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Atypical maternal behavior, maternal representations, and infant disorganized attachment

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Abstract
The data for 197 mother–infant pairs from two longitudinal studies were analyzed to assess relations between maternal attachment representations; atypical maternal behavior, coded with a new tool, Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE), and infant attachment. Both maternal and infant attachment were systematically related to atypical maternal behavior: mothers who were Unresolved on the Adult Attachment Interview and those whose infants were disorganized in the Strange Situation Procedure engaged in more atypical behaviors than those who were not Unresolved and whose infants showed organized patterns of attachment, respectively. Regression analyses indicated that when tested as a mediator, atypical maternal behavior as measured on the AMBIANCE did not reduce the association between maternal Unresolved status and infant disorganized attachment. This may, in part, reflect the fact that our low-risk sample did not include enough cases in the risk categories. These data provide preliminary empirical validation for the AMBIANCE and strengthen the evidence for links between atypical maternal behavior and disorganized attachment but indicate that in addition to maternal attachment representations, other factors must contribute to atypical maternal behavior.

Main and Solomon (1986, 1990) used the term "disorganized/disoriented attachment" to capture the salient quality of the odd, inexplicable, or contradictory behaviors displayed by some children in the context of separations and reunions from their primary caregiver. These behaviors are considered to reflect the absence or breakdown of an organized strategy for using the caregiver as a haven of safety in times of stress. Disorganized infant attachment has been observed and described among maltreated children (e.g., Spieker & Booth, 1988) and those being reared by a psychiatrically disordered parent (Radke–Yarrow, Cummings, Kuczynski, & Chapman, 1985), but is also found in low-risk samples (Main, Kaplan, & Cassidy, 1985). Among the four existing patterns of infant attachment (secure, avoidant, resistant, disorganized) observed in the Strange Situation Procedure for assessing infant attachment (SSP; Ainsworth, Blehar, Waters, & Wall, 1978) the disorganized classification has been most clearly related to later psychopathology (Carlson, 1998; Lyons–Ruth & Jacobvitz, 1999).

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Hence, understanding the origins of disorganized attachment may prove useful for understanding the origins of psychopathology.

The purpose of the present study is to examine relations between two predictors of infant disorganization: maternal attachment representations and atypical behavior toward the infant.

Background

Infant attachment

Three basic patterns of infant attachment, labeled secure, avoidant, and resistant, have been described on the basis of behavior in the SSP (Ainsworth et al., 1978). Infants called "secure" explore freely in their mothers' presence; they may or may not show overt distress during her absences, but they greet her return positively and, if upset, seek contact and are easily comforted. Infants called "avoidant" give the impression of being indifferent to the mother, though they monitor her whereabouts. They show little distress on her departures and ignore or rebuff her on her returns. Infants in the "resistant" group are least able to explore in the mother's presence, become distraught when she leaves and, although they seek comfort at reunions, are difficult to settle. These patterns are related to later social competence, with secure infants having more positive developmental outcomes than those who are insecure (avoidant or resistant; see Thompson, 1999, for a review).

As studies began to include populations with known parenting problems such as maltreatment (Crittenden, 1985) and parental depression (Radke–Yarrow et al., 1985), not only were there children who could not be readily classified into one of these three patterns, but there were some for whom the classifications seemed anomalous in view of known information (Main & Solomon, 1986). Main and Solomon (1986, 1990) reviewed videotapes of infants who failed to meet the criteria for the three known attachment patterns and identified infants they described as "disorganized/disoriented." These infants lacked a clear strategy for using the caregiver when stressed and/or exhibited odd behaviors such as freezing, repeated incomplete approaches to the caregiver, and combinations of contradictory behaviors (e.g., intense crying while avoiding the mother). Because disorganization, unlike the three organized classifications, is not an attachment strategy, infants who are primarily disorganized are also assigned to a "best fit" alternative classification from among the other three categories (secure, avoidant, resistant).

Once identified, disorganized infant attachment was found to occur in 15–20% of infants in community samples and 40–80% of high-risk samples (van IJzendoorn, Schuengel, & Bakermans–Kranenburg, 1999) and to be associated with subsequent behavior disorders (Carlson, 1998; Lyons–Ruth & Jacobvitz, 1999). It was noted (Solomon & George, 1999) that the disorganized category, rather than the organized attachment patterns we call "insecure," is consistent with Bowlby's original focus on the disorganized reactions of children experiencing prolonged separations or parental loss (e.g., Bowlby, 1944, 1969).

Although increased occurrence of disorganized attachment in high-risk samples suggests that it arises in disorganized environments where caregiving is inadequate, its occurrence in low-risk community samples as well indicates a more complex origin. Furthermore, the general notion of "inadequate caregiving" in itself does not suffice to indicate specific behaviors or mechanisms that could disrupt or "disorganize" the process of forming an attachment. Efforts to understand the roots of disorganized attachment have focused on both maternal representations and maternal behavior. Of course, this focus on maternal influences on the infant does not imply that mothers alone "cause" disorganized attachment. George and Solomon (1999), for example, show that the caregiving system, which is distinct from but intersects with the attachment system, reflects a development of its own with multiple influences playing a role. However, in understanding the development of attachment in infants, it is assumed that contextual factors such as marital relations, cultural expectations, and access to community re-

sources impinge on the young infant primarily via their effects on maternal behavior (Belsky, 1999).

Maternal attachment representations

One clue to understanding the origins of disorganized attachment is found in attachment-related narratives of parents of disorganized infants. When compared with parents whose infants display an organized pattern of attachment, parents of disorganized infants exhibit odd, obviously incorrect, and confused statements when discussing experiences of attachment loss or trauma during the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996).

The AAI was developed to assess adults' current state of mind with respect to attachment by asking them to recount and reflect on early experiences with their parents. Adults are assigned to one of three primary categories (dismissing, preoccupied, or autonomous) on the basis of qualitative characteristics of the narrative. An interviewee is judged "autonomous" when the narrative response to the interview is coherent, that is, consistent, clear, relevant, and reasonably succinct. An individual is considered "dismissing" if general descriptions of the parents are positive but unsupported by confirming memories. Often, dismissing individuals cannot recall past attachment experiences. Individuals are classified as "preoccupied" if the narrative indicates confused, passive, or angry preoccupation with the parents. Individuals are considered "unresolved" if they exhibit confusion or metacognitive lapses when discussing loss (through death) or trauma (physical, sexual, and/or emotional abuse). In such cases, the classification also includes one of the other three categories, depending on predominant narrative style in the remainder of the interview (see Main & Goldwyn, in press, for more detailed descriptions).

Theoretically, the expectation is for autonomous mothers to have secure infants, dismissing mothers to have avoidant infants, preoccupied mothers to have resistant infants, and the mother's unresolved loss or trauma to be associated with infant disorganization (Main, 1995). Indeed, the AAI categories were originally designed by reviewing interview transcripts of parents whose infant attachment status was known. However, the empirical literature is mixed regarding the strength of these matches. For example, in a sample of Israeli infants sleeping at home, 76% of the mother–infant pairs were matched as theoretically expected, whereas among those sleeping communally, only 40% were matched (Sagi, van IJzendoorn, Scharf, Joels, Koren–Karrie, Mayseless, & Aviezer, 1997). Furthermore, in most samples that have been studied, the majority of matches are accounted for by autonomous–secure mother–infant pairs, and matches for the insecure groups are less frequent. In a meta-analysis that included 548 mother–infant pairs from nine different studies, 74% of autonomous mothers had secure infants, 57% of dismissing mothers had avoidant infants, 21% of preoccupied mothers had resistant infants, and 53% of unresolved mothers had disorganized infants (van IJzendoorn, 1995).

The match between maternal unresolved status on the AAI and infant disorganized attachment is theoretically appealing. In the same way that the disorganized infant exhibits odd, unpredictable, and inexplicable behaviors, adults with unresolved loss or trauma exhibit odd, unpredictable, and inexplicable lapses in their narratives. Hesse (1996) suggests that these unpredictable lapses in behavior reflect sudden changes in state of consciousness. If such breakdowns repeatedly occur during care of the infant, they have the potential to disrupt ongoing interactions (Hesse, 1999; Main & Hesse, 1990). However, the observational data to document specific disruptive behaviors are limited and the processes by which unresolved status on the AAI may be linked to infant disorganized attachment are not yet clear.

Maternal behavior toward the infant

A core concept of attachment theory is that caregiver behavior toward infants is the primary determinant of individual differences in

infant attachment (e.g., Ainsworth et al., 1978; Bowlby, 1969). In particular, attachment researchers have been preoccupied with the study of maternal sensitivity/responsiveness as the feature most predictive of infant attachment (De Wolff & van IJzendoorn, 1997). Infants classified secure in the SSP are repeatedly found to have more sensitive and responsive mothers than those in the insecure groups. If disorganized attachment is considered the most insecure attachment pattern, one possibility is that it arises from extreme insensitivity.

However, measures of maternal sensitivity generally do not predict disorganization (Raval et al., 2001; van IJzendoorn et al., 1999). One of the first suggestions regarding the origins of disorganized attachment linked it to normally infrequent (atypical) maternal behaviors that are either frightening to the child or reflect parent fright (Main & Hesse, 1990). Main and Hesse (1990) hypothesized that when stress activates attachment behavior, the infant whose parent has engaged in fear-provoking behavior is placed in an approach–avoidance conflict: s/he both wishes to approach and fears approaching the caregiver. Repeated experience of such insoluble dilemmas is thought to either prevent the infant from developing an organized attachment strategy or intrude to disrupt previously organized strategies, giving rise to the unusual behaviors that are the hallmark of disorganized attachment.

Overt maltreatment, with its known association with disorganized attachment (e.g., Carlson, Cicchetti, Barnett, & Braunwald, 1989), certainly belongs in the category of frightening parental behavior. However, because disorganized attachment also occurs in samples at low risk for maltreatment, other parental behaviors must contribute to disorganized infant attachment. In their original discussion, Main and Hesse (1990) included relatively subtle and brief behaviors in the category that they called "frightening/frightened" behaviors (e.g., suddenly looming too close, inexplicable changes in voice quality, exaggerated startles to the infant's fall).

Recently, others have provided more elaborate models for the origins of disorganized attachment. Solomon and George (1999) based their account on research with preschool children and their mothers in which they found that in disorganized mother–child dyads, both participants experienced a combination of rigid control of emotions alternating with overwhelming feelings of helplessness and lack of control. They suggest that the key element in the origin of disorganized attachment is the caregiver's failure to terminate attachment needs when they have been aroused. This failure, they suggest, reflects what Bowlby called "segregated systems," meaning there is a lack of integration between attachment-related behavior, feelings, and thoughts. Repeated failure to terminate attachment needs subjects the infant to an extreme state of fear that "overwhelms his or her capacity for flexible defense, affect regulation and adaptation" and thus effectively prevents the infant from developing an organized attachment strategy.

Lyons–Ruth, Bronfman, and Parsons (1999) used a related concept of "failure to repair" and point out that in the normal course of events, many parents participate in events in which they inadvertently frighten their child. They give the example of a mother tripping and falling while carrying her infant. However, they argue, most parents "repair" this violation of the protective role by immediately providing comfort, soothing the infant, and then guarding against repetition. They further suggest that if a caregiver has not experienced comforting during her own extreme distress, the fear and pain of the infant evokes her own unresolved fearful affects and impairs her ability to repair lapses. In fact, these same unresolved fearful affects prevent her from recognizing situations that are fearful for the infant. Thus the infant repeatedly experiences an arousal of attachment needs without receiving the comfort and soothing to terminate them. In parallel with Solomon and George's (1999) description of a mixture of over- and undercontrol of affect, Lyons–Ruth, Bronfman, and Atwood (1999) describe a mixture of hostility and helplessness in mothers of disorganized infants. An important theme in both these more complex models is that *lack of response* (withdrawal) can be as fear provoking

for the child as behavior that is frightening in and of itself.

Assessing atypical maternal behavior

Several schemes have been developed to assess parents' proclivity to engage in the subtle but potentially disturbing behaviors described by Main and Hesse (1990). Main and Hesse themselves (1992) developed a coding scheme for frightening/frightened behavior that has been adapted and expanded by others. Jacobvitz, Hazan, and Riggs (1997) used the original Main and Hesse (1992) scheme with 113 women and their infants. The AAI was administered prenatally and mother–infant pairs were observed when the infants were 8 months old. Maternal unresolved loss or trauma was associated with later display of frightening/frightened behaviors toward the infant. There was also a marginally significant difference in maternal behavior among mothers in the unresolved group; those whose secondary classification was autonomous engaged in somewhat fewer of these behaviors than those who were nonautonomous.

A second study that used the Main and Hesse (1992) scales was conducted with 44 Dogon infants in Mali who participated in the SSP (True, Pisano, & Omar, 2001). Maternal behavior was observed at two well baby exams, one several weeks before the SSP and one conducted several weeks later. In this sample, the rate of secure attachment was in the expected range (67%) and the next most common attachment classification was disorganized (25%). There were no avoidant infants. Mothers of disorganized infants engaged in significantly more frightening/frightened behavior than other mothers. In fact, in this study, sensitivity was not a good predictor of insecurity but frightening/frightened behavior was. This probably reflects the predominance of disorganization over other forms of insecurity in this sample.

Schuengel, Bakermans–Kranenburg, and van IJzendoorn (1999) studied 85 mothers who had experienced the death of someone important to them. They participated in the AAI when their infants were 12 months old and observations of mother–infant interaction were made in homes when infants were 10–11 months old. A scale for frightening/frightened behavior was developed based on examples described by Main and Hesse (1992). It included three subscales, frightening behavior, dissociated behavior, and frightened/deferential behavior, as well as a summary score for disorganizing behavior. Mothers of infants who were classified disorganized with respect to attachment at 12 months were found to have had higher disorganizing scores when their infants were 10–11 months old than mothers of infants who showed one of the organized patterns of attachment. Furthermore, mothers with unresolved loss reported more dissociative experiences than those in the nonunresolved group. Finally, mothers who were unresolved and otherwise nonautonomous (preoccupied or dismissing) exhibited more frightening/frightened behaviors than those who were unresolved but otherwise autonomous.

Lyons–Ruth, Bronfman, and Parsons (1999) developed an expanded list of atypical behaviors, which is more consonant with the expanded approach to the origins of disorganized attachment laid out in their own work and that of Solomon and George (1999). They included five types of atypical behavior (affective communication errors, role/boundary confusion, intrusiveness/negativity, fearful/disoriented, and withdrawal behaviors) in their Atypical Maternal Behavior Instrument for Assessment and Classification coding system (AMBIANCE). They argue convincingly for the separation of frightening and frightened behavior (which Schuengel et al., 1999, also distinguished); and, in this instrument, the frightening behaviors described by Main and Hesse (1992) are found primarily in the "intrusiveness" subscale whereas the frightened and dissociated behaviors are included in the "fearful/disoriented" subscale. The withdrawal scale has some overlap with the "timid/deferential subcategory" of Main and Hesse (1992), as well as with some items they included as dissociative behaviors. In addition to listing salient behaviors, those considered more serious markers are italicized and more heavily weighted in scoring.

This coding system includes the frequency

of atypical behaviors displayed, a summary scale for global level of disrupted communication, and classification of mothers as generally disrupted or not disrupted in communicative behavior with the infant. When the AMBIANCE was used to code videotapes of 65 mothers and their 18-month-olds during assessment of attachment in the SSP, mothers of disorganized infants showed more atypical behavior, and in particular, more affective communication errors, more fearful/disoriented behavior, and more intrusiveness/negativity. Within this group of mothers, there were differences in the patterning of disrupted communication: mothers of infants who were otherwise secure were more likely to exhibit withdrawal, whereas behavior on the other dimensions was elevated among mothers of those who were otherwise insecure (Lyons–Ruth, Bronfman, & Parsons, 1999).

Thus, prior studies show links between atypical maternal behavior and disorganized infant attachment and between atypical behavior and unresolved maternal attachment representations. Only one study has provided potential data to examine a transmission process directly (Schuengel et al., 1999) in a sample of mothers who had experienced losses. However, in this study the AAI was administered *after* the home observations, thus compromising the use of AAI information to predict caregiving behavior (Hesse, 1999). These links have not yet been examined prospectively in a community sample. Much of the previous work on infant disorganization has focused on high-risk samples (e.g., Ward & Carlson, 1995), and the AMBIANCE was first developed with a disadvantaged group that included depressed mothers. In these populations, the majority of infants who are disorganized are also insecure (usually avoidant) in the SSP (Lyons–Ruth, 1996). In such samples many contextual conditions impinge on a mother's ability to provide care to an infant (e.g., poverty, single motherhood, depression, family violence). In the present study we wanted to find out whether the AMBIANCE findings could be replicated in low-risk community samples, where the majority of disorganized infants were most likely to be otherwise classified secure and contributions from unfavorable contextual conditions would be at a minimum.

Thus, we examine links between atypical maternal behavior, mothers' unresolved loss or trauma, and disorganized infant attachment in two community samples, using AMBIANCE as the indicator of atypical behavior. To replicate the Lyons–Ruth et al. (1999) findings, we focused on using the AMBIANCE in the SSP. Ultimately, in order to show that atypical maternal behavior as scored on the AMBIANCE *predicts* disorganized attachment, it will have to be assessed at prior ages in other contexts. This would undoubtedly involve modifications to the original scheme to accommodate different contexts and needs of younger infants. Thus, it seemed appropriate to first determine whether the AMBIANCE is applicable in the same situation with other samples before proceeding to modify the instrument and expand its usage. The data to be described also allow us to ask whether these atypical behaviors can be the mechanism by which an unresolved state of mind regarding attachment (as evidenced on the AAI) is transmitted to the infant and gives rise to disorganized attachment in the SSP.

Our questions for this study are as follows:

1. Are there differences in atypical maternal behavior (measured on the AMBIANCE) between classificatory groups based on (a) maternal attachment representations; (b) infant attachment? The rationale outlined above suggests that presence versus absence of unresolved status on the AAI and disorganized infant attachment in the SSP are the salient features associated with these differences.
2. Does autonomous attachment status serve to limit atypical behavior in mothers who are otherwise unresolved? Based on prior studies, we predicted that among mothers who are unresolved, those who were otherwise autonomous would show less atypical behavior than those who were nonautonomous. Similarly, we expected that mothers of infants who were disorganized but otherwise secure would show less atypical behavior than those of infants who were disorganized and otherwise insecure.

3. Is atypical maternal behavior as measured by the AMBIANCE a plausible mediator between unresolved status in the mother and disorganization in the infant?

Method

Participants

Data for the test of the model come from two longitudinal studies in which mothers completed the AAI prenatally and infants and mothers participated in the SSP to assess infant attachment. Study 1 was conducted in a large urban center and followed mother–infant dyads from the third trimester of pregnancy through the infants' second year. Study 2 was based in a small urban center and followed mother–infant pairs from the second or third trimester of pregnancy through the infants' first year.

Study 1: Recruitment and attrition. Expectant mothers were recruited during the second or third trimester of pregnancy from 79 prenatal education classes (27 at hospitals and 52 run by the public health department) for a longitudinal study of attachment and emotional development. A member of the research team visited each class, described the study as one designed to find out how different styles of thinking and feeling are passed from parent to child, and asked for volunteers to complete the Attachment Screening Questionnaire (Benoit & Parker, 1994a).

Of the 680 mothers attending these classes, 357 (52%) completed the questionnaire and were informed that they might be contacted to participate in the study. In fact, 233 women (65%) who were 18 years or older were invited to participate, based on their screening scores. For purposes of the longitudinal study, which focused on developmental differences between infants in the two organized insecure groups, preference was given to those whose scores suggested they were likely to be either dismissing or preoccupied. This strategy was employed in an effort to increase the number of insecure dyads in the sample, thus providing adequate statistical power for comparisons between insecure groups. Of 233 women contacted, 139 (60%) agreed to participate. These women gave informed consent to their participation and that of their infant, as approved by the Research Ethics Board of our institution, at their third trimester initial visit.

Of 139 initial participants, 8 (6%) discontinued participation before the 1-year visits. The reasons for discontinuing were the mother was "too busy," family moved away from the city, and illness of the baby or mother. The "discontinuers" did not differ from the continuing participants on any of the demographic characteristics assessed. The present analyses include 113 mother–infant dyads (56 girls, 57 boys) with complete data on all relevant measures.

This recruiting procedure, which had a bias toward including more nonautonomous mothers, may have yielded an unusual sample, but it also gave us the opportunity to assess potential effects of attachment status on participation in attachment studies. Prior analysis of data from the screening questionnaire suggested that mothers who were likely to be dismissing were less likely to agree to participate and mothers who were likely to be preoccupied were more likely to withdraw in the early stages of the study (Myhal & Goldberg, 1997).

Study 2: Recruitment and attrition. Expectant mothers were recruited from several sources during the second or third trimester of pregnancy for a study of attachment across three generations: (a) local childbirth education classes (a brief description of the project was presented and flyers were distributed describing the project and inviting participation), (b) local children's and maternity clothing stores (flyers were left), (c) physician's offices (flyers were left), and (d) newspaper articles and advertisements inviting participation. Criteria for inclusion were that the expectant mother be at least 18 years old and have an uncomplicated pregnancy and that her mother agree to participate in the study. During an initial meeting, informed consent and general demographic information were obtained from all participants.

Of the 110 mothers who agreed to participate, 14 (13%) either miscarried or decided not to participate after more information

Table 1. *Demographic characteristics for participants in Study 1 and Study 2*

Characteristic	Study 1 Sample (n = 113)	Study 2 Sample (n = 84)
Mother's age (years)		
M	31.50	29.48**
SD	3.77	4.00
Education (total years)		
M	15.70	15.71
SD	3.05	3.10
Household income (0–4 scale)[a]		
M	3.57	3.26*
SD	0.93	0.91
Married/cohabiting (%)	91.20	97.60
Currently employed (%)	87.60	72.60*
Infant gender (% female)	49.10	45.20

[a]Household income per year was rated as follows: 0, <$15K; 1, $15–$20K; 2, $20–$30K; 3, $30–$50K; 4, >$50K.
*$p < .05$. **$p < .01$.

about the project was provided. Of the 96 remaining mothers, 12 (13%) completed only parts of the study. The reasons given for dropping out of the study ranged from giving the baby up for adoption (1 mother) to time constraints and moving away. Those who dropped out of the study did not differ demographically from those who continued participation. The present analyses include 84 mother–infant dyads (38 girls, 46 boys) with complete data on all relevant measures.

Demographic comparison of Study 1 and Study 2 participants. The majority of the 197 participants were middle-class Caucasians, and all mothers in both studies either spoke English as their first language or were fluent in English. Table 1 summarizes demographic information for participants in both Study 1 and Study 2. Analyses indicated that mothers from the two study groups were equivalent with respect to education and percentage married or cohabiting. However, mothers in Study 1 were older, had a higher income,[1] and were more likely to be working than those in Study 2. Data from the two studies were combined in all analyses, and where appropriate, these three demographic indicators were used as covariates. The use of these indicators as covariates further served the purpose of controlling effects of contextual variables that could contribute to the main variables being investigated.

1. This income differential may well reflect secular trends over the time period between the two studies or consistent differences in income and living expenses in the two locations.

Procedure

In both studies, the AAI was completed prenatally and infant attachment was assessed in the SSP at the 12-month visit. AMBIANCE coding was based on the videotapes of the 12-month SSP. All assessments took place in a research laboratory room designed for behavioral observations. Coding of each measure was completed by individuals blind to other participant data in the study.

Measures

Screening questionnaire (*Study 1 only*). The Attachment Screening Questionnaire is derived from the Adult Attachment Questionnaire (Benoit, Parker, & Zeanah, 2000) and consists of 18 statements about the respondent's parents, relationship with each parent during childhood, and the impact of these relationships on his or her development. These statements were selected as those that most clearly discriminated dismissing and preoccupied respondents in prior studies (K. C. H. Parker, personal communication, 1994). Each statement is rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores on 8 of the 18 items are added to yield a "dismissing" score and those on 8 other items comprise the "preoccupied" score. Two filler items were added to balance distribution of questions about mother and father. Scores on each scale can range from 8 to 40. A score above 17 on the dismissing scale and below 11 on the preoccupied scale was used to indicate a participant likely to be dismissing; a score above 18 on the preoccupied scale and below 12 on the dismissing scale was used to identify potential preoccupied participants.

Maternal attachment: AAI. Maternal attachment representations were assessed with the AAI (George et al., 1985, 1996). The AAI is a 1- to 2-hr semistructured interview that asks the adult to recollect childhood relationships with attachment figures, describe attachment-relevant experiences from early childhood, and evaluate the impact of these experiences on her or his development, current functioning, and parenting. The interview was audiotaped, transcribed verbatim, and coded using the guidelines in the Main and Goldwyn (in press) manual. Transcripts for Study 1 were coded during 1996–1999 using the most recent version of the manual. Transcripts for Study 2 were coded in 1989–1991 with an earlier version of the manual. Basic coding conventions are consistent across these two versions. The coding system places primary importance on qualitative aspects of the narrative rather than factual information. Each transcript is rated on a series of 9-point scales that assess experiences with each attachment figure and current state of mind with respect to those experiences. Based on these ratings, transcripts are classified as autonomous, dismissing, preoccupied, or unresolved, as described in the Introduction. In both studies, all transcripts were coded by a highly experienced coder (DB) who has passed the standard reliability test and established reliability with other laboratories in previous studies. In Study 2, a second coder independently scored 32 transcripts. Interrater agreement was 78% for the four-category classification system ($\kappa = .69$, $p < .001$).

The main questions of the study focused on the groups formed on the basis of two dichotomies: autonomous or not and unresolved or not. Therefore subjects were placed into three groups for most analyses: not unresolved, unresolved–autonomous, and unresolved–nonautonomous. Interrater agreement for this grouping (based on Study 2) was 75% ($\kappa = .43$, $p < .01$).

Infant attachment: SSP. In both studies, infant attachment was assessed in the laboratory at 1 year of age using Ainsworth's SSP (Ainsworth et al., 1978). In this procedure, mother, infant, and an unfamiliar but friendly female figure interact in eight brief episodes in a laboratory playroom containing age-appropriate toys. The script features two separations and reunions between mother and infant. The full procedure is videotaped and trained coders review the tapes to classify each infant into categories based on the attachment behavior patterns described earlier: secure, avoidant, resistant, and disorganized. In Study 1, videotapes for 30 cases were coded by two different coders for reliability purposes. Agreement for the four-category scheme was 83% ($\kappa = .79$, $p < .0001$). In Study 2, interrater reliability was based on 28 cases. Agreement was 82% for the four-category system ($\kappa = .64$, $p < .001$). In cases where there was disagreement, consensus classifications were used for analyses.

As with the classifications for the mothers, the main questions of the study were concerned with groups formed by the two dichotomies of secure–insecure and organized–disorganized, resulting in three groups for analyses: organized, disorganized–secure, and disorganized–insecure. Interrater agreement for this grouping was 86% for Study 1 ($\kappa = .52$, $p < .001$) and 86% for Study 2 ($\kappa = .54$, $p < .001$)

Atypical maternal behavior instrument for assessment and classification. The AMBIANCE (version 2; Bronfman, Parsons, & Lyons–Ruth, 1999) was used to code atypical maternal behavior during episodes 2, 3, 5, and 8 of the SSP. The AMBIANCE provides scores on the following: (a) the frequency of behaviors on each of the following five dimensions: affective communication errors, role/boundary confusion, fearful/disoriented behavior, negative/intrusive behavior, and withdrawing behavior; (b) total frequency of atypical behaviors; (c) a qualitative 7-point rating scale for global level of disrupted communication; and (d) a classification for disrupted or not disrupted parental communication. It also includes a 3-point failure to repair scale. In our samples, we found inadequate variability on this latter scale for use in analyses.

Cases from both Study 1 and 2 were scored

by the same team of two coders naive to classifications on both grouping factors (AAI and SSP). One of the coders had no training in coding attachment. The second had received an introduction to coding organized attachment patterns but training on disorganization was deliberately postponed until after the AMBIANCE coding was completed. Coders were trained by two of the developers of the AMBIANCE measure (E.T.B. & K.L.–R.). The reliability for the total scores was .79 and for the level of disruptedness was $r = .77$. The percentage of agreement for the disrupted versus not disrupted classification was 85%. Disagreements were discussed to consensus and consensus scores were used for analysis. Reliability on the five subscales was highly variable and often below .75.[2] For this reason, we did not conduct a thorough analysis of the subscales but instead report preliminary data for subscales particularly relevant to theories regarding the role of maternal atypical behavior in disrupting development of attachment, fearful/disoriented behavior, negative/intrusive behavior, and withdrawing behavior.

Results

This section is divided into three parts. The first presents descriptive data on the distribution of cases for each grouping factor (maternal attachment and infant attachment). The second focuses on differences in atypical maternal behavior as a function of each of the grouping variables. The third tests whether atypical maternal behavior serves as a mediator between maternal unresolved status on the AAI and infant disorganized attachment in the SSP.

Descriptive statistics

The overall distributions of mother and infant attachment and the concordance between them have been published for the full sample of each of the two studies in previous publications (Benoit & Parker, 1994b; Raval et al., 2001). Briefly, the overall four-category concordances were 48.9 and 77% for Studies 1 and 2, respectively. The lower concordance in Study 1 is consistent with the increased number of nonautonomous mothers originally recruited. Table 2 shows the distribution of attachment groupings for the categories used for the cases included in the present analyses. It is evident that the majority of mothers fell into the non-unresolved group ($N = 151$) and that most of the infants were nondisorganized ($N = 152$). Unresolved mothers accounted for 23% of our cases, and 22.8% of infants were disorganized. These figures are comparable to those from other studies, indicating that maternal unresolved and infant disorganized classifications occur in 15–20% of cases (Main, 1995). The overall concordance for Table 2 is 72%, but organized infant attachment and not-unresolved maternal attachment account for the majority of the matches. Only 44% of unresolved mothers had disorganized infants and only 43% of disorganized infants had mothers who were unresolved. However, these concordance figures must be evaluated in the context of the low incidence of both unresolved and disorganized attachment. In fact, given the low rates of occurrence shown in the marginal totals (23.3 and 22.8%, respectively), chance matches would occur 5.3% of the time. In fact, they occurred 10.2% of the time, about twice as often as expected. By way of contrast, the high rates of not-unresolved and organized attachment (76.6 and 77.%, respectively) would lead to chance matches 59% of the time. The observed rate of 64% is only marginally above this. Thus, in spite of small numbers, the unresolved–disorganized link is, in fact, more convincing as a nonchance phenomenon than the high frequency of matches between not-unresolved and organized attachment. There were no infant gender differences for either infant attachment or AMBIANCE scores. (Because the AAIs were conducted before the infant's gender was known, gender differences in AAI classifications were not evaluated.)

2. These low reliabilities probably reflect the fact that we were the first group outside the originating laboratory to be trained and the scales were still partially under development.

Table 2. *Attachment classification agreement*

	Strange Situation Classification			
AAI	Nondisorganized (N = 152) 77.1%	Disorganized/ Secure (N = 23) 11.7%	Disorganized/ Nonsecure (N = 22) 11.2%	Total Disorganized (N = 45) 23%
Not unresolved				
N = 151	**126**	11	14	25
76.6%	**64 (59)**	5.6 (9.0)	7.1 (8.6)	12.7 (17.6)
Unresolved/autonomous				
N = 19	8	**9**	2	11
9.6%	4 (7.4)	**4.6 (1.1)**	1 (1)	5.6 (2.2)
Unresolved/nonautonomous				
N = 27	18	3	**6**	9
13.7%	9.1 (10.6)	1.5 (1.6)	**3.0 (1.5)**	4.6 (3.1)
Total unresolved				
N = 46	26	12	8	**20**
23.4%	13.2 (18)	6.1 (2.7)	4.1 (2.6)	**10.2 (5.3)**

Note: The figures in parentheses are expected cell percentages based on marginals. The bold numbers on the diagonal are the predicted matches.

Link between attachment group and AMBIANCE data

We next asked whether atypical maternal behavior, as measured by the AMBIANCE, was related to either maternal or infant attachment. We approached this question in three ways: by assessing group differences in total frequencies on the AMBIANCE, rated level of disruptedness, and disrupted versus nondisrupted classification. Although these measures were highly correlated (see Appendix), each represents a different approach to assessing atypical parental behavior. Because AMBIANCE is a relatively new measure, it is important to explore the characteristics of different approaches to scoring. In each case, we conducted a set of a priori tests based on the predictions above. The first test for the maternal grouping was between unresolved and not-unresolved participants; the second test was done within the unresolved group to compare unresolved/autonomous and unresolved/nonautonomous mothers. Similarly, for the infant attachment grouping, we first compared mothers of infants with disorganized versus organized attachment patterns and then examined subgroups within the disorganized group (secure vs. insecure). Finally, we examined group differences on the three subscales relevant to the theories of Lyons–Ruth, Bronfman, and Parsons (1999) and Solomon and George (1999).

Total AMBIANCE frequencies. Examination of the total frequencies for both maternal and infant attachment groupings (see Table 3) showed that the absence of the putative risk condition (i.e., unresolved maternal attachment or disorganized infant attachment) was associated with the lowest frequencies. One-way analysis of covariance (ANCOVA; with the three demographic factors as covariates) indicated that the not-unresolved group (M = 25.11) displayed fewer atypical behaviors than the unresolved group (M = 32.57), F (1, 191) = 6.18, $p < .02$. Similarly, the nondisorganized group (M = 24.95) displayed fewer atypical behaviors than the disorganized group (M = 33.27), F (1, 191) = 8.84, $p < .01$.

When we considered the AMBIANCE frequencies within the unresolved group, no significant differences were found between the unresolved/autonomous (M = 32.79) and the unresolved/nonautonomous (M = 32.41) groups. A one-way ANCOVA (with the three demographic factors as covariates) revealed a significant difference within the disorganized

Table 3. *Means and standard deviations for total frequency of AMBIANCE behaviors*

	Maternal Attachment Representations[a]				
	M	*SD*	Min	Max	*N*
Not unresolved	25.11	16.37	3	89	150
Unresolved/autonomous	32.79	14.35	9	69	19
Unresolved/nonautonomous	32.41	19.48	5	95	27
	Infant Attachment[b]				
Nondisorganized	24.93	15.70	3	85	152
Disorganized/secure	27.13	8.93	11	47	23
Disorganized/insecure	39.68	24.25	9	95	22

[a]The significant difference in frequencies between unresolved versus not unresolved ($p < .02$).
[b]The significant difference in frequencies between infant attachment groups ($p < .01$).

Table 4. *Means and standard deviations for rated level of disrupted communication*

	Maternal Attachment Representations[a]				
	M	*SD*	Min	Max	*N*
Not unresolved	3.73	1.45	1	7	151
Unresolved/autonomous	4.00	1.49	1	6	19
Unresolved/nonautonomous	4.41	1.65	1	7	27
	Infant Attachment[b]				
Nondisorganized	3.60	1.46	1	7	152
Disorganized/secure	4.22	1.13	1	6	23
Disorganized/insecure	5.18	1.26	3	7	22

[a]The significant difference in ratings between unresolved versus not unresolved ($p < .05$).
[b]The significant difference in ratings between infant attachment groups ($p < .0001$).

group, and the disorganized/secure group ($M = 27.13$) displayed fewer atypical behaviors than the disorganized/insecure group ($M = 39.68$), F (1, 40) = 5.60, $p < .03$.

Rated level of disruptedness. Table 4 shows the mean rating of disruptedness for the maternal and infant attachment groups. The ordering of group means was consistent with expectations: the absence of risk factors resulted in the lowest ratings and the presence of both risk factors yielded the highest ratings. A one-way ANCOVA (with the three demographic factors as covariates) indicated that the not-unresolved group ($M = 3.73$) was rated lower than the unresolved group ($M = 4.24$), F (1, 191) = 3.85, $p < .05$, and that the nondisorganized group ($M = 3.60$) was rated lower than the disorganized group ($M = 4.69$), F (1, 191) = 20.71, $p < .0001$.

When we considered the ratings within the unresolved group, no significant differences were found between the unresolved/autonomous ($M = 4.00$) group and the unresolved/

Table 5. *Distribution of disrupted and nondisrupted classification by attachment group*

	Maternal Attachment Representations		
	Not Unresolved ($N = 151$) 76.6%	Unresolved/ Autonomous ($N = 19$) 9.6%	Unresolved/ Nonautonomous ($N = 27$) 13.7%
Disrupted	53 (35.3)	9 (47.4)	15 (55.6)
Nondisrupted	98 (64.7)	10 (52.6)	12 (44.4)
	Infant Attachment[a]		
	Nondisorganized ($N = 152$) 77.2%	Disorganized/ Secure ($N = 23$) 11.7%	Disorganized/ Insecure ($N = 22$) 11.2%
Disrupted	49 (32.5)	11 (47.8)	17 (77.3)
Nondisrupted	103 (67.5)	12 (52.2)	5 (22.7)

Note: The percentages of cases are in parentheses.
[a]The significant difference in classification distribution between infant attachment groups ($p < .0001$).

nonautonomous group ($M = 4.41$). A one-way ANCOVA (with the three demographic factors as covariates) revealed a significant difference within the disorganized group, and the disorganized/secure group ($M = 4.22$) was rated less disrupted than the disorganized/insecure group ($M = 5.18$), F (1, 40) = 6.86, $p < .02$.

Disrupted versus nondisrupted classification. Table 5 shows the number and percentage of disrupted and nondisrupted classifications by attachment groups for both maternal and infant attachment. In each case the ordering was consistent with expectations: the absence of the putative risk condition (i.e., unresolved maternal attachment or disorganized infant attachment) was associated with the lowest rate of maternal disrupted classification, whereas the highest rate of disrupted classification occurred when the risk condition was accompanied by nonautonomous maternal attachment or disorganized/nonsecure infant attachment. Chi-square analyses indicate that maternal (unresolved vs. not-unresolved) and infant attachment (disorganized vs. nondisorganized) groupings were both significantly related to the disrupted classification, χ^2 ($df = 1$, $N = 196$) = 4.19, $p < .05$, and χ^2 ($df = 1$, $N = 196$) = 12.88, $p < .0001$, respectively. Within the unresolved group, there were no significant differences between autonomous and nonautonomous mothers. Within the disorganized group, the mothers in the disrupted classification were significantly different with fewer mothers disrupted in the secure versus insecure group, χ^2 ($df = 1$, $N = 45$) = 4.15, $p < .05$.

Subscales of atypical maternal behavior. The theorizing and data presented initially points to the scales for fearful/disoriented behavior, negative/intrusive behavior, and withdrawing behavior as most likely to contribute to the group differences we observed. Because reliabilities for these scales were not satisfactory, we present the following as preliminary data.

Table 6 shows the mean dimension scores for maternal and infant attachment groups. Review of the data by maternal attachment groups shows that the means are ordered as predicted, with the highest score for fearful and intrusive behaviors in the unresolved–nonautonomous group and the highest scores for withdrawal in the unresolved-autonomous group. A 2 (not unresolved vs. unresolved) x 3 (dimension) multivariate ANCOVA (MANCOVA; with

Table 6. *Means and standard deviations for subscales of atypical maternal behavior*

	Maternal Attachment Representations[a]		
	Not Unresolved (N = 151)	Unresolved/ Autonomous (N = 19)	Unresolved/ Nonautonomous (N = 27)
Fearful/disorientation	3.62 (4.11)	5.79 (6.38)	6.48 (6.12)
Intrusive/negativity	3.17 (3.47)	3.47 (2.55)	4.37 (4.70)
Withdrawal	4.04 (4.35)	8.26 (7.89)	4.48 (3.69)
	Infant Attachment[b]		
	Nondisorganized (N = 152)	Disorganized/ Secure (N = 23)	Disorganized/ Insecure (N = 22)
Fearful/disorientation	3.91 (4.67)	3.70 (3.17)	6.95 (6.07)
Intrusive/negativity	3.11 (3.03)	3.26 (2.20)	5.23 (6.76)
Withdrawal	4.11 (4.81)	5.91 (4.36)	5.82 (5.33)

[a]The overall difference on the subscales of atypical maternal behavior between the unresolved versus not-unresolved groups ($p < .01$); fearful/disoriented ($p < .01$); withdrawal ($p < .02$).
[b]The overall difference on the subscales of atypical maternal behavior between the disorganized versus organized groups ($p < .07$); withdrawal ($p < .05$).

the three demographic factors as covariates) was conducted, and the maternal attachment group was the between subject variable and the three dimensions of atypical maternal behavior were the dependent variables. The analysis revealed a significant effect for maternal attachment, F (3, 189) = 4.63, $p < .01$. Planned t tests revealed significant differences between the not-unresolved and unresolved groups on the fearful/disorientation dimension, M = 3.62, SD = 4.11 versus M = 6.20, SD = 6.17; t (195) = 3.28, $p < .01$, and the withdrawal dimension, M = 4.04, SD = 4.35 versus M = 6.04, SD = 6.03; t (195) = 2.49, $p < .02$. However, the comparisons between autonomous and nonautonomous subgroups within the unresolved group were not significant.

Examination of the scores for infant attachment grouping reveals generally similar patterning with less dramatic differences. A 2 (organized vs. disorganized) × 3 (dimension) MANCOVA revealed that the effect for infant attachment was not significant, F (3, 189) = 2.39, $p < .07$. Planned t tests revealed no significant difference between the organized and disorganized groups for the fearful/disorientation dimension, M = 3.91, SD = 4.67 versus M = 5.29, SD = 5.03; t (195) = 1.71, $p < .09$; or the intrusive/negativity dimension, M = 3.11, SD = 3.03 versus M = 4.22, SD = 5.02; t (195) = 1.84, $p < .07$, but there was a significant effect on the withdrawal dimension, M = 4.11, SD = 4.81 versus M = 5.87, SD = 4.80; t (195) = 2.16, $p < .05$. There were no significant differences between the secure and insecure subgroups within the disorganized group.

In summary, these data indicate that both maternal and infant attachment classifications are related to atypical maternal behavior. Mothers who were unresolved exhibited more atypical behavior than those who were not unresolved. Similarly, mothers of infants who were disorganized with respect to attachment showed more atypical behaviors than those whose infants exhibited organized patterns of attachment. Although the comparisons within the unresolved and the disorganized groups were consistently in the expected direction, only the comparisons between mothers of disorganized/insecure and disorganized/secure groups were significant. The pattern of means for the three subscales most relevant to theo-

ries concerning the origins of disorganization (fearful/disoriented, intrusive, and withdrawing behavior) were consistent with predictions but must be interpreted with caution because of the limited reliability of coding for these scales.

Testing the mediation model. Regression analyses were conducted using procedures recommended by Baron and Kenny (1986) in order to investigate the hypothesis that atypical maternal behavior (using the level of disrupted communication) serves as a mediator between unresolved status and disorganization. According to Baron and Kenny's mediational method, four conditions must be met in order for mediation to occur: (a) the unresolved status (the independent variable) must be significantly associated with atypical maternal behavior (the proposed mediator variable); (b) the unresolved status must be significantly associated with disorganization (the dependent variable); (c) the atypical maternal behavior must be significantly associated with disorganization; and (d) when both unresolved status and atypical maternal behavior are considered in the prediction of disorganization, the previously significant relation between unresolved status and disorganization must no longer be significant and atypical maternal behavior must remain a significant predictor of disorganization.

First, unresolved status was significantly related to atypical maternal behavior, $\beta = .16$, t (195) = 2.24, $p < .03$. Second, unresolved status was significantly related to disorganization, $\beta = .19$, t (195) = 2.76, $p < .01$. Third, atypical maternal behavior was related to disorganization, $\beta = .34$, t (195) = 5.10, $p < .0001$. 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 .19 dropped to .14, t (194) = 2.11, $p < .04$, but the original association remained significant. In sum, the results of the analysis do not satisfy the fourth of Baron and Kenny's (1986) criteria and the findings are not consistent with the hypothesis that atypical maternal behavior serves as a mediator between unresolved status and disorganization. These results are summarized in Figure 1.

Discussion

Before discussing the results per se, it may be useful to reflect on the somewhat unusual nature of the sample in Study 1. In order to increase potential statistical power for comparisons between insecure attachment groups in the longitudinal study, we used a screening tool in prenatal classes to procure a somewhat larger proportion of nonautonomous mothers than most community samples. This, in turn, resulted in a lower proportion of mother–infant attachment matches. We believe that although this is an unusual sample, it is particularly useful for transmission studies, where variation in matching is essential to attempts to explain such variability. Because we were able to track the number of attendees in classes, the number who completed the screen and the number of those who chose to participate when invited (in addition to the usual attrition data), we know that the sample for the present analyses reflects 19% of the women attending prenatal classes over the recruitment period. We also know (Myhal & Goldberg, 1997) that there may be differences between attachment groups in willingness to volunteer for attachment studies. This information serves to remind us that our widely cited figures regarding distribution of attachment patterns are most likely not population estimates but rather descriptive information about the more limited group of those who volunteer to participate in attachment research.

The main findings of the present study are: (a) both maternal and infant attachment patterns are linked to expression of atypical maternal behavior and unresolved mothers and mothers of disorganized infants showed higher levels of atypical behavior than mothers who were not-unresolved and mothers of infants with organized attachment patterns, respectively; (b) mothers of infants who were disorganized and otherwise insecure consistently showed more atypical behavior than those of disorganized–secure infants. However, there were no significant differences be-

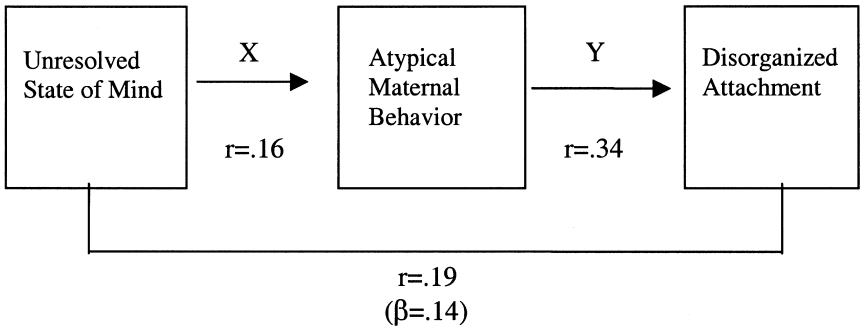

Figure 1. The result of the test of the mediational pathway: X, the correlation between unresolved states of mind and atypical maternal behavior; Y, the correlation between atypical maternal behavior and disorganized attachment relationships; Z, the mean correlation between unresolved states of mind and disorganized attachment relationships and the beta value after mediation.

tween autonomous and nonautonomous mothers within the unresolved group; (c) atypical maternal behavior, as measured by global level of disrupted communication, was not found to mediate the effect of maternal attachment status on infant disorganized attachment.

This study is one of the first efforts to use the AMBIANCE outside the laboratory where it was developed. Whereas prior instruments for assessing atypical maternal behavior focused exclusively on frightening/frightened behavior (e.g., Main & Hesse, 1992; Schuengel et al., 1999), the AMBIANCE includes a broader range of behaviors, reflecting a more elaborate view of the origins of disorganization. In particular, Lyons–Ruth and her colleagues (Lyons–Ruth, Bronfman, & Parsons, 1999) included behaviors indicative of withdrawal, which they found to be particularly characteristic of mothers whose infants were disorganized but otherwise secure. Although the pattern of withdrawal for both maternal and infant attachment groupings was consistent with the Lyons–Ruth, Bronfman, and Parsons (1999) findings, these differences were not significant in our sample. This may reflect poor reliability for subscale scores, large within-group variation, or the small sample sizes of these subgroups.

Nevertheless, the general consistency of our findings with those of Lyons–Ruth, Bronfman, and Parsons (1999) demonstrates that not only can this instrument be reliably used by others, but the findings of the developers are also replicable in low-risk community samples, thereby providing external validation of the instrument. Other work in our laboratory indicates that the AMBIANCE discriminates behavior of mothers in two different clinical groups with infant eating disorders and identifies change in maternal behavior following relationship-oriented treatment (Benoit, Madigan, Lecce, Shea, & Goldberg, 2001). Thus, the present findings contribute to the emergence of the AMBIANCE as a promising tool for both research and clinical practice. In the previous work of Lyons–Ruth, Bronfman, and Parsons (1999) and in the present study, maternal behavior was coded in selected episodes of the SSP. This does raise the possibility that links between infant SSP classifications and AMBIANCE behaviors simply reflect concurrent mutual interactions rather than directional mother–child influences. It is important that future efforts making use of the AMBIANCE should assess its applicability in other situations and in other age groups so that appropriate longitudinal studies can be conducted. As noted above, this will undoubtedly require modifications of the instrument for younger children and perhaps modifications for different situations.

For all of the AMBIANCE measures that we used, our data for both maternal attachment and infant attachment grouping effects on atypical behavior were patterned like those of previous studies (Jacobvitz et al., 1997; Lyons–Ruth, Bronfman, & Parsons, 1999;

Schuengel et al., 1999). Comparisons for the unresolved versus not-unresolved groups and disorganized versus organized groups were consistently significant. However, when we made comparisons within the unresolved and disorganized groups, the comparisons based on infant attachment groups were consistently significant but those based on maternal attachment groupings were not.

Schuengel et al. (1999) reported that frightening/frightened behavior was not significantly elevated in the unresolved/autonomous group. In fact, in that study, mothers who were autonomous on the AAI exhibited *more* frightened/frightening behavior than those who were unresolved/autonomous, which suggested to those authors the possibility of an active inhibition of these behaviors in the unresolved/autonomous group. Our data are more consistent with those of Jacobvitz et al. (1997), who found small differences between autonomous and nonautonomous mothers in the unresolved group, which were not significant. Whether these atypical behaviors themselves serve to disorganize infant behavior or they are markers for more extreme behaviors that occur outside observations (Solomon & George, 1999) remains to be seen.

When we systematically evaluated the possibility that atypical maternal behavior mediates the relation between maternal attachment status and infant disorganized attachment according to the Baron and Kenny (1986) criteria, we found that in spite of strong links between maternal attachment and atypical behavior and between infant attachment and atypical maternal behavior, atypical maternal behavior was shown not to be a mediator. This finding must be considered within the context of small numbers of cases in the unresolved and disorganized subgroups. These classifications and subclassifications occur with low frequency in community samples such as ours and it may be the case that atypical behavior as the mediating link between unresolved maternal attachment and disorganized infant attachment sample is, in fact, best studied in high-risk samples where there are substantially more cases in these groups and subgroups.

Nevertheless, the present data suggest that factors other than maternal attachment per se contribute to the propensity to engage in the atypical maternal behaviors that are linked with disorganized infant attachment. This suggests that investigation of infant factors (such as temperamental characteristics or special needs) and contextual factors (such as maternal physical and mental health, other family relationships, and broader social support) that could contribute to atypical maternal behaviors may constitute valuable domains for further exploration.

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Appendix

Intercorrelations among AMBIANCE variables (N = *197*)

	1	2	3	4	5	6
1. Total score	—	.67**	–.59**	.61**	.65**	.54**
2. Level of disrupted communication		—	–.80**	.47**	.46**	.27**
3. Disrupted vs. nondisrupted			—	–.42**	–.33**	–.20*
4. Fearful/disorientation				—	.30**	.12
5. Intrusive/negativity					—	.22*
6. Withdrawal						—

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