative representations of parents and decreases in positive representations of parents from Time 2 to Time 3. Furthermore, in order to establish that this direct effect of early maternal depressive symptoms on children's representations of parents at Time 3 was not due to the levels of recent or concurrent depressive symptoms, we also included paths between maternal depressive symptoms at Time 3 assessments and children's representations at Time 3. Findings revealed non-significant pathways between maternal depressive symptoms at Time 3 and children's negative ($\beta = -.12, p > .05$) and positive ($\beta = .15, p > .05$) representations of parents. In addition, the paths between maternal depression at Time 1 and children's representations of parents at Time 3 remained robust and significant, suggesting recent or co varying levels of depression did not reduce the effects of early depression on children's representations of parents.

Given the presence of significant direct effects, we were able to investigate whether children's attachment insecurity at Time 2 mediated the direct effect of maternal depressive symptoms at Time 1 on changes in children's negative and positive representations of their parents from Time 2 to Time 3. To accomplish this, we specified paths between children's attachment insecurity at age 3 and children's positive and negative internal representations of parents at age 4. Our mediating model is presented in Figure 1; for ease of interpretation only significant pathways are included. The model fit the data well, $\chi^2(6, N = 99) = 7.62, p = .27$, CFI = .99, and RMSEA = .05. First, path coefficients revealed that higher attachment insecurity at age 3 was a potent predictor of children's increased negative representations of parents from age 3 to age 4 ($\beta = .29, p < .001$) but did not predict changes in children's positive representations of parents from age 3 to 4 ($\beta = .01, p = .890$). This significant finding for negative representations held even when assessments of children's verbal abilities were included as a covariate in the model. In addition, children's attachment insecurity explained 4% of the variance in changes in children's negative representations of parents from age 3 to age 4.

Because attachment insecurity was a significant predictor of children's negative representations of parents, we were able to explore the mediational impact that it had on the direct effect of maternal depressive symptoms. Examination of the direct path coefficient revealed that the effect of depressive symptoms had been reduced to non-significance ($\beta = .$

16, $p > .05$) with the inclusion of the attachment insecurity path in the model. However, reduction in significance does not fully establish the presence of mediation. To further explore this, the model was re-examined with the direct path between maternal depression at Time 1 and children's negative representations of parents at Time 3 constrained to equal 0. If there is not a significant reduction in model fit with the exclusion of this direct path, then this suggests that the direct effect of maternal depressive symptoms are no different than zero when the mediation paths between children's attachment insecurity are considered in the model. The change in chi-square for the one degree of freedom obtained by constraining the direct path to 0 was not significant, $\Delta \chi^2(1 \text{ df}) = 1.87, p = .17$ (critical chi-square value for 1 degree of freedom = 3.84), suggesting that the model fit equally well with the exclusion of the direct path. In substantive terms, this suggests that the impact of early maternal depressive symptoms on children's increasing negative representations of parents at later ages is mediated by children's attachment insecurity to their mothers.

Finally, to further illuminate the process of how maternal depressive symptoms may set in motion perturbations in children's attachment security and subsequent development of children's internal representations, we tested the significance of the indirect pathway from maternal depression at baseline to increases in children's attachment insecurity to increases in children's negative representations of the parent from Time 2 to Time 3. We utilized procedures for examining the statistical significance of indirect paths outlined by Sobel (e.g., MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The indirect pathway ($\alpha\beta$) was significant, $z = 2.14, p < .05$. These results suggest that maternal depressive symptoms may be seen as having a significant indirect effect on increases in children's negative representations of parents through its impact on children's attachment insecurity. Given a non-significant path between attachment insecurity and children's positive representations of parents, no further testing on this pathway was conducted.

Children's Internal Representations of the Self

Our final set of analyses examined our process model specifying changes in children's representations of the self from Time 2 to Time 3 as our outcome variable of interest. We first examined the direct effects model with pathways between maternal depression at Time 1 and changes in children's attachment security (age 20 months to 3 years) and internal representations of the self (age 3 to 4). Results suggested that the model provided an adequate representation of the data, $\chi^2(9, N = 99) = 9.27, p = .41, CFI = .99, \text{ and RMSEA} = .02$ (See Figure 2). As reported previously, maternal depression at baseline was significantly associated with concurrent levels of attachment insecurity at baseline ($r = .39, p < .05$) and also with increases in attachment insecurity from Time 1 to Time 2 ($\beta = .23, p < .05$). However, maternal depression at baseline did not significantly predict changes in children's positive ($\beta = -.24, p > .05$) or negative representations ($\beta = .17, p > .05$) of the self from Time 2 to Time 3. In addition, findings revealed non-significant pathways between maternal depression at Time 2 and 3 and change in children's negative and positive representations of the self from Time 2 to Time 3.

Given that maternal depression did not directly impact children's internal representations of the self, we next examined an intervening effects model which postulates that maternal depression's effects on child attachment insecurity may be the catalyst for the development of children's representations of the self. Broadly defined, process models outlining the role of intervening variables in providing linkages between independent and outcome variables in developmental models examine how a predictor is related to an outcome variable through their relationship with an intervening variable (e.g., $X \rightarrow I \rightarrow Y$; MacKinnon et al., 2002; Preacher & Hayes, 2004). The analyses of indirect pathways in developmental research are valuable in that such analyses may elucidate important processes that are set in motion by

the occurrence of distal, but etiologically central, factors in developmental process models (e.g., Cummings, Davies, & Campbell, 2000).

Therefore, we next examined the model which included paths from children's attachment insecurity at Time 2 and changes in children's internal representations of the self from Time 2 to Time 3 (Figure 2). The model fit the data well, $\chi^2(8, N = 99) = 8.78, p = .36, CFI = .99,$ and $RMSEA = .02$. Path coefficients revealed that attachment insecurity at age 3 was a significant positive predictor of changes in children's negative representations of the self from Time 2 to Time 3 ($\beta = .25, p < .05$) and a non-significant predictor of changes in children's positive representations of self from Time 2 to Time 3 ($\beta = .12, p > .05$). This significant finding for negative representations held even when assessments of children's verbal abilities were included as a covariate in the model. In addition, children's attachment insecurity explained 4% of the variance in changes in children's negative representations of the self from age 3 to age 4. Finally, multiplicative tests evaluating the significance of the indirect pathway from maternal depression to increases in children's attachment insecurity to increases in children's negative representations of the self indicated that the indirect pathway ($\alpha\beta$) was significant, $z' = 1.70, p < .05$. These results suggest that maternal depression may have a significant indirect effect on children's development of negative representations of the self through its detrimental effects on children's attachment insecurity. Given a non-significant path between attachment insecurity and children's positive representations of the self, no further testing on this pathway was conducted.

Discussion

The goal of the present study was to elucidate how attachment security may mediate the effects of early maternal depression on the subsequent development of children's representations of parents and of self. Based on our interest in explicating processes contributing to risk for maladaptation among offspring, the research was guided by an organizational developmental model. Because the quality of the early attachment relationship contributes to internal representational models of self and of self in relation to others that organize cognitive, affective, and behavioral dimensions, these negative representational models can contribute to the canalization of perceptions and experiences over the course of development. Consequently, significant others are likely to be seen as unavailable or rejecting and the self is more prone to being regarded as unlovable. These attachment-related anomalies may culminate in the unfolding of self-system processes that have been linked to later maladaptation and depression, including low self-esteem, helplessness, and negative attributional biases (Harter & Marold, 1994; Mezulis, Hyde, & Abramson, 2006; Rudolph & Clark, 2001).

The findings of the current investigation are consistent with the early phases of this theoretical model and demonstrate the unfolding of developmental risk processes in the young children of mothers with early occurring depression. First, the results demonstrated that the severity of maternal depressive symptoms was related to the concurrent degree of attachment insecurity in toddlers at age 20 months, as well as to later attachment insecurity at age 3, controlling for initial levels of attachment insecurity. Thus, early occurring maternal depression contributed to promoting continuity of insecure attachment organizations as these children developed. Second, the degree of attachment insecurity at age three was shown to predict increasingly negative representations of parents and of the self by age four. These findings are particularly important in illustrating the evolving representational capacities as children develop and in demonstrating how insecure attachment contributes to the emergence of negative representations of self and of self in relation to others that are consistent with negative working models. Third, and importantly, the findings demonstrate that the degree of attachment insecurity at age three mediated the

relation between early maternal depression and emerging negative representational models of parents by age four. Moreover, evidence also was found that early maternal depressive symptomatology, through contributing to attachment insecurity at age three, indirectly influenced the development of negative representational models of the self by age four. Finally, evolving positive representations of parent and of self did not appear to be linked to earlier attachment insecurity or to maternal depressive symptoms.

These findings cohere with prior studies to highlight maternal depression occurring early in development as particularly salient in predicting socioemotional difficulties in offspring (Dawson et al., 2003; Maughan, Cicchetti, Toth, & Rogosch, 2007). In fact, in the current investigation, later levels of maternal depressive symptoms did not contribute to the prospective relations between attachment security and representational development, beyond the effects of early occurring maternal depression. The vulnerability stemming from early occurring maternal depression may emanate from a number of avenues. First, because rapid changes in cognitive, emotional, and neurobiological development occur during infancy (Cicchetti, 2002), the presence of maternal depression that impedes mothers' ability to provide the supportive care needed to foster secure attachment relationships and related positive self-system processes may be particularly pernicious. Second, alterations in brain structure and function during this developmental period may increase infant vulnerability to negative experiences (Cicchetti & Curtis, 2006) and contribute to the emergence of negative representations of parents and of self.

Extensive research in the normative developmental literature highlights the importance of parents as powerful influences on children's self-evaluations (Harter, 2006). Nurturant parents tend to raise children who internalize the support provided by caregivers and, in turn, the children are more likely to form positive self-views. Conversely, parents who fail to provide approval and encouragement to their offspring are more likely to contribute to the development of negative self-views in their children. In accordance with predictions derived from attachment theory and an organizational perspective, the current findings provide clear support for a model of development in which the relationship with a primary caregiver contributes to evolving models of self and of self in relation to others. These results are consistent with research with other high risk populations, particularly maltreated children, where relations between quality of caregiving and representation of parents and of self also have been obtained. Children with histories of maltreatment have been shown to consistently portray maternal figures as more negative and less responsive and to view the self as more negative than do children who have not experienced maltreatment (Macfie, Toth, Rogosch, Robinson, Emde, & Cicchetti, 1999; Toth et al., 1997).

It is interesting that in the current investigation maternal depression was not related to positive representations of parents, but rather that attachment insecurity mediated the relation between depression and negative representations of parents. Because of the anxiety and fear-based aspects of insecure attachments, particularly those of a disorganized/disoriented nature, attachment influences on negative representations of parents appear to be particularly salient. In general, the parenting of depressed mothers has been described as either hostile/punitive (increased negative behaviors) or withdrawn (decreased positive behaviors) (Lyons-Ruth, Lyubchik, Wolfe, & Bronfan, 2002). In a nationally representative survey of households with a child under the age of 3 years, both decreased positive and increased negative behaviors were found to be independently related to maternal depressive symptoms (Lyons-Ruth et al., 2002). It is possible that increased negative behaviors are more prevalent in mothers who have experienced MDD, as in the current study, and that it is the negative interactions that contribute to insecure attachment and to emerging negative representational models of parents and of self. In fact, a significant body of research

highlights the presence of criticism, derogation, and punitiveness in the parenting of depressed caregivers (Garber & Martin, 2002).

The fact that negative representational models of parents and of the self emerge and are carried forward over the course of development is particularly interesting. Although greater attachment insecurity in offspring of mothers with early occurring depression was present at 20 and at 36 months-of-age, attachment insecurity related to negative representations increasingly evolving by the 48 month assessment. From a developmental perspective, these results suggest that, early on in the development of representational capacities, the influences of maternal depression may not be evident, but that such influences may become increasingly pernicious over the course of development as representational capacities become more consolidated. Furthermore, at age 3 negative parent and negative self representations correlated $r = .29$, but this dynamic of negative parent and negative self representation appeared to be further enhanced by age 4 ($r = .50$). Again, these results can be understood in the context of the negative interactions that are common in the parenting of depressed caregivers and that become increasingly incorporated into children's negative self-views over the course of development. It also is important to note that, consistent with prior investigations, positive and negative representations are related but they are not opposite endpoints on a continuum (Oppenheim et al., 1997).

Other investigations also have found developmental progressions in the coherence and consolidation of representational capacities. In a recent examination of attachment security and mother-child dialogues, infant attachment security was found to predict emotionally matched mother-child dialogues at two time points several years later. Although the quality of attachments were associated with dialogues at both ages 4.5 and 7.5 years, infant attachments accounted for variance in age 7.5 dialogues beyond that accounted for at the 4.5 year assessments. Oppenheim and colleagues (Oppenheim, Koren-Karie, & Sagi-Schwartz, 2007) discuss their findings as suggesting that mother-child dialogues at the earlier developmental period appear to reflect a transitional phase in the emergence of emotion narratives. Although we do not have data on narratives during the school-age years, our findings suggest that children's narratives become more consolidated as development proceeds from age 3 to age 4.

The current investigation advances the extant literature on the relations among maternal depression, attachment insecurity, and representational development, but limitations also must be noted. First, the generalizability of these findings to a broader population of children with depressed mothers is limited as a function of the relatively advantaged status of this sample. Future work examining a broader range of socioeconomic and ethno-racial diversity is necessary in order to increase the generalizability of the findings. For example, given that co-occurring risk factors were minimized in this investigation, it is likely that the relations between insecure attachment and future negative representational models would be even more striking in a higher risk sample. Second, given ongoing developmental processes in children, it was necessary to utilize different Strange Situation coding systems at age 20 months and 36 months in order to take into account differences in child age. While this must be noted, stability parameters in model analyses suggested that there was an acceptable degree of correspondence between Strange Situation coding systems over time. Pathways among maternal depression, children's attachment security, and children's representations also tended to be modest in magnitude. Nevertheless, in the context of our multi-method, three-wave longitudinal models, even modest associations among family processes may be regarded as substantively meaningful. It also is possible that the magnitude of the findings was a function of the utilization of a three-point ordinal attachment security scale. Although this approach provides more variance than a secure/insecure dichotomy, if a true continuous, interval scale of attachment security derived from the Strange Situation were available, then

the results reported might be stronger. Finally, although we interpret these results as highlighting the influence of parenting and maternal behavior, affect, and cognition on children's evolving representations of parents and of self, it also is possible that biological mechanisms related to maternal depression may also play a role in the emergence of negative representations. For example, studies have found that parents with depression and their children evidence similar patterns of EEG asymmetry, including greater right versus left side hemispheric activation that has been associated with processing negative emotion (Davidson, 2000). Findings such as these suggest that offspring of depressed mothers may develop negative representations because their experience is organized by a biological tendency to experience and express negative emotion rather than by direct effects of maternal behavior on developing representations. Conversely, it is equally possible that parenting affects brain development in offspring and that, with intervention, the EEG asymmetries might be modified. These are intriguing questions that await further research (Cicchetti & Gunnar, 2008).

These findings highlight the presence of a "window of opportunity" for early intervention with insecurely attached offspring of depressed mothers. Because representational capacities appear to remain more open earlier in development, it may be possible to intervene to prevent the crystallization of negative representations of parents and of the self. For example, in a treatment evaluation study, preschool-aged maltreated children receiving an attachment-theory informed intervention depicted maternal figures as more positive and had more positive expectations about the mother-child relationship following the completion of the intervention than they did prior to the provision of the intervention (Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002). The current findings reflect a significant advance in understanding the effects of early occurring maternal depression on the security of attachment and the emergence of negatively-valenced representations of parents and of self in offspring of depressed mothers and suggest that intervention approaches that foster secure attachment may be promising avenues to pursue in order to prevent the emergence and consolidation of negative representational capacities in offspring of depressed mothers.

Acknowledgments

This research was supported through a grant (MH45027) from the National Institute of Mental Health. We thank the mothers and children who participated in this research and the many research assistants who assisted with data collection. In particular we thank Angeline Maughan and Mary Spagnola for their assistance with coding.

References

- Ainsworth, MDS.; Blehar, MC.; Waters, E.; Wall, S. Patterns of attachment: A psychological study of the Strange Situation. Hillsdale, NJ: Lawrence Erlbaum Associates; 1978.
- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders DSM-III. Washington, DC: American Psychiatric Association; 1987.
- Atkinson L, Paglia A, Coolbear J, Niccols A, Parker KCH, Guger S. Attachment security: A meta-analysis of maternal mental health correlates. *Clinical Psychology Review*. 2000; 20:1019–1040. [PubMed: 11098398]
- Ayoub CC, O'Connor E, Rappolt-Schlichtmann G, Fischer KW, Rogosch FA, Toth SL, Cicchetti D. Cognitive and emotional differences in young maltreated children: A translational application of dynamic skill theory. *Development and Psychopathology*. 2006; 18:679–706. [PubMed: 17152396]
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*. 1986; 51:1173–1182. [PubMed: 3806354]
- Beck AT, Steer RA, Garbin MG. Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*. 1988; 8(1):77–100.

- Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Archives of General Psychiatry*. 1961; 4:561–571. [PubMed: 13688369]
- Bentler PM. Comparative fit indexes in structural models. *Psychological Bulletin*. 1990; 107:238–246. [PubMed: 2320703]
- Bowlby, J. Attachment. New York: Basic Books; 1969.
- Bowlby, J. Attachment and loss: Separation. Vol. 2. New York: Basic Books; 1973.
- Bowlby, J. Attachment and loss: Loss, sadness, and depression. Vol. 3. New York: Basic Books; 1980.
- Bretherton, I. Open communication and internal working models: Their role in the development of attachment relationships. In: Thompson, R., editor. Nebraska Symposium on Motivation, Vol. 36: Socioeconomic development. Lincoln, NE: University of Nebraska Press; 1990. p. 57-113.
- Bretherton I, Beehly M. Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*. 1982; 18:906–921.
- Bretherton, I.; Oppenheim, D.; Buchsbaum, H.; Emde, RN. the MacArthur Narrative Group. MacArthur Story Stem Battery. 1990. Unpublished manuscript
- Bretherton, I.; Prentiss, C.; Ridgeway, D. Family relationship as represented in a story-completion task at thirty-seven and fifty-four months of age. In: Bretherton, I.; Watson, MW., editors. Children's perspectives on the family. San Francisco: Jossey-Bass; 1990. p. 85-106.
- Bretherton, I.; Ridgeway, D.; Cassidy, J. Assessing internal working models of the attachment relationship: An attachment story completion task for 3-year-olds. In: Greenberg, M.; Cicchetti, D.; Cummings, EM., editors. Attachment in the preschool years. Chicago: University of Chicago Press; 1990. p. 273-308.
- Browne, MW.; Cudeck, R. Alternative ways of assessing model fit. In: Bollen, KA.; Long, JS., editors. Testing structural equation models. Beverly Hills, CA: Sage Publications; 1993. p. 136-162.
- Campbell SB, Brownell CA, Hungerford A, Spieker S, Mohan R, Blessing JS. The course of maternal depressive symptoms and maternal sensitivity as predictors of preschool attachment security at 36 months. *Development and Psychopathology*. 2004; 16(2):231–252. [PubMed: 15487594]
- Campbell, SB.; Cohn, JF.; Meyers, T.; Ross, S.; Flanagan, C. Chronicity of maternal depression and mother-infant interaction. Paper presented at the Biennial meeting of the Society for Research in Child Development; New Orleans, LA. 1993.
- Cassidy J. Child-mother attachment and the self in six-years-olds. *Child Development*. 1998; 59:121–134. [PubMed: 3342707]
- Cassidy, J.; Marvin, R. Attachment organization in preschool children: Procedures and coding manual. Pennsylvania State University and University of Virginia; 1992. Unpublished manuscript
- Cicchetti, D. How a child builds a brain: Insights from normality and psychopathology. In: Hartup, WW.; Weinberg, RA., editors. The Minnesota symposia on child psychology: Child psychology in retrospect and prospect. Vol. 32. Mahwah, NJ: Lawrence Erlbaum Associates; 2002. p. 23-71.
- Cicchetti, D.; Curtis, WJ. The developing brain and neural plasticity: Implications for normality, psychopathology, and resilience. In: Cicchetti, D.; Cohen, D., editors. *Developmental Psychopathology* (2nd ed.), Vol. 2: Developmental Neuroscience. New York: Wiley; 2006. p. 1-64.
- Cicchetti D, Gunnar M. Integrating biological methods into the design and evaluation of preventive interventions. *Development and Psychopathology*. 2008; 20:737–743. [PubMed: 18606029]
- Cicchetti D, Rogosch FA, Toth SL, Spagnola M. Affect, cognition, and the emergence of self-knowledge in the toddler offspring of depressed mothers. *Journal of Experimental Child Psychology*. 1997; 67:338–362. [PubMed: 9440297]
- Cicchetti, D.; Sroufe, LA. An organizational view of affect: Illustration from the study of Down's syndrome infants. In: Lewis, M.; Rosenblum, L., editors. The development of affect. New York: Plenum; 1978. p. 309-350.
- Cicchetti, D.; Toth, SL. Developmental psychopathology and disorders of affect. In: Cicchetti, D.; Cohen, DJ., editors. *Developmental psychopathology: Risk, disorder, and adaptation*. Vol. 2. New York: Wiley; 1995. p. 369-420.
- Cicchetti D, Toth SL. The development of depression in children and adolescents. *American Psychologist*. 1998; 53:221–241. [PubMed: 9491749]

- Cicchetti D, Toth SL, Rogosch FA. The efficacy of toddler-parent psychotherapy to increase attachment security in offspring of depressed mothers. *Attachment and Human Development*. 1999; 1:34–66. [PubMed: 11707882]
- Cole DA, Maxwell SE. Testing mediational models with longitudinal data: Question and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*. 2003; 112:558–577. [PubMed: 14674869]
- Crittenden PM. Internal representational models of attachment relationships. *Infant Mental Health Journal*. 1990; 11:259–277.
- Cummings, EM. Classification of attachment on a continuum of felt security: Illustrations from the study of children of depressed parents. In: Greenberg, M.; Cicchetti, D.; Cummings, EM., editors. *Attachment during the preschool years*. Chicago: University of Chicago Press; 1990. p. 311-338.
- Cummings, EM.; Cicchetti, D. Toward a transactional model of relations between attachment and depression. In: Greenberg, MT.; Cicchetti, D.; Cummings, EM., editors. *Attachment in the preschool years*. Chicago: University of Chicago Press; 1990. p. 339-372.
- Cummings, EM.; Davies, PT.; Campbell, SB. *Developmental psychopathology and family process: Theory, research, and clinical implications*. New York: Guilford Press; 2000.
- Davidson RJ. Affective style, psychopathology, and resilience. *Brain mechanisms and plasticity*. *American Psychologist*. 2000; 55:1196–1214. [PubMed: 11280935]
- Davies PT, Dumenci L, Windle M. The interplay between maternal depressive symptoms and marital distress in the prediction of adolescent adjustment. *Journal of Marriage and the Family*. 1999; 61:238–254.
- Dawson G, Ashman SB, Panagiotides H, Hessl D, Self J, Yamada E, et al. Preschool outcomes of children of depressed mothers: Role of maternal behavior, contextual risk, and children's brain activity. *Child Development*. 2003; 74:1158–1175. [PubMed: 12938711]
- DeMulder E, Radke-Yarrow M. Attachment with affectively ill and well mothers: Concurrent behavioral correlates. *Development and Psychopathology*. 1991; 3:227–242.
- Downey G, Coyne JC. Children of depressed parents: An integrative review. *Psychological Bulletin*. 1990; 108:50–76. [PubMed: 2200073]
- Dunn, LM.; Dunn, L. *The Peabody Picture Vocabulary Test-Revised*. Circle Pines, MN: American Guidance Service; 1981.
- Emde, RN.; Wolf, DP.; Oppenheim, D. *Revealing the inner worlds of young children*. Oxford, NY: Oxford University Press; 2003.
- Fischer, KW.; Ayoub, C. Affective splitting and dissociation in normal and maltreated children: Developmental pathways for self in relationships. In: Cicchetti, D.; Toth, S., editors. *Rochester symposium on developmental psychopathology: Vol. 5. Disorders and dysfunctions of the self*. Rochester, NY: University of Rochester Press; 1994. p. 149-222.
- Fraley R, Spieker SJ. Are infant attachment patterns continuously or categorically distributed? A taxometric analysis of strange situation behavior. *Developmental Psychology*. 2003; 39:387–404. [PubMed: 12760508]
- Garber, J.; Martin, N. Negative cognitions in offspring of depressed parents: Mechanisms of risk. In: Goodman, SH.; Gotlib, IH., editors. *Children of depressed parents: Mechanisms of risk and implications for treatment*. 2002. p. 121-153.
- Gersten, M.; Coster, W.; Schneider-Rosen, K.; Carlson, V.; Cicchetti, D. The socioemotional bases of communicative functioning: Quality of attachment, language development, and early maltreatment. In: Lamb, ME.; Brown, AL.; Rogoff, B., editors. *Advances in developmental psychology*. Vol. 4. Hillsdale, NJ: Lawrence Erlbaum Associates; 1986. p. 105-151.
- Gollob HF, Reichardt CS. Taking account of time lags in causal models. *Child Development*. 1987; 58:80–92. [PubMed: 3816351]
- Goodman SH, Gotlib IH. Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*. 1999; 106(3):458–490. [PubMed: 10467895]
- Goodman, SH.; Gotlib, IH. *Children of depressed parents: Mechanisms of risk and implications for treatment*. Washington, DC: American Psychological Association; 2002.

- Harter, S. The self. In: Eisenberg, N., editor. *Handbook of child psychology: Social, emotional, and personality development*. Vol. 3. Hoboken, NJ: John Wiley & Sons, Inc; 2006. p. 505-570.
- Harter, S.; Marold, DB. The directionality of the link between self-esteem and affect: Beyond causal modeling. In: Cicchetti, D.; Toth, SL., editors. *Rochester symposium on developmental psychopathology: Disorders and dysfunctions of the self*. Vol. 5. Rochester, NY: University of Rochester Press; 1994. p. 333-369.
- Hollingshead, A. Four-factor index of social status. Yale University; 1975. Unpublished manuscript
- Kagan, J. *The second year: The emergence of self-awareness*. Cambridge, MA: Harvard University Press; 1981.
- Kessler R. The national comorbidity survey of the United States. *International Review of Psychiatry*. 1994; 6:365–376.
- Kline, RB. *Principles and Practice of Structural Equation Modeling*. Guilford Press; 2006.
- Kochanska G, Padavich Y, Koenig AL. Children's narratives about hypothetical moral dilemmas and objective measures of their conscience: Mutual relations and socialization antecedents. *Child Development*. 1996; 67:1420–1436. [PubMed: 8890492]
- Lyons-Ruth K, Connell D, Grunebaum H, Botein S. Infants at social risk: Maternal depression and family support services as mediators of infant development and security of attachment. *Child Development*. 1990; 61:85–98. [PubMed: 2307048]
- Lyons-Ruth, K.; Lyubchik, A.; Wolfe, R.; Bronfan, E. Parental depression and child attachment: Hostile and helpless profiles of parent and child behavior among families at risk. In: Goodman, S.; Gotlib, IH., editors. *Children of depressed parents: Mechanisms of risk and implications for treatment*. Washington, DC: American Psychological Association; 2002. p. 89-120.
- Macfie J, Toth SL, Rogosch FA, Robinson J, Emde RN, Cicchetti D. Effect of maltreatment on preschoolers' narrative representations of responses to relieve distress and of role reversal. *Developmental Psychology*. 1999; 35:460–465. [PubMed: 10082016]
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*. 2002; 7:83–104. [PubMed: 11928892]
- Main, M.; Solomon, J. Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. In: Greenberg, M.; Cicchetti, D.; Cummings, EM., editors. *Attachment in the preschool years*. Chicago: University of Chicago Press; 1990. p. 121-160.
- Martins C, Gaffan EA. Effects of early maternal depression on patterns of infant-mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry*. 2000; 41:737–746. [PubMed: 11039686]
- Maughan A, Cicchetti D, Toth SL, Rogosch FA. Early-occurring maternal depression and maternal sensitivity in predicting young children's emotional regulation and socioemotional difficulties. *Journal of Abnormal Child Psychology*. 2007; 35(5):685–703. [PubMed: 17503175]
- Mezulis AH, Hyde JS, Abramson LY. The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*. 2006; 42(6):1012–1025. [PubMed: 17087538]
- Moss, E.; Bureau, JF.; Beliveau, MJ. Association between mother-child attachment and attachment narratives during the school-age years. 2007. Manuscript in preparation
- Murray L. The impact of postnatal depression on infant development. *Journal of Child Psychology and Psychiatry*. 1992; 33:543–561. [PubMed: 1577898]
- Murray L, Halligan SL, Adams G, Patterson P, Goodyer IM. Socioemotional development in adolescents at risk for depression: The role of maternal depression and attachment style. *Development and Psychopathology*. 2006; 18(2):489–516. [PubMed: 16600065]
- Muthen, BO.; du Toit, S.; Spisic, D. Robust inference using weighted least squares and quadratic estimating equations in latent variable modeling with categorical and continuous outcomes. University of California; Los Angeles: 1997. Unpublished manuscript
- Muthen, L.; Muthen, BO. *Mplus*. 4. Los Angeles, CA: Muthen & Muthen; 2007.
- Oppenheim D. The attachment doll-play interview for preschoolers. *International Journal of Behavioral Development*. 1997; 20:681–697.

- Oppenheim D, Emde RN, Warren S. Children's narrative representations of mothers: Their development and associations with child and mother adaptation. *Child Development*. 1997; 68:127–138. [PubMed: 9084129]
- Oppenheim D. Child, parent, and parent-child emotion narratives: Implications for developmental psychopathology. *Development and Psychopathology*. 2006; 18(3):771–790. [PubMed: 17152400]
- Oppenheim D, Koren-Karie N, Sagi-Schwartz A. Emotion dialogues between mothers and children at 4.5 and 7.5 years: Relations with children's attachment at 1 year. *Child Development*. 2007; 78:38–52. [PubMed: 17328692]
- Preacher K, Hayes A. SPSS and SAS procedures for estimating indirect effects in simple mediational models. *Behavior Research Methods, Instruments, & Computers*. 2004; 36:717–731.
- Radke-Yarrow, M. *Children of depressed mothers*. New York: Cambridge University Press; 1998.
- Radke-Yarrow M, Cummings EM, Kuczynski L, Chapman M. Patterns of attachment in two-and-three-year-olds in normal families and families with parental depression. *Child Development*. 1985; 56:884–893. [PubMed: 4042751]
- Robins L, Helzer J, Croughan J, Ratcliff K. The NIMH Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of General Psychiatry*. 1981; 38:381–389. [PubMed: 6260053]
- Robins, L.; Helzer, J.; Orvaschel, H.; Anthony, J.; Blazer, DG.; Burnam, A., et al. The Diagnostic Interview Schedule. In: Eaton, W.; Kessler, L., editors. *Epidemiologic field methods in psychiatry*. New York: Academic Press; 1985. p. 143-170.
- Robins LW, Helzer JE, Ratcliff KS, Seyfried W. Validity of the diagnostic interview schedule, version II: DSM-III diagnoses. *Psychological Medicine*. 1982; 12:855–865. [PubMed: 7156256]
- Robinson, J.; Mantz-Simmons, L.; Macfie, J. The MacArthur Narrative Working Group. The narrative coding manual-Rochester Revision. 1996. Unpublished manuscript
- Rudolph KD, Clark AG. Conceptions of relationships in children with depressive and aggressive symptoms: Social-cognitive distortion or reality? *Journal of Abnormal Child Psychology*. 2001; 29(1):41–56. [PubMed: 11316334]
- Schneider-Rosen, K. The developmental reorganization of attachment relationships: Guidelines for classification beyond infancy. In: Greenberg, M.; Cicchetti, D., editors. *Attachment in the preschool years: Theory, research, and intervention*. Chicago, IL: University of Chicago Press; 1990. p. 185-220.
- Sroufe LA. The coherence of individual development: Early care, attachment, and subsequent developmental issues. *American Psychologist*. 1979; 34:834–841.
- Sroufe LA, Rutter M. The domain of developmental psychopathology. *Child Development*. 1984; 55:17–29. [PubMed: 6705619]
- Sroufe LA, Waters E. Attachment as an organizational construct. *Child Development*. 1977; 48:1184–1199.
- Steele M, Steele H, Johansson M. Maternal predictors of children's social cognition: An attachment perspective. *Journal of Child Psychology & Psychiatry*. 2002; 43:861–872. [PubMed: 12405475]
- Teti DM, Gelfand D, Messinger D, Isabella R. Maternal depression and the quality of early attachment: An examination of infants, preschoolers, and their mothers. *Developmental Psychology*. 1995; 31:364–376.
- Toth SL, Cicchetti D, Macfie J, Emde RN. Representations of self and other in the narratives of neglected, physically abused, and sexually abused preschoolers. *Development and Psychopathology*. 1997; 9:781–796. [PubMed: 9449005]
- Toth SL, Maughan A, Manly JT, Spagnola M, Cicchetti D. The relative efficacy of two interventions in altering maltreated preschool children's representational models: Implications for attachment theory. *Development and Psychopathology*. 2002; 14:777–808.
- van IJzendoorn MH, Schuengel C, Bakersman-Kranenburg MJ. Disorganized attachment in early childhood: Meta-analyses of precursors, concomitants, and sequelae. *Development and Psychopathology*. 1999; 11:225–249. [PubMed: 16506532]
- Von Klitzing, K.; Kelsay, K.; Emde, RN. The structure of 5-year-old children's play narratives within the macarthur story stem methodology. In: Emde, RN.; Wolf, DP.; Oppenheim, D., editors. *Revealing the inner worlds of young children*. Oxford: University Press; 2003. p. 106-128.

- Waters E, Sroufe LA. Social competence as a developmental construct. *Developmental Review*. 1983; 3:79–97.
- Zahn-Waxler C, Cole PM, Richardson DT, Friedman RJ, Michel MK, Belouad F. Social problem-solving in disruptive preschool children: Reactions to hypothetical situations of conflict and distress. *Merrill-Palmer Quarterly*. 1994; 40:98–119.
- Zahn-Waxler C, Cole PM, Welsh JD, Fox NA. Psychophysiological correlates of empathy and prosocial behaviors in preschool children with behavior problems. *Development and Psychopathology*. 1995; 7:27–48.

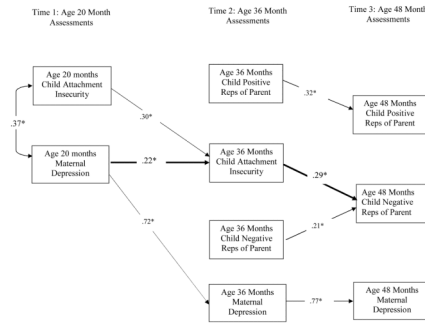


Figure 1. Process model outlining pathways of the association between early maternal depression, children’s attachment insecurity, and children’s representations of the parent. For ease of presentation non-significant structural paths are not shown in the figure. * = $p < .05$

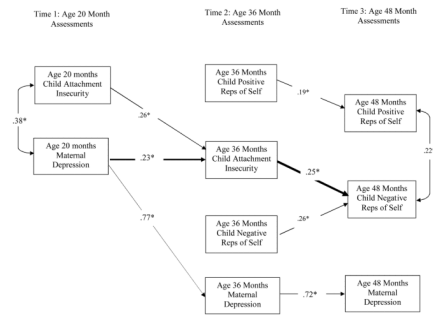


Figure 2. Process model outlining pathways of the association between early maternal depression, children’s attachment insecurity, and children’s representations of the self. For ease of presentation non-significant structural paths are not shown in the figure. * = $p < .05$.

Means, standard deviations and ANOVA comparisons of depressed and non-depressed groups on of the main variables in the primary analyses.

Table 1

	M	SD	Range	M Depressed Group	M Non-Depressed Group	F	η^2
1. W1 Dep	8.78	9.59	0–36	16.85	2.26	126.72*	.56
2. W1 Att Insec	1.90	0.84	1–3	2.30	1.60	21.72*	.17
3. W2 Dep	5.93	7.08	0–33	10.59	2.02	56.67*	.36
4. W2 Att Insec	1.96	0.79	1–3	2.23	1.72	11.78*	.10
5. W2 Pos Reprs Self	1.02	1.23	0–6	1.07	1.06	0.01 ns	.001
6. W2 Neg Reprs Self	0.77	1.12	0–5	1.07	0.52	5.74*	.06
7. W2 Pos Reprs Par	4.50	2.83	0–12	4.50	4.39	0.04 ns	.001
8. W2 Neg Reprs Par	1.06	1.44	0–8	1.73	1.18	0.01 ns	.001
9. W3 Dep	5.47	6.90	0–31	9.64	1.92	44.71*	.33
10. W3Pos Reprs Self	2.85	1.51	0–7	3.00	2.65	1.31 ns	.01
11. W3 Neg Reprs Self	1.41	1.62	0–6	1.65	1.26	1.46 ns	.03
12. W3 Pos Reprs Par	6.19	3.15	0–15	6.57	5.78	1.61 ns	.01
13. W3 Neg Reprs Par	1.63	1.73	0–7	1.76	1.53	0.42 ns	.005

Note: Dep = Depression, Att Insec = Attachment Insecurity, Reprs = Representations, Par = Parent, W = Wave.

* = $p < .05$, ns = $p > .05$.

Table 2

Intercorrelations of the main variables in the primary analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. W1 Dep	--												
2. W1 Att Insec	.35*	--											
3. W2 Dep	.64*	.31*	--										
4. W2 Att Insec	.31*	.39*	.19*	--									
5. W2 Pos Reps Self	-.07	-.10	-.10	-.10	--								
6. W2 Neg Reps Self	.08	.16	.05	.14	.13	--							
7. W2 Pos Reps Par	.01	-.21*	-.17	-.09	.14	.03	--						
8. W2 Neg Reps Par	-.01	.12	.02	-.02	.08	.29*	-.01	--					
9. W3 Dep	.60*	.26*	.76*	.13	-.07	.05	-.03	.02	--				
10. W3Pos Reps Self	-.09	-.19	-.15	-.02	.18	.12	-.06	-.08	.01	--			
11. W3 Neg Reps Self	.16	.02	.12	-.23*	-.01	.32*	-.05	.15	.19	.14	--		
12. W3 Pos Reps Par	-.17	-.13	-.05	-.08	-.12	-.26*	.31*	-.06	-.02	-.04	-.25*	--	
13. W3 Neg Reps Par	.21*	.18	.05	.28*	.14	.33*	.05	.21*	.07	.04	.50*	.14	--

Note: Dep = Depression, Att Insec = Attachment Insecurity, Reps = Representations, Par = Parent, W = Wave.

* = $p < .05$