

Unresolved States of Mind, Disorganized Attachment Relationships, and Disrupted Interactions of Adolescent Mothers and Their Infants

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The links between unresolved maternal attachment status, disrupted maternal interaction in play situations, and disorganized attachment relationships were examined in a study of 82 adolescent mother–infant dyads. Maternal interactive behavior was measured using the Atypical Maternal Behavior Instrument for Assessment and Classification coding system. Additional rating scales were developed to correspond to the 5 dimensions of disrupted maternal behavior outlined by E. Bronfman, E. Parsons, and K. Lyons-Ruth (1999). A robust association was observed between disrupted maternal behavior and disorganized attachment. Ratings of disrupted maternal behavior revealed that disorganized attachment relationships were strongly related to ratings of fearful/disoriented behavior. Moreover, mothers who were unresolved were more likely than not-unresolved mothers to show disrupted patterns of interaction with their infants. Regression analyses suggested that disrupted behavior statistically mediated the association between unresolved status and disorganized attachment relationships.

Keywords: disrupted maternal behavior, attachment relationships, mother–infant interactions

Ainsworth, Blehar, Waters, and Wall (1978) and Bowlby (1969/1982) theorized that the quality of the caregiver's response to infant distress is both the primary determinant of the attachment relationship and the developmental foundation of the child's behavioral and cognitive strategies for dealing with stress and negative emotions. Most infants develop organized relationships and associated effective strategies for dealing with stressful situations; however, 15% of low-risk and up to 77% of high-risk populations display disorganized patterns of responding (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Disorganization has been shown to be a strong predictor of subsequent socioemotional maladjustment and related mental health problems. In addition to poor regulation and control of negative emotions (Greenberg, 1999), children with a history of disorganized attachment are more likely to display oppositional, hostile-aggressive behavior and coercive styles of peer interaction (Lyons-Ruth, Alpern, & Repacholi, 1993). Research investigating the developmental sequelae of disorganized attachment has shown that these children are also at increased risk for developing internalizing and externalizing problems in childhood (van IJzendoorn et al., 1999) and adolescence (Carlson, 1998). Consequently, much recent research has been

devoted to understanding the genesis of disorganized attachment relationships. In the present study, we examined the role of disrupted maternal behavior, as described by Lyons-Ruth, Bronfman, and Parsons (1999), in disorganization in a sample of adolescent mothers and their infants.

Behavioral Organization and Disorganization

John Bowlby's (1969/1982) conviction that major disruptions in the parent–child relationship, including prolonged separations, can have a lasting, significant impact on the child's functioning was a major stimulus for the development of attachment theory. Bowlby proposed that a variety of endogenous attachment behaviors predispose the human parent and infant to seek and maintain proximity, establishing the parent as the child's primary protector and haven of safety. When the attachment system is activated by an alarming situation, the human infant looks to the primary attachment figure for contact and protection, a reaction thought to be based on a history of interaction in which the caregiver previously has provided comfort and/or a resolution of such fear-inducing conditions (Hesse & Main, 2000). Main and Hesse (1990) suggested that when confronted with expressions of fear by their parent, infants in organized attachment relationships (i.e., secure, avoidant, or resistant) act so as to elicit protective parental responses that will reduce their state of alarm. These infants behave as if they presume the source of alarm is in the external environment and are able to maintain behavioral and attentional organization as they resolve their distress (Main, 2000).

Main and Hesse (1990) proposed that a disorganized attachment relationship develops when a child finds him- or herself emotionally and physically dependent on someone who is also a source of fear; under conditions of stress, this paradoxical dilemma results in a breakdown of attentional and behavioral coping strategies. The origin of the infant's fear resides in the actions of his or her attachment figure, the infant's potential safe haven. Main and

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Hesse suggested that the infant is then unable to use the caretaker to maintain behavioral and attentional organization and is left without an organized strategy to cope with his or her fear. Under these conditions, the child displays the anomalous patterns characteristic of the disorganized/disoriented relationship (Hesse & Main, 2000; Main & Hesse, 1990; Main & Solomon, 1990).

During the Strange Situation (a standardized evaluation of the quality of the attachment relationship; Ainsworth et al., 1978), infants are classified as disorganized if they display a variety of odd, unusual, contradictory, or conflicted behavior in the parent's presence (Main & Solomon, 1990). Such manifestations of disorganization include the sequential or simultaneous display of contradictory behavior patterns, including intense attachment behavior followed suddenly by freezing or dazed behavior; marked avoidance of the caregiver accompanied by distress or anger; mistimed, misdirected, incomplete, or interrupted movements; and direct apprehension of the parent as reflected by hunched shoulders or fearful facial expressions. Such actions are taken as suggestions of an underlying inability to maintain a consistent, coherent coping strategy and of a breakdown of an organized response to distress.

Maternal Representations of Attachment

Main, Kaplan, and Cassidy (1985) hypothesized that the parent's mental representation of his or her own childhood attachment experiences is an important determinant of the quality of the attachment relationship formed with the infant. The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996), a semi-structured interview focusing on childhood and current relationships with attachment figures, was constructed to investigate this hypothesis. The AAI provides a categorization of the individual's current state of mind regarding attachment rather than a description of his or her attachment history. Adults are assigned to one of three primary categories (autonomous, dismissing, or preoccupied) on the basis of qualitative characteristics and the coherence of the narrative emerging from the AAI, each category reflecting a distinctive but organized state of mind (Main, Goldwyn, & Hesse, 2002). Individuals are assigned to a fourth category, classified as unresolved/disoriented, if their narrative regarding attachment-related loss or abuse includes lapses in the monitoring of reasoning or discourse, that is, if sections of their narrative appear disorganized or disoriented. Hesse and Main (2000) suggested that slips in reasoning or discourse can imply that the speaker continues to experience unusual absorption regarding the trauma and/or fails to undergo conscious psychological processing of the event.

Main and Hesse (1990) proposed that caregivers displaying an unresolved state of mind regarding intimate relationships are more likely than others to foster disorganized attachment relationships with their infants. A meta-analysis of studies found that 53% of parents with unresolved states of mind had infants classified as disorganized (van IJzendoorn, 1995). Main and Hesse suggested that the same processes that give rise to such parents' characteristic dissociative-type lapses during discussions of loss or abuse are also likely to produce the anomalies in interaction that are developmental determinants of a disorganized attachment relationship.

Frightened, Frightening, and Dissociative Parental Behavior

Main and Hesse (1990) argued that the observed association between maltreating parents and disorganized attachment is a product of the fear generated in the infant by abuse and other frightening and threatening parental behavior. Although common in maltreating relationships, disorganized attachment is also routinely observed, albeit at a lower rate, in low-risk populations, which suggests the existence of a developmental pathway to disorganization that does not feature abuse. Main and Hesse proposed that this pathway also involves the evocation of fear in the child by the nonabusive caregiver. In this case, however, they argued that some caregivers, those characterized as unresolved, have failed psychologically to integrate or resolve their experiences of loss and/or trauma. Main and Hesse suggested that the fear aroused by emotions and cognitions associated with such traumatic events, perhaps triggered by spontaneous intrusions from alarming memories or by events that occur in interaction with their infants, gives rise to frightened or frightening behavior. Main and Hesse argued that such behavior elicits fear, confusion, and disorientation in the infant, thus undermining the development of an organized attachment relationship even in the absence of maltreatment.

On the basis of this model, Main and Hesse (1992, 1998) developed a coding scheme to describe patterns of frightened and frightening caregiver behavior (FR behavior). This coding scheme assesses six categories of FR behavior, including anomalous frightening/threatening behavior; frightened behavior; dissociated behavior; sexualized behavior; disorganized/disoriented behavior; and deferential, timid, and submissive behavior. Support for Main and Hesse's (1990) hypothesis was first provided by Schuengel, Bakermans-Kranenburg, and van IJzendoorn (1999) in a sample of 85 middle-class mother-infant dyads observed interacting in their homes when the infants were between 10 and 11 months of age. Mothers in disorganized relationships displayed significantly more FR behavior than mothers in organized relationships. Moreover, dissociative behavior was the only subcategory significantly related to disorganized attachment (Schuengel, 1997). True, Pisani, and Oumar (2001) examined FR behavior in home and clinic interactions of 44 Dogon mothers and their 10.5- to 12-month-old infants in Mali, West Africa. They also found that, in home and clinic settings, mothers in disorganized relationships displayed significantly more FR behavior than mothers in organized relationships. Abrams, Rifkin, and Hesse (in press) examined the relationship between FR behavior and disorganized attachment in 75 middle-class parents. They observed parental FR behavior during approximately 18 min of mildly stressful play sessions followed by 12 min of a more structured parent-child interaction involving a stranger dressed as a clown. A robust relationship was established between the display of FR and disorganized attachment. Among the subcategories of the FR coding system, dissociative behavior was the best predictor of disorganized attachment.

Links between FR behavior and unresolved states of mind have been established in at least three studies. Schuengel et al. (1999) found that mothers classified as unresolved with a secondary nonautonomous classification exhibited more FR behavior than mothers classified as unresolved but otherwise autonomous on the AAI. They also found that mothers classified as unresolved with a secondary classification of autonomous displayed very low levels

of FR behavior, which suggested a protective role for mothers' autonomous states of mind. Jacobvitz, Leon, and Hazan (in press) examined 113 middle-income mothers and their 8-month-old infants in a structured and potentially stressful context that included a feeding session, a play session, and a changing session. Mothers who had displayed unresolved states of mind in discussion of loss or abuse during a prenatal AAI were significantly more likely than not-unresolved mothers to display FR behavior in interactions with their infants. Abrams et al. (in press) also found that parents who were unresolved more frequently engaged in FR behavior. The results of these three studies are consistent with Main and Hesse's (1990) contention that experiences of loss or abuse, when not psychologically integrated or resolved, leave parents unable to control the memories and emotions associated with those events.

Disrupted Maternal Behavior

In an elaboration of Main and Hesse's (1990) model of the origins of disorganization, Lyons-Ruth et al. (1999) postulated that the same caregivers who repeatedly provoke fear in their infants because of their unresolved experiences of loss or trauma are also likely to be unable to respond appropriately to their infants' cues. The same intrusive thoughts and emotions that repeatedly evoke fear in the infant must, according to Lyons-Ruth et al., interfere with the caregiver's ability to monitor and respond to the child's

affective state, substantially disrupting the caregiver's ability to engage in effective affective communication with the infant.

In support of their efforts to explore this extended hypothesis regarding the origins of attachment, Lyons-Ruth et al. (1999) developed an instrument that broadened Main and Hesse's (1992) coding scheme to encompass a fuller spectrum of disrupted maternal behaviors—the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE). The AMBIANCE retains scales that capture many of the same frightened and frightening actions that appeared in Main and Hesse's (1992) original instrument, but it expanded that instrument to encompass actions that reflect the mother's inability to repair her disrupted interactions and her tendency to display extreme forms of insensitive behaviors (see Table 1 for a fuller description and examples of the dimensions of the AMBIANCE). This coding system also includes a 7-point summary scale for the mother's global level of disrupted communication and a classification of mothers as disrupted or not disrupted. Lyons-Ruth et al. (1999) applied the AMBIANCE coding scheme in a study of 65 low-income, disadvantaged mothers and their 18-month old infants. When observed in the Strange Situation, mothers in disorganized relationships were more likely than mothers in organized relationships to display disrupted interactive behavior with their infants; in particular, they displayed more affective communication errors. Furthermore, mothers in

Table 1
AMBIANCE (Bronfman, Parsons, & Lyons-Ruth, 1999) Dimensions and Examples of Disrupted Maternal Behaviors

Dimension	Subdimensions	Examples of disrupted maternal behavior	Corresponding categories in the FR coding system of Main and Hesse (1998)
Dimension 1: Affective communication errors	1a. Contradictory signaling to the infant	1a. Invites approach verbally, then distances	
	1b. Failure to initiate responsive behavior to infant cue	1b. Does not attempt to soothe infant when distressed	
	1c. Inappropriate responding to infant signals or needs	1c. Laughs while infant crying or distressed	
Dimension 2: Role/boundary confusion	2a. Role confusion	2a. Demands show of affection from infant	
	2b. Treats child as sexual/spousal partner	2b. Touches inappropriate body parts of infant	Items from sexualized behavior category
Dimension 3: Fearful/disoriented behavior	3a. Appears frightened, hesitant, or deferential in relation to infant	3a. Exhibits haunted or frightened voice	Items from frightened category
	3b. Disorientation/dissociative or disorganized behavior	3b. Handles infant as though inanimate	Items from frightened and disorganized categories
Dimension 4: Intrusive/negative behavior	4a. Physical negative–intrusive behavior	4a. Pulls infant by the wrist	Items from frightening category
	4b. Verbal negative–intrusive behavior	4b. Uses loud, sharp, or angry voice	Items from frightening category
	4c. Attributes negative feelings, motivation	4c. Personalizes infant's behavior as negative	
	4d. Exerts control using objects	4d. Removes toy from infant despite engagement	
Dimension 5: Withdrawal	5a. Creates physical distance from infant	5a. Holds infant away from body with stiff arms	
	5b. Creates verbal distance from infant	5b. Interacts silently with infant	
	5c. Directs infant away from self via toys	5c. Steers infant toward toys from behind	

Note. AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification; FR = frightened and frightening caregiver behavior.

disorganized/insecure relationships displayed a greater frequency of role confusion and intrusive/negative behaviors than mothers in disorganized/secure relationships, whereas mothers in disorganized/secure relationships displayed a greater frequency of withdrawal behaviors than mothers in disorganized/insecure relationships.

Using Lyons-Ruth et al.'s (1999) AMBIANCE coding system, Goldberg, Benoit, Blokland, and Madigan (2003) explored the association between disorganized attachment and disrupted maternal behavior in a low-risk community sample. One hundred ninety-seven mother–infant dyads were observed in the Strange Situation when the infants were 12 months of age. Mothers in disorganized relationships had higher levels of disrupted communication than mothers whose infants displayed organized attachment patterns. Mothers with unresolved states of mind had higher levels of disrupted communication, fearful/disoriented behaviors, and withdrawal behaviors than mothers who were not unresolved. Goldberg et al. tested the model proposed by Main and Hesse (1990) but found that disrupted behaviors did not account for a significant portion of the association between unresolved states of mind and disorganized attachment. They suggested that their failure to find evidence of such mediation could be attributed to the small number of cases of unresolved mothers and disorganized dyads in their low-risk community sample, and they explicitly called for a replication of the analysis in a high-risk sample of mother–infant dyads.

The Current Study

In research to date, the AMBIANCE measure has been applied only to mother–infant interactions during the Strange Situation. Thus, the empirical evidence of associations between infant disorganization and disrupted maternal behavior arises from coding of the same sample of interaction, a situation that introduces a substantial source of common method variance that could contribute significantly to the statistical associations found between the two assessments. In an attempt to replicate the findings of Goldberg et al. (1999) and Lyons-Ruth et al. (1999) and to determine the validity of the AMBIANCE outside of the Strange Situation, in the present study we examined disrupted behavior in play situations that occurred during the same visit but were not part of the Strange Situation paradigm in which attachment strategies were assessed. The assessment of disrupted behavior outside of the Strange Situation represents a critical step in mapping the developmental origins of disorganization. That is, if we are to sustain the proposal that such behavior is implicated in the development of disorganization, we must at a minimum demonstrate that disrupted interactive behavior in less scripted interactions is differentially associated with interactions in disorganized attachment relationships.

The participants in this study were adolescent mothers and their infants, a population that has been shown to be at substantial developmental risk (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001). Moreover, adolescent mothers are more likely than those in the general population to have experienced trauma associated with sexual and physical abuse (Boyer & Fine, 1992) and thus are more likely to experience the unresolved state of mind proposed to be associated with the display of anomalous interactive behavior and

the development of disorganized relationships. These mothers are also known to be more likely to exhibit a range of substantially atypical interactions with their infants (Culp, Culp, Osofsky, & Osofsky, 1991; García Coll, Hoffman, Van Houten, & Oh, 1987; Ward & Carlson, 1995), which Lyons-Ruth et al. (1999) suggested, in addition to frightened and frightening behavior, may be implicated in the development of disorganized relationships. The greater variability of interactive behavior in the insensitive range by a high-risk sample of adolescent mothers is likely to provide a rich environment for exploring the origins of disorganized attachment.

As noted previously, the AMBIANCE was first developed with a disadvantaged sample that featured an array of demographic risks and family adversity and was intended to capture the full array of disrupted maternal interaction. The AMBIANCE, therefore, was seen as well suited to the objectives of the current study of adolescent mothers. Using the subscales of the AMBIANCE, we also were able to explore the models of Main and Hesse (1990) and Lyons-Ruth et al. (1999) through an examination of the associations of specific patterns of disrupted interaction with disorganized relationships and maternal unresolved states of mind.

Method

Participants

Expectant mothers were recruited in the hospital shortly after their infants' births. All infants were full-term and physically healthy at birth. Criteria for participation were as follows: mother's age less than 20 years, uneventful delivery, and full-term birth without complications. Of the 138 mothers contacted, 25 (18%) declined to participate, 13 (9%) repeatedly cancelled appointments, and 1 had an infant who died; the remaining 99 (72%) mother–infant dyads were involved in the study. The present analyses include the 82 (59% of those originally contacted) mother–infant dyads (45 girls, 37 boys) for whom complete data were available on all relevant measures.

The mothers averaged 18.4 years of age and 11.0 years of education, and average household income was between \$10,000 and \$19,999 (range = < \$5,000 to \$29,999). Eighty-one percent of the sample was Caucasian; the remaining mothers were of Native American ($n = 5$), Middle Eastern ($n = 5$), Latin American ($n = 4$), Caribbean ($n = 1$), and Asian ($n = 1$) descent. Fifty-seven percent were single, 28% were living in common-law relationships, and 15% were married.

As part of a larger study, mothers were assigned to either an intervention group or a control group (see Moran, Pederson, & Krupka, 2005). Of the 82 mother–infant dyads in the present sample, 39 dyads served as the intervention group and 43 served as the comparison group. Each dyad in the intervention group was seen eight times at their place of residence between the 6th and 12th months of the infant's life. The goal of the intervention was to support the mother's sensitivity to her infant by affirming parenting strengths already present in the mother and by increasing the mother's awareness of how her behavior influenced her infant's behavior. The intervention model was a structured behavioral model in which mothers interacted with their infants while being videotaped and then reviewed the tapes with the home visitors. An interaction guidance approach was used to scaffold the mothers up a hierarchy of sensitive behaviors (Clark & Seifer, 1983).

Measures

Maternal representations of attachment: The AAI (George et al., 1996). The AAI is a 1- to 2-hr semistructured interview that examines the mother's recollection of her past experiences with her primary attachment

figures. The interviews were audiotaped, transcribed verbatim, and assigned to one of three primary attachment categories: autonomous, dismissing, or preoccupied (Main et al., 2002). Individuals also were considered for assignment to the classification of unresolved. In the present study, 39% of the mothers were classified as dismissing, 26% as autonomous, and 35% as unresolved. All of the mothers classified as preoccupied were also classified as unresolved. Of the mothers classified as unresolved, 55% were classified as unresolved/dismissing, 7% as unresolved/autonomous, and 38% as unresolved/preoccupied.

Thirty-five AAI transcripts were independently scored by two experienced coders (trained by M. Main and E. Hesse), blind to infant attachment classifications, who had successfully completed the reliability test. Concordance between the two coders for the four-way classifications was 86% ($\kappa = .78, p < .001$). Disagreements were resolved by conferencing.

Attachment relationships: The Strange Situation procedure (Ainsworth et al., 1978). The Strange Situation procedure is a semistructured laboratory paradigm involving separations and reunions of the child, the mother, and a friendly but unfamiliar female stranger. Each episode was 3 min in duration; the separation episodes were curtailed if the infant cried for more than 20 s. The procedure was videotaped, and attachment classifications were determined after a review of the tapes. In addition to classification into one of the three primary categories (secure, avoidant, or resistant) infants also were considered for classification as disorganized (Main & Solomon, 1990). In the present study, 9% of infants were classified as avoidant, 33% as secure, and 59% as disorganized. As with other high-risk samples (i.e., Lyons-Ruth et al., 1999), all infants classified as resistant were also classified as disorganized. Of the dyads classified as disorganized, 44% were disorganized/avoidant, 25% were disorganized/secure, and 31% were disorganized/resistant.

Twenty-two Strange Situation procedures were scored independently by two experienced coders (trained by B. Carlson & A. Sroufe), blind to adult attachment classifications, who had successfully completed the reliability test. Concordance between the two coders for the four-way classifications was 91% ($\kappa = .83, p < .0001$). For the purposes of data analysis, disagreements between coders were resolved by consensus.

AMBIANCE (Bronfman, Parsons, & Lyons-Ruth, 1999). A descriptive narrative of each interactive mother–infant play session was composed using the guidelines outlined in the AMBIANCE coding manual. The AMBIANCE yielded the following measures for each mother: (a) a score on a qualitative 7-point rating scale of global level of disrupted communication and (b) a classification of disrupted (a score of 5–7 on the level of disrupted communication) or nondisrupted (a score of 1–4.5 on the level of disrupted communication).

In previous applications of the AMBIANCE, the *frequency* of occurrence of events within the five dimensions of disrupted communication has been used in analyses. These frequency measures have been associated with psychometric problems, including low interrater reliability, violations of assumptions of homogeneity, and low absolute levels of occurrence of events on some subscales (e.g., withdrawal; Goldberg et al., 2003). In an attempt to circumvent these problems, we developed 7-point qualitative rating scales for each of the five dimensions. The subscales were derived from Bronfman et al.'s (1999) original 7-point scale for level of disrupted communication, emphasizing the intensity and frequency of behaviors associated with each dimension. As shown in the Appendix, these qualitative rating scales were moderately to highly correlated in this sample. Given, however, that the rating scales were being used for the first time and because each was originally designed to capture theoretically distinct aspects of maternal interaction, no aggregation was used in the analyses.

A single coder (Sheri Madigan) scored all play sessions and was blind to the Strange Situation and AAI classifications. This coder was trained by the original developers of the AMBIANCE (K. Lyons-Ruth and E. Bronfman) and had successfully completed the reliability test ($N = 20$). Eighteen cases (22%) were scored for reliability purposes. The reliability coder was trained by Sheri Madigan and received extensive training on all measures

of the AMBIANCE. Reliabilities on the rating scales for the AMBIANCE dimensions for play *without* toys (no toys, or NT) and *with* toys (T) were as follows: affective communication errors, $r_{NT} = .90, r_T = .96$; role/boundary confusion, $r_{NT} = .84, r_T = .54^1$; fearful/disoriented behavior, $r_{NT} = .78, r_T = .87$; intrusive/negative behavior, $r_{NT} = .81, r_T = .81$; withdrawal, $r_{NT} = .87, r_T = .86$; level of disrupted communication, $r_{NT} = .87, r_T = .94$. Disrupted classification agreement was 89% for play both without and with toys, $\kappa_{NT} = .77 (p < .001), \kappa_T = .72 (p < .01)$. For the purposes of data analysis, disagreements between coders were resolved by consensus.

Procedure

When the infants were 6 months of age, the mothers were visited in their homes, where the AAI was administered. When infants were approximately 12 months old, mothers brought them to the university research facility, where the Strange Situation procedure was conducted; immediately after the procedure, mothers were invited to play freely with their infants. The first play session, without toys, was 3 min in duration; a second 3-min session was conducted with a standard set of toys (i.e., book, music box, doll, and bouncing ball). Both sessions were videotaped.

Results

Preliminary descriptive analyses revealed no significant attachment group differences for maternal age, income, or education level. Infant gender was not significantly associated with maternal or infant attachment. We thus did not include any of these variables as covariates in subsequent analyses. Measures of strength of association in subsequent analyses are indicated by ω^2 : A value of 0.01 indicates a small effect size; a value of 0.06, a medium effect size; and values greater than 0.14, a large effect size. Effect sizes for nonparametric analyses are based on Cramer's V, which is based on calculation of ϕ^1 : A value of .10 indicates a small effect size; a value of .30, a medium effect size; and a value of .50, a large effect size (Cohen, 1988).

Moderating Impact of Intervention on the Attachment and the AMBIANCE Variables

Although the intervention was not designed to have an impact on disrupted maternal behavior, a series of two-way analyses of variance (ANOVAs; AMBIANCE variables by intervention group status) were performed in case of inadvertent effects. Mothers in the intervention group did not differ from those in the control group on any of the AMBIANCE variables, nor were there any significant interactions between AAI or Strange Situation classifications and intervention group status. We were satisfied, then, that the intervention did not moderate the association between attachment classification and AMBIANCE variables.

Distribution of Maternal States of Mind and Infant Attachment Relationships

As shown in Table 2, this sample of adolescent mothers and their infants featured relatively small numbers of participants with autonomous states of mind (21, or 26%) and with secure attach-

¹ There were very low rates of role/boundary confusion in the play session with toys ($M = 1.73, SD = 0.86$, minimum = 1, maximum = 4).

ment relationships (27, or 33%). As expected, given the high-risk character of the group, many displayed unresolved states of mind (29, or 35%)² and disorganized relationships (48, or 59%).³ In light of this atypical distribution, in most subsequent analyses we used binary comparisons of not-unresolved versus unresolved categories and of organized versus disorganized attachment relationships. There was an above-chance likelihood that mothers with unresolved states of mind were involved in disorganized relationships with their infants (79%), and correspondingly, mothers who were not classified as unresolved were likely to be involved in organized attachment relationships with their infants (53%), $\chi^2(2, N = 82) = 7.98, p < .01, \phi^1 = .31$. (See Table 3.)

In two previous studies of the association of anomalous maternal behavior and states of mind regarding attachment with low-risk samples (Schuengel et al., 1999, and Goldberg et al., 2003), mothers classified as unresolved were further categorized according to their secondary classifications. Such a subcategorization was not possible in the current high-risk sample because only 2 mothers were classified as unresolved/autonomous.

All intercorrelations between AMBIANCE scores for play sessions with and without toys achieved significance. Individual associations were as follows: affective communication errors, $r = .41 (p < .001)$; role/boundary confusion, $r = .26 (p < .05)$; fearful/disoriented behavior, $r = .35 (p < .001)$; intrusive/negative behavior, $r = .46 (p < .001)$; withdrawal, $r = .21 (p < .05)$; and global level of disrupted communication, $r = .52 (p < .001)$.

Associations Between Maternal and Infant Attachment Groups and Disrupted Behavior for Each Play Session

A comparison of the link between disrupted behavior in the play session with versus without toys. We explored the role of play context in the elicitation of disrupted maternal behavior by way of a 2 (unresolved vs. not unresolved) \times 2 (play session) repeated measures ANOVA on the level of disrupted behavior, with attachment status as the between-subjects variable and play session (without toys vs. with toys) as the repeated measure. There was a significant main effect of play session, $F(1, 80) = 20.93, p < .0001$, where the level of disrupted communication was significantly higher in the play session without toys ($M = 4.41, SD = 1.89$) than in the play session with toys ($M = 3.45, SD = 1.74$).

Table 2
Cross-Tabulation of Categories of Maternal States of Mind Regarding Attachment in the Adult Attachment Interview (AAI) With Categories of Attachment Relationships Assessed in the Strange Situation

AAI	Strange Situation classifications				% match
	Avoidant	Secure	Disorganized	Total	
Dismissing	5	10	17	32	16
Autonomous	0	13*	8	21	62
Unresolved	2	4	23*	29	79
Total	7	27	48	82	
% match	71	48	48		

* Indicates significant cells, $p < .05$.

Table 3
Cross-Tabulation of Mothers Classified as Not Unresolved or Unresolved in the Adult Attachment Interview (AAI) With Dyads Classified as Organized or Disorganized in the Strange Situation

AAI	Strange Situation classifications			% match
	Organized	Disorganized	Total	
Not unresolved	28*	25	53	53
Unresolved	6	23*	29	79
Total	34	48	82	
% match	82	48		

* Indicates significant cells, $p < .05$.

However, there was no significant interaction between maternal attachment grouping and play session.

A parallel set of analyses was performed for the disorganized versus organized group. A repeated measures ANOVA revealed a significant main effect of play session, $F(1, 80) = 20.93, p < .0001$, and a significant interaction between attachment group and play session, $F(1, 80) = 4.73, p < .05$ (see Figure 1). Follow-up t tests revealed that the level of disrupted communication in the disorganized group was significantly greater in the play session without toys than in the play session with toys, $t(47) = 4.82, p < .0001, \omega^2 = .21$, whereas the level of disrupted communication in the organized group did not differ significantly between the two play sessions, $t(33) = 1.82, ns$.

Play without toys. As shown in Table 4, an unresolved maternal state of mind was associated with a disrupted pattern of interaction in play sessions without toys, $\chi^2(1, N = 82) = 4.22, p < .05, \phi^1 = .23$. Moreover, the mean level of disrupted communication was significantly higher in the unresolved group ($M = 5.09, SD = 1.86$) than in the not-unresolved group ($M = 4.05, SD = 1.81$), $t(80) = 2.46, p < .05, \omega^2 = .06$. A multivariate analysis of variance (MANOVA), however, revealed no differences on the dimensions of the AMBIANCE between dyads grouped on the basis of maternal unresolved/not-unresolved status.

Parallel analyses of dyads classified as disorganized or organized in the Strange Situation revealed that disorganized attachment was associated with a disrupted pattern of interaction in play sessions without toys, $\chi^2(1, N = 82) = 21.20, p < .0001, \phi^1 = .51$. The mean level of disrupted communications was significantly higher in the disorganized group than in the organized group, $t(80) = 5.20, p < .0001, \omega^2 = .24$ (see Table 5). A 2 (disorganized vs. organized) \times 5 (AMBIANCE dimensions) MANOVA, with

² Sixty-six mothers reported an experience of loss; 18 (27%) of these mothers were classified as having an unresolved state of mind regarding loss. Forty-three mothers reported an experience of abuse; 15 (35%) of these mothers were classified as having an unresolved state of mind regarding abuse.

³ The original finding of this unusually high percentage of disorganized relationships in the sample prompted a complete recoding of the Strange Situation episodes, including consultation with Betty Carlson of the Minnesota Institute of Child Development. The recoding did not substantially alter the distribution of classifications.

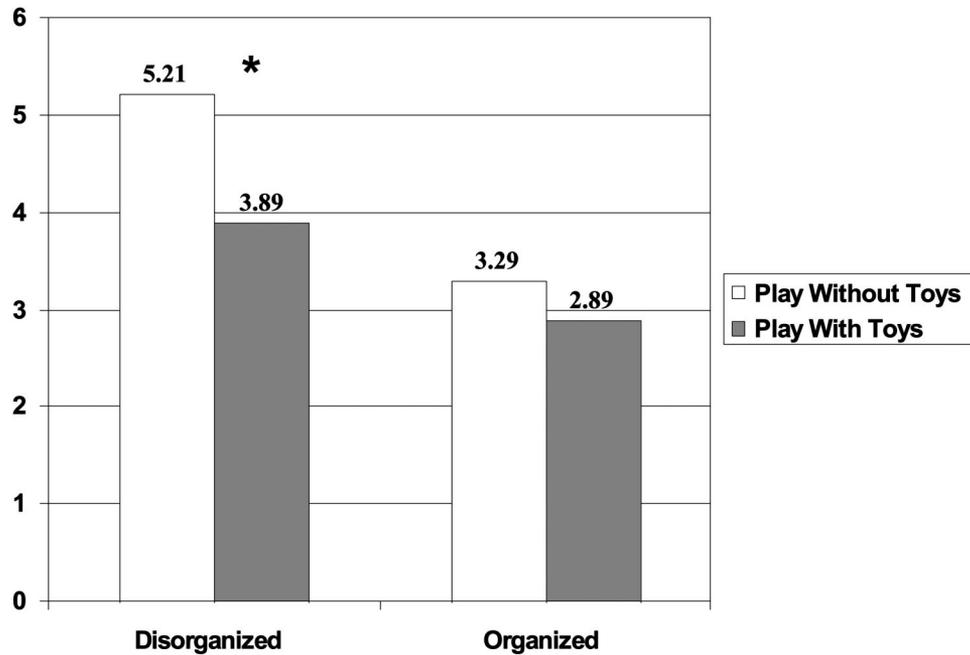


Figure 1. The display of disrupted maternal behavior (using the level of disrupted communication) in mothers in disorganized and organized attachment relationships in the play sessions with and without toys. * $p < .0001$.

attachment status as the between-subjects variable and the five dimensions of disrupted behavior as the dependent variables, produced a significant group effect, $F(5, 76) = 4.84, p < .001, \omega^2 = .21$. Planned t tests revealed significant differences between the disorganized and organized groups on affective communication errors, role/boundary confusion, fearful/disoriented behavior, and intrusive/negative behavior.

All mothers with preoccupied states of mind were also classified as unresolved, and all dyads classified as resistant were also classified as disorganized. This pattern raised the possibility that the statistical associations between unresolved states of mind and

measures of disrupted behavior, and between disorganized attachment and measures of disrupted behavior, could be driven by associations with their secondary classifications (i.e., preoccupied and resistant, respectively). A series of analyses was performed to evaluate this possibility. In the first of these analyses, all mothers with a preoccupied classification were compared with mothers with other classifications. Preoccupied states of mind were associated with a disrupted pattern of interaction in play sessions without toys, $\chi^2(1, N = 82) = 4.05, p < .05, \phi^1 = .22$. However, the mean level of disrupted communication in the preoccupied group ($M = 5.41, SD = 2.08$) was not significantly higher than

Table 4

Distribution of Disrupted and Not-Disrupted Classifications as a Function of Maternal Unresolved/Not-Unresolved State of Mind Regarding Attachment and Disorganized/Organized Attachment Relationship Classification in Play Sessions With and Without Toys

AAI	Strange Situation classification			
	Disorganized ($n = 48$)		Organized ($n = 34$)	
	Disrupted	Not disrupted	Disrupted	Not disrupted
Play session without toys				
Unresolved ($n = 29$)	18 (78%)	5 (22%)	2 (33%)	4 (67%)
Not unresolved ($n = 53$)	18 (72%)	7 (28%)	6 (21%)	22 (79%)
Play session with toys				
Unresolved ($n = 29$)	8 (35%)	15 (65%)	1 (17%)	5 (83%)
Not unresolved ($n = 53$)	8 (32%)	17 (68%)	2 (7%)	26 (93%)

Note. AAI = Adult Attachment Interview.

Table 5

Means (and Standard Deviations) of Subscale Dimensions of Disrupted Maternal Behavior, as Assessed Using the AMBIANCE, for Play Sessions Without Toys and With Toys

Dimension	Disorganized	Organized	<i>t</i>	<i>p</i>	ω^2
Play session without toys					
Affective communication errors	3.28 (1.68)	2.35 (1.57)	2.53	< .05	.06
Role/boundary confusion	3.23 (1.77)	2.28 (1.18)	2.93	< .01	.09
Fearful/disoriented behavior	3.70 (1.99)	1.97 (1.28)	4.71	< .0001	.21
Intrusive/negative behavior	3.97 (1.75)	2.63 (1.76)	3.41	< .001	.11
Withdrawal	1.58 (1.08)	1.44 (0.74)	0.66	ns	
Level of disrupted communication	5.20 (1.58)	3.29 (1.72)	5.20	< .0001	.24
Play session with toys					
Affective communication errors	2.31 (1.81)	1.40 (1.05)	2.88	< .01	.08
Role/boundary confusion	1.85 (0.90)	1.56 (0.79)	1.54	ns	
Fearful/disoriented behavior	2.22 (1.46)	1.54 (1.00)	2.58	< .001	.06
Intrusive/negative behavior	2.41 (1.42)	2.29 (1.46)	0.35	ns	
Withdrawal	2.14 (1.53)	1.81 (1.07)	1.14	ns	
Level of disrupted communication	3.88 (1.78)	2.82 (1.50)	2.84	< .01	.08

Note. AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification.

that in the not-preoccupied group ($M = 4.26$, $SD = 1.82$), $t(80) = 1.91$, *ns*. A MANOVA revealed no differences on the dimensions of the AMBIANCE between dyads in play sessions without toys grouped on the basis of preoccupied versus not-preoccupied status.

In a parallel set of analyses, resistant attachment was found to be associated with a disrupted pattern of interaction, $\chi^2(1, N = 82) = 8.04$, $p < .01$, $\phi^1 = .31$. The mean level of disrupted communications was significantly higher in the resistant group ($M = 5.63$, $SD = 1.20$) than in the not-resistant group ($M = 4.14$, $SD = 1.91$), $t(80) = 3.84$, $p < .001$, $\omega^2 = .15$. A 2 (resistant vs. not resistant) \times 5 (AMBIANCE dimensions) MANOVA produced a significant group effect, $F(5, 76) = 3.92$, $p < .001$, $\omega^2 = .15$. Planned *t* tests revealed significant differences between the resistant and not-resistant groups on affective communication errors ($M = 4.10$, $SD = 1.80$ vs. $M = 2.63$, $SD = 1.55$), $t(80) = 3.23$, $p < .01$, $\omega^2 = .10$, but not on other AMBIANCE dimensions. The previously described associations with role/boundary confusion, fearful/disoriented behavior, and intrusive/negative behavior were unique, then, to disorganized attachment.

Play with toys. As shown in Table 4, a chi-square analysis revealed no significant association between unresolved status and a classification of disrupted in the play interactions with toys. However, the mean global level of disrupted communication was significantly higher in the unresolved group ($M = 4.00$, $SD = 1.81$) than in the not-unresolved group ($M = 3.14$, $SD = 1.64$), $t(80) = 2.18$, $p < .05$, $\omega^2 = .04$. A MANOVA revealed no differences on the dimensions of the AMBIANCE between dyads grouped on the basis of maternal unresolved versus not-unresolved status.

Parallel analyses of dyads classified as disorganized or organized revealed that disorganized mother-infant pairs were significantly more likely to be classified as disrupted, $\chi^2(1, N = 82) = 6.72$, $p < .01$, $\phi^1 = .29$, and displayed higher levels of disrupted communication, $t(80) = 2.84$, $p < .01$, $\omega^2 = .08$, than dyads categorized as organized. A 2 (disorganized vs. organized) \times 5 (AMBIANCE dimensions) MANOVA produced a significant

group effect, $F(5, 76) = 3.41$, $p < .01$, $\omega^2 = .11$. Planned *t* tests revealed significant differences between the disorganized and organized groups on affective communication errors and fearful/disoriented behavior (see Table 5).

Analyses parallel to those used in play without toys were performed to ascertain if the associations of unresolved states of mind and disorganized attachment with disrupted behavior in the toys situation were influenced by maternal preoccupied status or resistant attachment relationships. These analyses revealed no significant associations between preoccupied status and the measures of disrupted behavior. Resistant relationships, however, were associated with an overall disrupted pattern of interaction, $\chi^2(1, N = 82) = 5.69$, $p < .05$, $\phi^1 = .26$, and the mean level of disrupted communications was significantly higher in the resistant group ($M = 4.27$, $SD = 1.91$) than in the not-resistant group ($M = 3.26$, $SD = 1.66$), $t(80) = 2.06$, $p < .05$, $\omega^2 = .04$. A MANOVA revealed no differences on the dimensions of the AMBIANCE between dyads in play sessions with toys grouped on the basis of infant resistant/not-resistant status.

Disrupted Maternal Behavior as a Mediator Between Unresolved Status and Disorganized Attachment Relationships

As discussed previously, the extant model of the development of disorganized attachment relationships (Lyons-Ruth et al., 1999; Main & Hesse, 1990) holds that mothers with an unresolved state of mind regarding attachment are relatively likely to display a variety of substantially disrupted patterns of behavior in interaction with their infants. The model further argues that such interactive behavior results in the breakdown of the child's organized strategy for dealing with stress, which is characteristic of the disorganized relationship, thus mediating the established association between unresolved status and the disorganized relationship. Baron and Kenny (1986) prescribed four widely accepted conditions that must be met to establish such a mediating role.

Play without toys. Regression analyses revealed that each of Baron and Kenny's (1986) required conditions were met in the play sessions without toys: Unresolved state of mind was significantly associated with disorganized attachment $\beta = .31$, $t(80) = 2.94$, $p < .01$; unresolved state of mind was related to disrupted maternal behavior, $\beta = .27$, $t(80) = 2.50$, $p < .05$; disrupted maternal behavior was related to disorganized relationships, $\beta = .50$, $t(80) = 5.20$, $p < .0001$; and, finally, when disrupted maternal behavior was entered as a mediator variable, the regression coefficient representing the relationship between the unresolved state of mind and disorganized attachment declined from an original beta value of .31 to a nonsignificant value of .19, $t(80) = 1.95$, *ns*. This drop in beta value was significant ($z = 2.23$, $p < .05$) according to Sobel's (1982) approximate significance test. This mediational model is presented in Figure 2.

Play with toys. Maternal unresolved state of mind was significantly associated with disorganized attachment, $\beta = .31$, $t(80) = 2.94$, $p < .01$; unresolved state of mind was related to disrupted behavior, $\beta = .24$, $t(80) = 2.18$, $p < .05$; disrupted behavior was related to disorganized relationships, $\beta = .30$, $t(80) = 2.84$, $p < .01$; and, finally, the inclusion of the mediator variable lowered the regression coefficient representing the relationship between the predictor and criterion variables—the original beta value of .31 dropped to a beta of .24, $t(80) = 2.84$, $p < .01$ —but the original association remained significant. This drop in beta value was not significant ($z = 1.80$, *ns*) according to Sobel's (1982) approximate significance test. Thus, in the play session with toys, the results of the analysis did not satisfy the fourth of Baron and Kenny's (1986) criteria necessary to establish mediation.

Discussion

We sought to further our understanding of the processes linking maternal representations of attachment and the development of disorganized attachment relationships by examining disrupted patterns of interaction in unscripted play situations. A more thorough understanding of these processes is especially important in the case of adolescent mothers and their infants because the infant's risk for maladaptive socioemotional development may have its roots in disorganized relationships in infancy (Furstenberg et al., 1989; Jaffee et al., 2001). Our results revealed that adolescent mothers in

disorganized relationships were more likely than those in organized relationships to exhibit interactive behavior characterized by affective communication errors, role/boundary confusion, fearful/disoriented behavior, and intrusive/negative behavior. Mothers also showed similar patterns of association of disrupted interaction with unresolved states of mind regarding a past experience of loss or abuse, although this association was not as robust as that with disorganized attachment relationships.

Our results parallel those of Lyons-Ruth et al. (1999) and Goldberg et al. (2003) but are especially noteworthy because they arose, for the first time, from applications of the AMBIANCE measure to observations of mother–infant interaction *outside* the Strange Situation. The use of interactions observed in the Strange Situation to assess both disorganized attachment and disrupted behavior introduces a substantial source of common method variance. Moreover, the Strange Situation was expressly designed to constrain the mother's interaction with her infant. Although this constraint is critical to the assessment of the quality of the mother–infant attachment relationship (see Ainsworth et al., 1978), it seems particularly inappropriate for assessing a mother's display of disrupted behavior in her interactions. The current study, although still in a laboratory context, establishes that mothers in disorganized relationships and those displaying an unresolved state of mind with regard to attachment tend to interact in a disrupted manner with their infants—not only in the scripted paradigm used to assess the attachment relationship but also in brief, less constrained play situations.

These results also enhance our understanding of the detailed nature of the patterns of behavior that comprise disrupted interactions and their association with disorganized attachment. As discussed previously, the five dimensions of the AMBIANCE each assess a conceptually distinct aspect of disrupted behavior, three of which overlap with Main and Hesse's (1990) conceptualization of frightened and frightening behavior. We found a strong pattern of intercorrelations among these dimensions in both play sessions, which suggests that a mother's tendency to display disrupted patterns of interaction is relatively general rather than limited to one or more of the particular aspects assessed by the AMBIANCE. Perhaps most conceptually salient is the finding that mothers who displayed higher levels of affective communication errors also

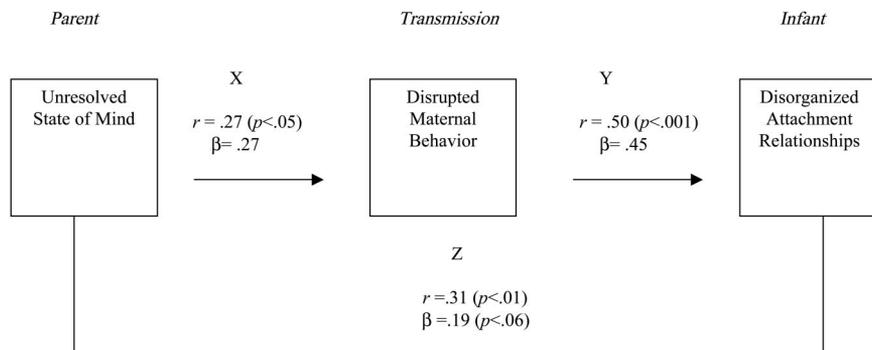


Figure 2. Results of the test of the mediational pathway for the play session without toys. X = correlation between unresolved states of mind and disrupted maternal behavior; Y = correlation between disrupted maternal behavior and disorganized attachment relationships; Z = mean correlation between unresolved states of mind and disorganized attachment relationships and beta value after mediation.

were likely to show elevated levels of role/boundary confusion, fearful/disoriented behavior, intrusive/negative behavior, and withdrawal in interaction. Affective communication errors is the dimension most reflective of extreme insensitivity, rather than the frightened and frightening behavior originally linked theoretically to an unresolved state of mind and disorganized attachment.

Some indication of the relative importance of extreme insensitivity versus frightened or frightening behavior in this developmental process may be inferred from our examination of the pattern of associations between the dimensions of disrupted maternal behavior and disorganized attachment relationships. Mothers in disorganized relationships showed a distinct tendency to display behavior associated with the three dimensions most clearly linked to Main and Hesse's (1990) original theoretical model. The fearful/disoriented and intrusive/negative behavior dimensions reflect the frightened and frightening behavior that Main and Hesse saw as leading to disorganization by inducing fear and placing the infant in an unresolvable conflict: The mother cannot provide reassurance or a haven of safety because she is herself the source of fear. Role/boundary confusion (which includes behaviors drawn from Main and Hesse's categories of sexual and deferential behavior) is hypothesized to be a reflection of the caregiver's unmonitored state of consciousness during interaction with the infant. The theory holds that the caregiver's motives for displaying such behavior are indiscernible and thus frightening to the infant, again placing the infant in a paradoxical dilemma, where disorganization is a likely outcome.

We also found, however, a clear association between disorganization and affective communication errors, which is consistent with Lyons-Ruth et al.'s (1999) hypothesis that a mother's failure to repair an interaction and extreme insensitivity contribute to the development of disorganized attachment. Although this aspect of disrupted behavior was not included in Main and Hesse's (1990) original model, its empirical association with disorganization may be compatible with their account. In fact, it may be useful to view the two theoretical models as complementary rather than as alternative or competing accounts. That is, Lyons-Ruth et al. (1999) hypothesized that disorganization arises from an interactional environment that is so disrupted that organized infant attachment strategies are inadequate. Main and Hesse (1990) argued that the disorganized relationship arises *indirectly* from the unresolved mother's pervasive fear and *directly* from frightening and frightened behavior associated with this fear. It is the latter, tangible, manifestations of the mother's representational state that provide the actual experiential mechanism for the infant. Many of these acts are indistinguishable from the extreme forms of insensitive caregiving implicated by Lyons-Ruth et al. (1999), including some aspects of affective communication errors. Having said this, we find it striking that the three dimensions of disrupted behavior most directly linked to Main and Hesse's (1990) hypothesis were uniquely linked to attachment disorganization rather than to both disorganization and resistant attachment relationships. The fourth dimension, affective communication errors, was related to both categories of relationships.

Like Goldberg et al. (2003), we found evidence that the association of disrupted maternal behavior with the disorganized attachment relationship was more robust than that with unresolved state of mind. The relatively weaker link between AAI classifications and measures of interaction may reflect, first, the fact that the

two assessments were separated by 6 months in the current study and by 18 months in the Goldberg et al. study, whereas the attachment relationship and mother-infant interaction were assessed on the same day in both studies. Second, the difference might reflect the fact that disrupted behavior and disorganized relationships are conceptually and procedurally more similar to one another than either is to maternal attachment representations. That is, descriptions of maternal interactive behavior reflect a dyadic process, as does the assessment of the attachment relationship. In contrast, maternal state of mind is a representational characteristic of the mother alone, assessed from a verbal transcript. Third, a sizable group of not-unresolved mothers were classified as disrupted in play without toys and were in disorganized relationships. It is possible that these mismatches reflect an underestimate of associations with unresolved attachment status resulting from an underreporting of experiences of abuse, a prerequisite for the classification (Bailey, 2003). Similarly, elaborations of existing assessments of representations of attachment (e.g., hostile/helpless states of mind with respect to attachment; Lyons-Ruth, Yellin, Melnick, & Atwood, 2003) may expand our ability to capture maladaptive states of mind. Finally, the difference in the strength of the two associations may simply reflect the fact that the base rate for unresolved state of mind was comparatively lower than that of attachment disorganization, allowing for a stronger pattern of association for the latter.

The finding of an association between disrupted mother-infant interactions and unresolved states of mind, on the one hand, and the disorganized attachment relationships, on the other, made it possible to explore the question of whether the former statistically mediates the association between the latter two. Goldberg et al. (2003), who failed to find evidence of such mediation, suggested that the hypothesis might better be tested in a high-risk sample such as that studied here. We found substantiation of mediation only in the play session without toys. As in analyses of the association between autonomous attachment status and the secure attachment relationship (e.g., Atkinson et al., 2005; Pederson, Gleason, Moran, & Bento, 1998; Raval et al., 2001; van IJzendoorn, 1995), the mediator statistically accounted for only a portion of the association between an unresolved state of mind and the disorganized attachment. A full explanation of the link between an unresolved maternal state of mind and attachment disorganization may lie in a consideration of variables beyond disrupted maternal behavior, at least as it is currently conceptualized and assessed. Future developments in the assessment of maternal representations of attachment may also provide us with a more complete understanding of the transmission process (Lyons-Ruth et al., 2003).

Abrams et al. (in press) found a greater frequency of frightened and frightening behavior in mildly stressful laboratory play sessions than in more structured parent-child interactions involving an adult clown, and they concluded that the play session's mild demands for compliance imposed more stress on the parents. If one follows a parallel chain of logic, one may speculate that most mother-infant dyads are likely to find interacting without toys more stressful than interacting with an attractive set of toys that relieve the mother of the sole burden of interaction. The challenge of interaction without toys may, for some mothers, increase the likelihood of a collapse of their vulnerable behavioral and attentional strategies. Consistent with this argument were our results revealing relatively higher levels of disrupted maternal behavior in

play without toys and only in dyads featuring disorganized relationships. These results underscore the importance of assessing mother–infant relationships in conditions of moderate stress, conditions that most likely reflect the day-to-day circumstances of mother–infant interaction (Abrams et al., in press; Pederson & Moran, 1995, 1996). These findings are also consistent with theoretical accounts (Hesse & Main, 2000) and previous empirical evidence (see Abrams et al., in press; Goldberg et al., 2003; Jacobvitz et al., in press; Schuengel et al., 1999) suggesting that disorganization and disorientation associated with an unresolved state of mind are likely to be evident under stressful circumstances even if not apparent in other situations. More generally, the results suggest that a mother’s ability to provide the necessary social framework for her infant is severely tested at just those times when it is most critical to her infant’s development and when its absence is likely to have significant developmental consequences (Lamb, Leyendecker, Schölmerich, & Fracasso, 1998).

The current study adds to the growing body of literature implicating some form of markedly disrupted maternal interactive behavior in the developmental system linking unresolved maternal state of mind with the disorganized attachment relationship. The association has been observed in a variety of contexts. The current study’s findings, based on observations of unstructured play, reinforce and elaborate the results of these previous studies. The work also suggests that more stressful circumstances elicit greater disrupted behavior from disorganized dyads, which raises interesting theoretical and practical issues. Finally, the study provides the first evidence of a statistical mediation by disrupted maternal behavior of the association between unresolved states of mind and disorganized attachment relationships. The further exploration of the origins of disorganization in early interaction has important implications, both for our understanding of a critical social developmental mechanism and for our support of mothers and infants at developmental risk.

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Appendix

Intercorrelations Among AMBIANCE Variables for the Play Sessions Without and With Toys Present

Variable	1	2	3	4	5	6	7	8	9
1. Level of disrupted communication	—	.82***	.72***	.25*	.48***	.58***	.52***	.30**	.24*
2. Disrupted/not disrupted	.85***	—	.71***	.07	.42**	.36	.53**	.29**	.14
3. Affective errors	.72**	.64**	—	.05	.09	.31**	.43***	.28**	.31**
4. Role/boundary confusion	.60***	.55**	.27*	—	.03	.45***	.18	.17	.12
5. Fearful/disorientation	.67***	.64***	.40***	.27**	—	.08	.25*	.25**	.03
6. Intrusive/negativity	.79***	.64***	.51***	.53***	.60***	—	-.09	.04	.18
7. Withdrawal	.16	.17	.38***	-.16	-.09	-.20	—	.12	.09
8. Disorganized	.50***	.51***	.27*	.29**	.44***	.36***	.07	—	.31**
9. Unresolved	.27*	.25*	.19	.17	.13	.21	.09	.31**	—

Note. $N = 82$. Data for play without toys are below the diagonal; data for play with toys are above the diagonal. AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification.

* $p < .05$. ** $p < .01$. *** $p < .001$.

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