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Maternal Frightened, Frightening, or Atypical Behavior and Disorganized Infant Attachment Patterns

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#### **IV. MATERNAL FRIGHTENED, FRIGHTENING, OR ATYPICAL BEHAVIOR AND DISORGANIZED INFANT ATTACHMENT PATTERNS**

*Karlen Lyons-Ruth, Elisa Bronfman, and Elizabeth Parsons*

A central question in the study of atypical attachment relationships in infancy is whether interactive processes between caregiver and infant are associated with the infant's display of disorganized strategies (Main & Hesse, 1990). Attachment theory locates one central influence on the infant's attachment strategies in the interplay between parent and infant over the 1st year, especially in the degree of sensitive responsiveness to the entire range of the infant's affectively charged communications (Ainsworth, Blehar, Waters & Wall, 1978). Linkages between appropriate parental responsiveness and secure infant attachment strategies have been supported in a number of empirical studies (Ainsworth et al., 1978; Belsky, Rovine, & Taylor, 1984; Grossmann, Grossmann, Spangler, Seuss, & Unzner, 1985; Londerville & Main, 1981; van IJzendoorn, 1995). These earlier studies, however, were undertaken prior to the discovery of the disorganized/disoriented infant attachment pattern. They explored the relation between maternal behavior and the three organized infant attachment strategies only (ambivalent/avoidant/secure). With the increasing recognition that a sizable proportion of infants from families with serious social risk factors display disorganized forms of attachment strategies, the question of whether disorganized behaviors emerge in the context of particular patterns of parent-infant interaction also must be addressed.

The issues of whether and how mother-infant interactive processes are related to disorganization of infant attachment patterns gains additional importance from recent findings that early disorganized or controlling

attachment strategies are related to oppositional or hostile-aggressive behaviors up to age 7 (Lyons-Ruth, Alpern, & Repacholi, 1993; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Shaw, Keenan, Owens, Winslow, Hood, & Garcia, 1995; see Lyons-Ruth, 1996, for review). Additional work has related disorganized or controlling attachment patterns during preschool to concurrent oppositional or externalizing behavior (Greenberg, Speltz, DeKlyen & Endriga, 1993; Moss et al., 1996, 1998; Solomon, George, & DeJong, 1995; Speltz, Greenberg, & DeKlyen, 1990). Others have described the coercive cycles observed between oppositional preschoolers and their mothers by the time of clinic referral (Campbell, 1991; Patterson, 1982). Less well understood is the extent to which parental coercion develops in response to a temperamentally aggressive or difficult-to-discipline child (Patterson, 1982) or whether the coercive process has deeper historical roots in intergenerationally transmitted patterns of relationship (Elder, Caspi, & Downey, 1986). Observing maternal interactive behavior in infancy and toddlerhood, before the establishment of coercive cycles, can shed light on the extent to which atypical early caregiving contributes to the developmental pathway leading to externalizing syndromes.

A number of studies have related an increased incidence of disorganized infant attachment behaviors to serious maternal risk factors such as maltreatment, depression, adolescent parenthood, or alcohol consumption (Carlson, Cicchetti, Barnett, & Braunwald, 1989b; Crittenden, 1985; Hann, Castino, Jarosinski, & Britton, 1991; Lyons-Ruth, Connell, Grunebaum, & Botein, 1990; O'Connor, Sigman, & Brill, 1987; Teti, Gelfand, Messinger, & Isabella, 1995). Other studies have examined the process of mother-child interaction among these dyads. Several studies have examined interaction during infancy (Hann et al., 1991; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991; Spieker & Booth, 1988) and at least three other studies have explored mother-child interaction at later ages, either among children classified as disorganized during infancy (Main, Kaplan, & Cassidy, 1985) or among children classified as disorganized or controlling at later ages (DeMulder & Radke-Yarrow, 1991; Solomon, George, & Ivins, 1987). The few existing studies provide some support for the hypothesis that less optimal patterns of interaction characterize dyads that include a disorganized infant. Because of the mixed findings and the wide range of parental behaviors and child ages assessed, however, no clear picture emerges of the maternal behaviors involved.

A robust empirical link *has* been established between parental responses to the Adult Attachment Interview and infant disorganized attachment patterns. In a meta-analysis, van IJzendoorn (1995) reported an average effect size of .31 between infant disorganization and classification of responses to the Adult Attachment Interview as unresolved with respect to loss or trauma. Unresolved status is indexed by lapses in the monitoring of reasoning or discourse during loss or trauma-related portions of the

interview. Main and Hesse (1990; Hesse, 1996) relate such lapses to the segregation or dissociation of traumatic material in an encapsulated system of consciousness separate from normal processing.

The major theory-based hypothesis that has been advanced regarding mother-child interactive processes among infants with disorganized attachment strategies is Main and Hesse's (1990) formulation regarding frightened or frightening parental behavior. According to Main and Hesse, "the traumatized adult's continuing state of fear together with its interactional/behavioral concomitants (frightened and or frightening behavior) is the mechanism linking unresolved trauma to the infant's display of disorganized/disoriented behaviors" (p. 163). When the current study was designed, Main and Hesse's (1990) hypothesis regarding the central etiological role of frightened or frightening maternal behavior had not been empirically tested. Main and Hesse (1992), however, had developed a coding protocol for assessing frightened or frightening behavior.

We would argue that two related hypotheses regarding parental correlates of disorganized infant attachment patterns also are implicit in the attachment literature. The first hypothesis, which we termed the "failure of repair" hypothesis, is that parental interactive behaviors that exceed the tolerance limits for supporting an organized infant attachment strategy should lead to infant disorganization. That is, parental behavior must be responsive enough that an organized infant strategy "works." For example, an ambivalent infant strategy, to be stable, must work well enough to elicit care ultimately from a reluctant or preoccupied caregiver. Should the rejecting or unresponsive parental responses associated with infant avoidant or ambivalent attachment strategies become even more unresponsive to infant affective communications, the avoidant or ambivalent strategy should break down. The mother's repeated failure to alter her caregiving behavior toward the infant in the face of clear and repeated infant cues should lead to disorganization of infant strategies whether the unresponsive maternal behavior is withdrawing, role-reversing, controlling, or rejecting in form. The derailment of communication between parent and infant in attachment-eliciting contexts should be fear-arousing in itself because the infant will have little sense of influence over the caregiver at times of heightened fear or stress. Lyons-Ruth and colleagues have related such parental failures of response theoretically to the parent's self-protective mechanisms associated with unresolved loss and trauma and Main and Hesse's (1990) "continuing state of fear" (Lyons-Ruth & Block, 1996; Lyons-Ruth, Bronfman, & Atwood, in press).

The second hypothesis, the "competing strategies" hypothesis, posits that a parent who is experiencing a continuing state of fear around attachment needs is likely to experience and display competing parental attachment tendencies toward the infant, much as the disorganized infant displays competing or contradictory attachment behaviors toward the parent.

Caregiving behaviors likely to both reject and heighten infant attachment affects would be examples of behaviors that combine competing dismissing and involving strategies, such as ignoring the infant's distress while asking the infant for a kiss. These three hypotheses (fear-related behavior, failure of repair, and competing strategies) are not mutually exclusive and may be describing interrelated aspects of the parent-child interaction experienced by disorganized infants.

The research base on disorganized infant attachment behaviors indicates that behaviorally differentiated infant subgroups can be identified within the larger disorganized attachment category. Therefore, the different caregiving hypotheses also may be describing aspects of disrupted caregiving that are differentially salient for one or another disorganized infant subgroup. Lyons-Ruth, Repacholi, McLeod, and Silva (1991) reviewed studies that used the disorganized classification system and also reported the data on alternate forced classifications for all disorganized infants. This review revealed that a majority of infants from low-risk samples who were classified in the D category displayed disorganized forms of secure strategies without marked avoidance or resistance (D/Forced Secure or DS; Lyons-Ruth et al., 1991). In contrast, a majority of infants from families with more serious psychosocial risk factors displayed disorganized forms of avoidant or ambivalent strategies (D/Forced Insecure or DI). Analyses *within* a low SES cohort also have confirmed the association between increased incidence of maternal depression, psychiatric hospitalization, or infant maltreatment and increased incidence of DI, but not DS, strategies (Lyons-Ruth et al., 1991).

Disorganized forms of secure approach (DS) strategies and disorganized forms of avoidant or ambivalent behavior (DI) have different correlates in maternal childhood history. DS infant attachment strategies have been associated with maternal histories of loss of a parent in childhood, particularly unresolved losses as coded on the Adult Attachment Interview (AAI; Ainsworth & Eichberg, 1991; Lyons-Ruth et al., 1991; Main et al., 1985). In contrast, DI infant attachment strategies have been associated with a maternal history of foster care, family violence, or abuse (Lyons-Ruth et al., 1991; Lyons-Ruth & Block, 1996). Therefore, the maternal behaviors associated with these disorganized infant subtypes may also differ.

In designing the current study, we noted that the anecdotal observations of frightened or frightening maternal behavior cited by Main and Hesse (1990) are often examples drawn from maternal behavior in the Strange Situation. The Strange Situation has several advantages over other possible assessment settings for evaluating attachment-relevant maternal behavior. Following George and Solomon (1996), we conceptualize the maternal caregiving system as the parental complement to the infant attachment system, that is, the set of parental responses activated to respond to the infant's tendency to seek proximity, contact or comfort when stressed. The Strange Situation

is currently the best validated assessment technique specifically designed to activate the infant attachment behavioral system. Attachment behaviors also can be observed at home but are attenuated by the familiarity of the setting (Ainsworth, Blehar, Waters, & Wall, 1978). In addition, at home, attachment-eliciting situations that are responded to by caregiver and infant with distancing and avoidance are more difficult to detect. Infant distancing and avoidance, as well as other attachment-related behaviors, are codable in the Strange Situation because of the known normative eliciting properties of that setting. Thus, we reasoned that maternal attachment-related caregiving responses might best be observed under conditions when the infant's attachment system was known to be aroused. Therefore, we elected to code maternal caregiving behavior in the Strange Situation as a first test of whether particular maternal caregiving responses were associated with the appearance of disorganized forms of infant attachment strategies.

Strange Situation videotapes from an ongoing longitudinal study of infants at social risk were coded for maternal behavior. Infant attachment behavior from these assessments had been coded in an earlier phase of the study (Lyons-Ruth, Connell, Grunebaum, & Botein, 1990). These infant attachment classifications were related both to concurrent family risk factors and to later childhood outcomes, and similar relations between attachment classifications, family risk factors, and childhood outcomes have been found in other studies of both low- and middle-income families, as noted above. Therefore, the infant attachment data from this sample were well supported empirically as a validating criterion for the maternal behavior data.

Because the infants' attachment behaviors also are evident in the Strange Situation, a maternal coding instrument was developed that was closely tied to clearly described maternal behaviors, and coders were used who were not developmental psychologists and were not familiar with the coding procedures for infant attachment behaviors. The cross-situational stability of aspects of maternal interaction observed in the Strange Situation also was assessed in relation to maternal behaviors at home. Maternal behaviors at home had been coded in the infant phase of the study before disorganized attachment behaviors had been described in the literature (Lyons-Ruth, Connell, Zoll, & Stahl, 1987; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991). Therefore, the home coding protocol had emphasized aspects of maternal behavior associated with secure attachment, such as sensitivity, warmth, verbal communication, and tender touching, and did not attempt to include a full array of atypical maternal behaviors now thought to be associated specifically with disorganization.

The current study addressed three questions. First, do mothers of infants who display disorganized attachment strategies behave differently toward their infants than mothers of infants who display organized strategies? Second, do mothers of D infants behave similarly to one another or do DS

and DI infant subgroups have different correlates at the level of maternal behavior? Finally, can we demonstrate cross-situational stability for maternal behaviors observed in the Strange Situation?

## METHODS

### *Participants*

Participants in the study were 65 low-income mothers and infants (39 boys, 29 firstborns) participating in an ongoing longitudinal study for whom videotaped Strange Situation attachment assessments were available at 18 months of age. Approximately half the sample had been referred to a home-based intervention service because of concerns about the quality of the caregiving environment. The other half of the sample were low income women matched to the referred group on infant age, gender, and birth order, per person family income, and maternal education, age, and ethnicity. Therefore the sample was designed to overrepresent mother-infant dyads considered at risk by area social and health service providers. Sixty-six percent were supported by government assistance and 45% were single parents. Forty-seven percent had their first child before age 20. Sixty-two percent were high school graduates. Nineteen percent of mothers were Black or Hispanic. Nine infants in the sample (14%) were being followed by state social service workers for neglect of the target child or an older sibling. Additional descriptive information is available in Lyons-Ruth, Connell, Grunebaum, and Botein (1990).

Originally 71 families had been videotaped in the Strange Situation (Lyons-Ruth, Connell, Grunebaum, & Botein, 1990) but tapes for six subjects had technical problems that precluded recoding for maternal behavior. One additional tape with areas of sound failure in the first two episodes was not included in the initial analyses relating maternal behavior to infant attachment due to the compromised quality of the maternal data. This tape was judged adequately codeable to contribute to later multivariate analyses once validity of the maternal codes had been analyzed. Of the 64 uncompromised tapes, 11 tapes were used for scale development and 53 were used for validation analyses of infant-mother correspondence. In analyses subsequent to the validation analyses, codes from all 65 tapes were included.

## PROCEDURES

*Infant Attachment Security.* At 18 months of age, mothers and infants were videotaped in the Ainsworth Strange Situation (Ainsworth et al.,

1978). In this procedure the infant is observed in a playroom during a series of eight 3-min episodes in which the mother leaves and rejoins the infant twice. Videotapes were coded for infant attachment behaviors and for the three attachment classifications as described by Ainsworth and her colleagues (1978) and for disorganized/disoriented behaviors as described by Main and Solomon (1990). Pearson correlations between two coders on 12 tapes for the infant attachment behaviors described by Ainsworth et al. (1978), including avoidance, resistance to mother, resistance to stranger, proximity-seeking, contact-maintaining, and crying, ranged from .97 to .72, with a mean of .86. The three original attachment classifications (secure, avoidant, ambivalent) were assigned by both a computerized multivariate classification procedure developed on the original Ainsworth data (Connell, 1976; see Lyons-Ruth, Connell, Zoll & Stahl, 1987, for additional details; see also reference in Richters, Waters, & Vaughn, 1988) and a coder trained by M. Main. Agreement between the two sets of classifications was 86%. Seventy-five percent of the disagreed-upon tapes were later found to meet criteria for the disorganized/disoriented classification. Agreement on the disorganized classification between M. Main and a second coder for 32 randomly selected tapes was 83%,  $\kappa = .73$ . Coder reliability for the 9-point Level of Disorganized Behavior Scale was  $r = .84$ .

Infants who were classified as insecure but *not* disorganized were all in the avoidant classification. Of four infants classified as ambivalent at 18 months, all also met criteria for the disorganized/disoriented category and were classified as disorganized. The distribution of attachment classifications was as follows: Secure  $n = 22$ , Avoidant  $n = 13$ , Disorganized  $n = 30$  (D Forced Secure = 10, D Forced Insecure = 20).

*Atypical Maternal Behavior in the Strange Situation.* An initial coding system for maternal behavior observed in all episodes of the Strange Situation was first developed on 11 randomly selected Strange Situation videotapes (four Secure, one Avoidant, five D [Forced Avoidant], one D [Forced Ambivalent]). The tapes were viewed blind to infant attachment classification and assigned blind-coded maternal classifications by the third author (EP), a clinical psychology student who worked with adult trauma patients and who was untrained in infant attachment classification. These initial blind classifications were retained so that subsequent to the validation analyses blind-coded data would be available for these pilot tapes as well. Infant attachment classifications were then reviewed and the coding indices were refined nonblind to capture variation in maternal behaviors related to infant disorganization.

These atypical behavior codes were then reorganized by the second author (EB) for ease of coding and expanded to include all items from Main & Hesse's (1992) coding instrument, entitled Frightening, Frightened,

Dissociated, or Disorganized Behavior on the Part of the Parent, which describes proposed behavioral indices of frightened or frightening behavior. Items from Sroufe, Jacobvitz, Mangelsdorf, DeAngelo, and Ward's (1985) Boundary Dissolution Scales and Spousal Behavior Scales relevant to infants and toddlers also were added to expand the role confusion codes because indices of role confusion were important aspects of the pilot tapes.

The resulting coding protocol yielded the following measures: (a) frequency of total atypical behaviors, with six subtotals for affective communication errors, role confusion, negative-intrusive behavior, disorientation, withdrawal, and controlling behavior; (b) one qualitative 3-point scale for failure of repair, or the extent of maternal inability to modify her behavior based on repeated infant signals; (c) one qualitative 7-point scale for level of disrupted communication; and (d) a bivariate classification for disrupted or not disrupted affective communication (defined as scores of 5–7 on the Level of Disrupted Communication Scales; Bronfman, 1993). The qualitative scale and classification were included to allow coders to weigh the seriousness of the atypical behaviors observed. Possibly only a few instances of atypical behavior would be displayed but those instances might be disturbing enough to yield a high coder rating on qualitative rating scales. The coding protocol for total atypical behaviors provided a list of codable behavioral examples for each of the six subtypes of atypical behavior, although coders could add additional behaviors that fit the general descriptors for each subtype. Table 9 displays behavioral examples for the five subtypes of atypical behavior that were reliably coded (see below). Full coding procedures are available in Bronfman, Parsons and Lyons-Ruth (1993).

Two new raters were then trained on the 11 pilot tapes using the coding manual. In the training phase, coders first coded each tape blind to both mother and infant attachment classification, then discussed the coding. The primary coder's (EB) frequencies and ratings, as coded blind prior to discussion, were retained. Because the third author (EP) had refined the coding scales based on review of the infant attachment data, however, only her initial blind classifications are completely blind for the 11 pilot tapes.

After training on the 11 pilot tapes, 15 additional tapes, randomly selected from all remaining tapes, were coded by both coders to assess reliability. Intraclass correlation coefficients for the measures were as follows: Total Atypical Behavior Score  $r_i = .67$ , Affective Communication Errors Subscore  $r_i = .75$ , Role Confusion Subscore  $r_i = .76$ , Negative-Intrusive Behavior Subscore  $r_i = .84$ , Disorientation Subscore  $r_i = .73$ , Withdrawal Subscore  $r_i = .73$ , Controlling Behavior Subscore  $r_i = .31$ , Failure of Repair Scale  $\kappa = .74$ , Level of Disrupted Communication Scale  $\kappa = .93$ , Disrupted Communication Classification Agreement = 87%,  $\kappa = .73$ . Since the Controlling Behavior subscore did not reach reliability, those scores were deleted

TABLE 9  
 DIMENSIONS OF DISRUPTED MATERNAL AFFECTIVE COMMUNICATION

- 
1. Affective Errors
    - a. Contradictory cues, e.g., invites approach verbally then distances.
    - b. Nonresponse or inappropriate response, e.g., does not offer comfort to distressed infant.
  2. Disorientation (items from Main & Hesse, 1992)
    - a. Confused or frightened by infant, e.g., exhibits frightened expression.
    - b. Disorganized or disoriented, e.g., sudden loss of affect unrelated to environment.
  3. Negative-Intrusive Behavior (including frightening items, Main & Hesse, 1992).
    - a. Verbal negative-intrusive behavior, e.g., mocks or teases infant.
    - b. Physical negative-intrusive behavior, e.g., pulls infant by the wrist.
  4. Role Confusion (includes items from Sroufe et al., 1985; Main & Hesse, 1992).
    - a. Role-reversal, e.g., elicits reassurance from infant.
    - b. Sexualization, e.g., speaks in hushed intimate tones to infant.
  5. Withdrawal
    - a. Creates physical distance, e.g., holds infant away from body with stiff arms.
    - b. Creates verbal distance, e.g., does not greet infant after separation.
- 

from the Total Atypical Behavior score and were not used further. Reliability of the Total Atypical Behavior Score with Control items deleted,  $r_1 = .75$ .

The three-level Failure of Repair Scale was originally included to focus the coders' attention on the conceptual importance of this construct in assessing parental behavior. In Parsons' (1991) original work, she had counted the numbers of repeated infant signals and maternal nonresponses in extended sequences in which the infant's communication was never heeded. This proved too cumbersome a procedure for large-scale coding and the attempt to reduce the measure to a three-level scale was not felt to be particularly satisfactory. Because this three-level measure was relatively poorly delineated and proved to be highly correlated with the more fine-grained Level of Disrupted Communication Scale,  $r = .73$ , it was not analyzed separately here.

Due to the complexity of the coding protocol, separate counts of the behaviors on the Main and Hesse (1992) coding instrument for frightened or frightening behavior (FR) were not initially maintained. Given the interest in those behaviors, however, coding protocols were reviewed again after the initial study was completed and separate counts were generated for the frightened, frightening, dissociated, and role reversed behaviors included in

the Main and Hesse (1992) instrument. When considered separately, these codes also achieved adequate reliability as assessed by intraclass correlation: FR (total frightened or frightening behaviors)  $r_i = .80$ ; FR<sup>+</sup> (total frightened, frightening, role reversed, and dissociated behaviors)  $r_i = .79$ ; frightened behavior  $r_i = .76$ ; frightening behavior  $r_i = .65$ ; dissociated behavior  $r_i = .65$ ; role reversed behavior  $r_i = .58$ . Analyses of Main and Hesse's (1992) frightened or frightening behaviors subset are presented after the analyses of the original set of variables.

*Maternal Behavior at Home.* Two weeks prior to the Strange Situation assessment, naturalistic mother-infant interaction was videotaped at home for 40 min. Maternal behavior was coded in 10 4-min intervals on 12 5-point rating scales and one timed variable. This coding was carried out during the initial phase of the longitudinal study before infant disorganized attachment patterns had been described and the coding scheme focused on the maternal behaviors that had correlated with secure or insecure infant attachment in previous literature. Behaviors coded included sensitivity, warmth, verbal communication, quality and quantity of comforting touching (physical contact in the service of communicating affection, "touching base," or reducing distress), quality and quantity of caretaking touching, interfering manipulation, covert hostility, anger, disengagement, flatness of affect, and time out of room, rounded to the nearest half minute. (For additional description, see Lyons-Ruth, Connell, Zoll, & Stahl, 1987.) Coders were blind to all other data on the families. Interobserver reliabilities, computed on a randomly selected 20% of the 40-min videotapes, yielded intraclass correlations ranging from .76 to .99. Principal components analyses of the scales yielded two main factors. Factor 1, labeled maternal involvement, accounted for 38% of the variance and included negative loadings ( $> .50$ ) for maternal disengagement and flatness of affect and positive loadings ( $> .50$ ) for maternal sensitivity, warmth, verbal communication, and quantity of comforting touch. Factor 2, labeled hostile intrusiveness, accounted for 26% of the variance and included negative loadings ( $> .50$ ) for quality of comforting touch and quality of caretaking touch and positive loadings ( $> .50$ ) for covert hostility, interfering manipulation, and anger (Lyons-Ruth, Zoll, Connell & Grunebaum, 1989). These two factor scores were used for data analysis. Home data were missing for one subject.

*Infant Negative Affect at Home.* Two measures of infant affect during naturalistic observation at home also were coded from the home videotapes by different coders than those who coded maternal behaviors: (a) the number of 20-s intervals in which the infant displayed distress; and (b) the total times anger toward mother, anger toward sibling, displaced anger, and resistance to contact were exhibited (Lyons-Ruth & Block, 1996). Twenty

minutes of the 40-min home videotape were coded for infant affect, selecting every other 4-min period for coding. Intraclass correlations between two coders on 20 tapes were as follows: distress  $r_i = .74$ , anger toward mother  $r_i = .77$ , anger toward sibling  $r_i = .92$ , displaced anger  $r_i = .92$ , and resistance to mother,  $r_i = .79$ . Infant affect data were missing for two subjects.

*Demographic Risk.* Nine demographic variables were coded from maternal interviews: mother's minority status (Black or Hispanic), whether mother was a high school graduate, per person weekly income (including government assistance [AFDC] and food stamps), mother's age at birth of the target child, child's birth order, mother's age at the birth of her first child, whether mother was a single parent, whether the family was supported by government assistance, and the number of siblings under age 6.

A cumulative demographic risk score was also computed from maternal interview data by summing the presence of the following factors: mother minority status, no high school diploma, AFDC recipient, no male partner, mother under 20 at birth of first child, more than two children under age 6.

*Severe Psychosocial Risk.* Severe maternal psychosocial risk was coded as positive if the mother had a documented history of child maltreatment and/or a history of inpatient psychiatric care. Sixteen mothers were coded as positive.

## RESULTS

### *Analytic Strategy*

Of the six possible contrasts among infant attachment subgroups, the two questions of primary theoretical interest were, first, whether maternal behavior among disorganized infants differed from maternal behavior among organized infants and, second, whether maternal behavior among DS infants displaying predominantly approach behavior (forced secure subclassification) differed from maternal behavior among DI infants displaying prominent avoidant or resistant behavior (forced insecure subclassification). Given modest cell sizes, planned contrasts were used to test these two primary questions, using  $T$  statistics with unequal variance assumptions, with effect sizes evaluated by the eta statistic. Less central comparisons among subgroups were evaluated by post hoc tests protected for multiple comparisons among means (Duncan's Multiple Range Tests). The five subtypes of maternal behavior were analyzed only if differences in the overall frequency of atypical maternal behavior were significant. Cell sizes were too small in the disorganized subgroups to evaluate gender by subgroup interactions, so the

interaction between gender and overall attachment disorganization was examined in a separate analysis.

*Intercorrelations of Atypical Maternal Behaviors*

Table 10 displays the intercorrelations among the five subscores for maternal atypical behavior. The low to moderate intercorrelations indicate that the subscores are not redundant with one another but tap relatively discrete dimensions of maternal behavior. All subscores correlated positively with the total atypical behavior score, however,  $r_s = .33$  to  $.74$ .

*Do Mothers of Disorganized Infants Behave Differently Than Mothers of Organized Infants?*

*Atypical Maternal Behavior by Level of Infant Disorganization.* The frequency of atypical maternal behavior was significantly correlated with the 9-point scale for level of disorganized attachment behavior displayed by the infant,  $r = .39, p < .01$ . The rated level of disrupted affective communication also was significantly associated with the level of infant disorganization,  $r = .42, p < .001$ , as was the maternal classification as disrupted,  $\eta = .31, p < .05$ . Given the significant associations between infant disorganization and these summary measures, the five subtypes of atypical maternal behavior also were analyzed. Three of the five subtypes were significantly related to level of infant disorganization, including affective communication errors,  $r = .32, p < .01$ , disorientation,  $r = .31, p < .01$ , and negative-intrusive behavior,  $r = .31, p < .01$ .

*Atypical Maternal Behavior by Infant Disorganized Attachment Classification.* Table 11 displays the mean frequencies and ratings for maternal behavior scores by infant attachment classification, along with effect sizes and significance levels. The first set of analyses assessed whether mothers whose infants displayed disorganized attachment strategies behaved differently

TABLE 10  
CORRELATIONS AMONG THE SUBSCORES FOR MATERNAL ATYPICAL BEHAVIORS

Subscore	Disorientation	Negative-intrusive behavior	Role confusion	Withdrawal
Affective errors	.33	.39	.14	.44
Disorientation		.33	.21	.14
Negative-intrusive behavior			.53	-.14
Role confusion				-.26

Note.  $N = 53$ .

ATYPICAL ATTACHMENT IN INFANCY AND EARLY CHILDHOOD

TABLE 11  
 INFANT ATTACHMENT STATUS AND MATERNAL ATYPICAL BEHAVIOR SCORES

Maternal Atypical Behavior Scores	Infant Attachment Classification				Strength of Association	
	Secure	Avoidant	Forced secure	Forced insecure	Org vs. Dis	DS vs. DI
	<i>n</i>	18	11	10	14	
Total atypical behaviors	16.00	12.91	16.30	28.71	.34*	.44*
Affective errors	4.94	2.27	5.40	7.14	.28*	.22
Disorientation	1.83	2.73	2.60	5.14	.25	.32
Negative-intrusive behavior	1.89	1.45	1.30	4.93	.27	.49**
Role confusion	3.39	4.91	2.40	9.00	.18	.42*
Withdrawal	3.94	1.55	4.60	2.50	.06	-.44*
Level of disrupted communication	3.28	3.36	3.40	4.93	.31*	.54**
Maternal disrupted classification						
Not disrupted	67%(12)	64%(7)	70%(7)	21%(3)	.24	.49*
Disrupted	33%(6)	36%(4)	30%(3)	79%(11)		

Note. Strength of association is assessed by  $\eta$  statistic, with significance level assessed by *t*-test, except for maternal classification where strength of association is assessed by  $\Phi$ , with significance assessed by  $\chi^2$  or Fisher's Exact Test.

\**p* < .05. \*\**p* < .01.

toward their infants than did mothers of infants displaying organized strategies. Consistent with predictions, mothers of disorganized infants displayed more atypical maternal behaviors in interaction with their infants,  $T(44) = 2.43, p < .02$ . Given the significantly elevated total scores, the five scores for subtypes of atypical maternal behavior were then analyzed to see which behaviors contributed to the discrimination between organized and disorganized attachment groups. Only the subscores for affective communication errors separately differentiated mothers of organized and disorganized infants,  $T(49) = 2.03, p < .05$ , as shown in Table 11.

The rated level of disrupted communication displayed by mothers in the Strange Situation also was significantly associated with infant disorganized classification,  $T(40) = 2.15, p < .04$ . The association between maternal classification (Disrupted/Not Disrupted) and infant classification (D/not D) did not quite reach significance,  $\chi^2(1, N = 53) = 3.01, p < .08$ . Proportions in each group are shown in Table 11.

*Do Mothers of DS Infants Behave Differently Than Mothers of DI Infants?*

The second set of analyses assessed whether mothers of infants who displayed disorganized forms of secure behavior (DS) behaved differently than mothers of infants who displayed disorganized forms of insecure (avoidant or ambivalent) behavior (DI). These analyses revealed substantial differences in maternal behavior *within* the disorganized infant group, with mothers of DI infants displaying significantly more atypical behaviors than mothers of DS infants,  $T(22) = 2.49, p < .02$ . Mothers of DI infants were also rated higher on level of disrupted communication  $T(15) = 2.80, p < .01$ , and were more likely to be classified disrupted, Fisher's Exact Test ( $N = 24$ ),  $p = .04$ , as shown in Table 11.

When the atypical behavior subscores were analyzed, the two D subgroups did not differ significantly in frequency of affective communication errors or in frequency of disoriented behaviors. As was shown in Table 10, scores for role confusion and negative-intrusive behavior were strongly correlated, and mothers of DI infants displayed significantly higher rates of both types of behavior than did mothers of DS infants, negative-intrusive,  $T(21) = 2.92, p < .01$ , role confusion  $T(16) = 2.52, p < .02$ . In contrast, mothers of DS infants exhibited significantly higher rates of withdrawal,  $T(13) = 2.10, p < .05$ .

Given the significant differences obtained in maternal behavior *within* the overall D group, post hoc tests were conducted to compare atypical maternal behaviors of DS and DI subgroups separately to the two organized groups, Duncan's Multiple Range Tests, all  $p < .05$ . Behaviors of mothers of disorganized-insecure infants differed from the behaviors of mothers in both organized groups, with mothers of DI infants displaying more frequent total atypical behaviors, receiving higher ratings on level of disrupted communication, and being classified more often as disrupted with  $\Phi$  or  $\eta$  values indexing strength of association ranging from .43 to .55. In addition, mothers of DI infants displayed more disorientation and more role confusion than mothers of secure infants, and mothers of DI infants displayed more affective communication errors than mothers of avoidant infants. In contrast, mothers of infants displaying disorganized forms of secure strategies (DS) displayed more affective communication errors and more withdrawing behaviors than mothers of avoidant infants, but not more than mothers of secure infants. Differences between mothers of avoidant and DI infants were not due to the presence of three DI infants with ambivalent rather than avoidant subclassifications. With mothers of those three infants excluded, all significant differences between mothers of avoidant and disorganized-avoidant infants remained the same, effect sizes .43 to .58.

Given the substantial differences obtained in the interactive behaviors of mothers of DS and DI infants, it also was of interest to refine the analysis of these dyadic patterns by examining more directly the specific infant

behaviors exhibited in the Strange Situation in relation to the five dimensions of maternal behavior. Table 12 displays the associations between the five dimensions of maternal behavior and the five central infant behaviors coded as part of the standard scoring for the Strange Situation. Only one subgroup of disorganized infants was included with both groups of organized infants in each analysis. Only one disorganized subgroup was included in each analysis, because it was important to assess whether particular maternal behaviors were correlated with similar infant behaviors across both DS and DI subgroups or whether infant subgroup differences were based partly on different infant responses to similar maternal behaviors. All organized infants were included in both sets of analyses to maintain adequate score variability on maternal and infant measures.

Table 12 reveals several findings of interest. As previously noted, there were two maternal scores on which the two D subgroups did not differ: maternal affective communication errors and disorientation. Each of these maternal behaviors had similar correlates in infant behaviors regardless of the disorganized subgroup included in the analysis, except in the case of infant resistance. In both sets of analyses maternal affective communication

TABLE 12  
CORRELATIONS BETWEEN TYPES OF MATERNAL ATYPICAL BEHAVIORS  
AND TYPES OF INFANT ATTACHMENT BEHAVIORS

Infant Attachment Behaviors	Atypical Maternal Behaviors				
	Affective communication errors	Disorientation	Negative-intrusive behavior <sup>c</sup>	Role confusion <sup>c</sup>	Withdrawal <sup>c</sup>
Infants with organized and disorganized-secure classifications only <sup>a</sup>					
Disorganization	.27*	.24	.10	-.05	.28*
Avoidance	-.25	.26*	.13	.16	-.25
Resistance	.08	.09	.26*	-.02	-.03
Proximity-seeking	.40**	-.07	.17	-.06	.15
Crying	.46**	-.18	.13	-.17	.23
Infants with organized and disorganized-insecure classifications only <sup>b</sup>					
Disorganization	.35**	.34**	.43**	.26*	.05
Avoidance	-.14	.29*	.28*	.31*	-.21
Resistance	.28*	.30*	.14	.09	.00
Proximity-seeking	.31*	-.15	-.09	-.18	.21
Crying	.45**	-.24	-.04	-.07	.25*

<sup>a</sup> N = 39; 14 infants classified disorganized-insecure omitted from analyses.

<sup>b</sup> N = 43; 10 infants classified disorganized-secure omitted from analyses.

<sup>c</sup> For the DS subgroup negative-intrusive behavior and role confusion were not elevated and for the DI subgroup withdrawal was not elevated (see Table 11), which is likely to have mitigated the relations between those maternal variables and infant behavior in the relevant columns above.

\*p < .05. \*\*p < .01.

errors were correlated with increased infant disorganization, increased proximity-seeking, and increased crying. Infant resistance appeared to be a more individually variable response to maternal affective communication errors, and infants who displayed resistance in combination with crying, proximity-seeking, and disorganization were forced-classified in the DI subgroup, as would be appropriate, and infants who did not display resistance were forced-classified in the DS group. In contrast to affective errors, maternal disorientation was significantly associated with increased avoidance in both subgroups. Maternal disorientation also was positively associated with infant disorganization in both subgroups, but the correlation only reached significance for the DI subgroup. Again, infant resistance appeared to be a more individually variable response to maternal disorientation and infants who displayed resistance in combination with avoidance were forced-classified in the DI subgroup.

The patterning of infant behavior to the other three maternal behaviors, withdrawal, negative-intrusive behavior, and role confusion was different for the DS and DI subgroups, but these differences most likely reflected the significant differences in those maternal behaviors exhibited by mothers in the two subgroups. Mothers in the DI subgroup did not show elevated rates of withdrawal, resulting in less variability for the DI analyses, and mothers in the DS subgroup did not show elevated rates of role confusion and negative-intrusive behavior (see Table 11), reducing variability in maternal behavior for the corresponding DS analyses.

For the DI analyses, where elevated levels of maternal negative-intrusive behavior and role confusion occurred, these maternal behaviors were correlated with increased scores for infant disorganization and infant avoidance but not with increased infant resistance. Infant resistance (without disorganization) only emerged as a correlate of maternal negative-intrusive behavior in the DS analyses, where lower levels of negative-intrusive behavior were present. In the DS analyses, where elevated levels of maternal withdrawal occurred, heightened maternal withdrawal was associated only with increases in infant disorganized behaviors, unaccompanied by avoidance, resistance, or proximity seeking. At the milder levels observed in the DI analyses, maternal withdrawal was associated only with increased infant crying.

In summary, these analyses reveal four dyadic correlational patterns contributing to the DI and DS subgroups. In the first pattern, infants displaying disorganized forms of avoidance are more likely to have mothers who exhibit negative-intrusive and role-confused behavior. In the second pattern, infants who display disorganized forms of proximity seeking, forms that may include resistant behavior, are more likely to have mothers who display elevated rates of affective communication errors. In the third pattern, infants who display disorganized forms of mixed avoidance and

resistance are more likely to have mothers who exhibit disoriented behavior at high levels. The milder levels of disorientation occurring among mothers in analyses including the DS group (see Table 11) appear to be reliably associated only with infant avoidance. Finally, infants who show disorganized behaviors alone, without associated avoidance, resistance, or proximity-seeking (e.g. dazed wandering, putting head down on the floor) are more likely to have withdrawing mothers.

These significant relations between maternal and infant behaviors do not appear to represent necessary dependencies of one partner's behavior on the other's. One could envision, for example, maternal withdrawal leading to infant avoidance or maternal role confusion leading to increased crying and infant resistance. Instead, these relations begin to sketch out profiles of mother-infant relational organization within the disorganized spectrum.

Subsequent to the validation analyses for the coding system presented above, maternal behavior scores for the 11 pilot subjects and the one subject with partial sound failure on the tape (infant classified avoidant) were added to the database to contribute to analyses with other variables. For the full cohort, relations between maternal and infant attachment data were very similar to those shown in Table 11. The association between maternal D classification and infant D classification, however, reached significance for the full sample with the blind-coded pilot classifications added,  $\chi^2(1, N = 65) = 6.62, p < .01, \Phi = .32$ .

Given the significant results of the overall analyses, a final review of the coding protocols was conducted to see whether a smaller set of maternal behaviors could be identified that were particularly highly associated with disorganized infant behavior. Code sheets were reviewed with knowledge of infant classification to identify maternal behaviors that occurred at least three times more often among mothers of disorganized infants and that were displayed by at least three mothers. Table 13 lists those behaviors and Table 14 displays their associations with infant attachment classifications. This was a nonblind, optimizing analysis so the results need to be validated in other samples. Results suggest, however, that simpler and more powerful coding protocols for identifying high-risk interactive behaviors could emerge from continued refinements of the coding system. Based on the results in this sample, selecting mothers who displayed none of these serious interactive errors and mothers who displayed four or more would result in relatively pure subgroups of disorganized and nondisorganized infants, with a 9% false negative rate and a 16% false positive rate, as shown in Table 14. It also is notable that the DS subgroup is better discriminated by this set of maternal behaviors.

TABLE 13

SERIOUS INTERACTIVE ERRORS: MATERNAL ATYPICAL BEHAVIORS THAT WERE PARTICULARLY FREQUENT AMONG MOTHERS OF INFANTS DISPLAYING DISORGANIZED ATTACHMENT STRATEGIES

Does not attempt to soothe the infant when distressed (Aff. Err.)
Laughs while infant crying or distressed (Aff. Err.)
Directs inauthentic "over bright" affect towards infant (Aff. Err.)
Fails to set appropriate limits (Aff. Err.)
Invites approach and then distances (Aff. Err.)
Uses friendly tone while maintaining threatening posture (Aff. Err.)
Directs infant to do something and then not to do it (Aff. Err.)
Does not offer comfort when infant falls (Aff. Err.)
Exhibits frightened expression (Disorient.)
Exhibits sudden change of mood unrelated to the environment, including loss of affect (Disorient.)
Handles infant as though inanimate (Disorient.)
Exhibits "haunted" or frightened voice (Disorient.)
Hushes crying infant (Intrus.)
Uses loud or sharp voice (Intrus.)
Speaks in hushed intimate tones to the infant (Role Conf.)
Pulls infant by the wrist (Intrus.)
Mocks/teases infant (Intrus.)
Removes toy despite infant engagement (Intrus.)
Withholds toy from infant (Intrus.)
Holds infant away from body with stiff arms (Withdrawal)

*Note.* Subscore to which item contributed indicated in parentheses. Aff. Err. = Affective Communication Errors, Disorient. = Disorientation, Role Conf. = Role Confusion, Intrus. = Negative-Intrusive Behavior. All listed behaviors were three times more prevalent among mothers of disorganized infants and were displayed by at least three mothers.

TABLE 14

NUMBER OF MOTHERS DISPLAYING SERIOUS INTERACTIVE ERRORS BY INFANT ATTACHMENT CLASSIFICATION

Number of Serious Maternal Interactive Errors	Infant Attachment Classification			
	Organized		Disorganized	
<i>n</i>	Secure 22	Avoidant 13	DS 10	DI 20
0	12	8	2	0
1-3	7	4	3	4
4+	3	1	5	16

*Frightened or Frightening Behavior—Separate Analyses*

Our coding protocol was not initially set up to yield separate analyses of the frightened or frightening behaviors on the Main and Hesse (1992) coding inventory. Due to the interest generated by Main and Hesse's (1990) hypotheses regarding this class of maternal behaviors, however, separate

counts were generated for the frightened, frightening, dissociated, and role-reversed behaviors included in the Main and Hesse (1992) inventory and a second set of analyses was conducted. In reporting these results, the symbol FR refers to frightened or frightening behaviors only; FR<sup>+</sup> refers to all four classes of behavior on the Main and Hesse protocol.

Descriptively, 20 mothers, or 31% of the sample, displayed no FR<sup>+</sup> behaviors during the Strange Situation and 65% of their infants were securely attached. A majority of mothers who displayed any FR<sup>+</sup> behavior displayed more than one type, however, and this was true in all attachment subgroups. Forty-nine percent of mothers displayed frightening behavior, 43% displayed frightened behavior, and 28% and 14% exhibited dissociated or role-reversed behavior, respectively. Role-reversed and dissociated behavior almost never occurred in the absence of other FR<sup>+</sup> behaviors, 0% and 3%, respectively, partly because they were displayed less frequently than frightened or frightening behavior. Frightening, dissociated, and role-reversed behaviors were significantly intercorrelated,  $r$ s ranging from .32 to .38, all  $p$ s < .01, but frightened behavior was independently distributed,  $r$ s ranging from .16 to .00.

Using the same planned comparisons and post hoc follow-up tests as before, total frightened or frightening behaviors showed the same relation to infant disorganized attachment classification as did total atypical behavior. Frightened or frightening maternal behaviors (FR) discriminated infants classified as disorganized,  $T(45) = 2.32$ ,  $p < .03$ ,  $\eta = .32$ ,  $N = 65$ . In addition, mothers whose infants were classified DI exhibited more FR behavior compared to each of the other attachment groups, Duncan's  $p$ s > .05, with means of 1.95 (secure), 2.0 (avoidant), 2.3 (DS), and 5.6 (DI). The same results were obtained using the FR<sup>+</sup> score (frequency of dissociated and role-reversed behaviors added to the total FR score). Mothers of DI infants also displayed more dissociative behaviors than mothers of secure infants and displayed more frightening behaviors than mothers of secure or avoidant infants, Duncan's  $p < .05$ , but did not differ from other groups in frequencies of frightened or role-reversed behavior, although means of the DI subgroup were highest on all scores. Similar to results of the total atypical behavior scores, mothers of DS infants did not differ from mothers of organized infants in any of these analyses.

As shown in Table 15, however, a more subject-based analysis of patterns of behavioral organization across all four types of FR<sup>+</sup> behavior yielded different results. These analyses revealed that, as a group, mothers of DS infants did display a distinct pattern of behavior that distinguished them both from mothers of organized infants and from mothers of DI infants. Mothers of DS infants were more likely than other mothers to exhibit frightened behavior at moderate but not extreme levels and without associated elevations in frightening, dissociated, or role-reversed behavior. This was

TABLE 15

THE PROPORTIONS OF INFANTS IN EACH ATTACHMENT CLASSIFICATION WHOSE MOTHERS DISPLAYED A PARTICULAR PATTERN OF FRIGHTENED OR FRIGHTENING BEHAVIOR

Maternal Frightened or Frightening Behavior	<i>n</i>	Infant Attachment Classifications			
		Secure	Avoidant	Disorganized DS	DI
		22	13	10	20
No FR <sup>+</sup> behavior <sup>a</sup>		.59 (13)	.23 (3)	.20 (2)	.10 (2)
Mild frightened pattern <sup>b</sup>		.14 (3)	.23 (3)	.50 (5)	.10 (2)
Mild frightening, dissociated, or role-reversed pattern <sup>c</sup>		.18 (4)	.46 (6)	.20 (2)	.25 (5)
High frightened, frightening, dissociated or role-reversed behavior <sup>d</sup>		.09 (2)	.08 (1)	.10 (1)	.55 (11)

Note. *N* = 65, cell *ns* in parentheses.

<sup>a</sup> FR<sup>+</sup> refers to all behaviors on the Main and Hesse (1992) coding protocol.

<sup>b</sup> No single FR<sup>+</sup> score over 4; frightened behavior score within one point of frightening score; no dissociation or role reversal scored.

<sup>c</sup> No single FR<sup>+</sup> score over 4; frightening behavior predominates or dissociation or role reversal scored.

<sup>d</sup> Scores over 4 on any single type of FR<sup>+</sup> behavior.

termed a fearful-inhibited pattern. Fifty percent of mothers of DS infants displayed this pattern of behavior, compared to 14% and 23% of mothers of secure and avoidant infants, respectively, and 10% of mothers of DI infants. Consistent with previous linear analyses, higher levels of frightened behavior, as well as frightening, dissociated or role reversed behaviors, were displayed by mothers of DI infants, as also shown in Table 15. Because of small expected cell sizes, Table 15 was collapsed into two orthogonal two-way tables to test whether mothers of DS infants differed separately from mothers of organized infants and from mothers of DI infants, DS versus Org/Fearful versus all other, Fisher's Exact Test (*N* = 45), *p* = .05,  $\Phi$  = .32; DS versus DI/Fearful versus all other, Fisher's Exact Test (*N* = 30), *p* = .03,  $\Phi$  = .44.

Therefore, effects associated with frightened maternal behavior were nonlinear. Milder levels of frightened maternal behavior, occurring in the absence of frightening, dissociated, or role-reversed behavior, were associated with disorganized-secure infant attachment behavior. In contrast, higher-intensity frightened behavior or frightened behavior co-occurring with heightened frightening, role-reversed, or dissociated behavior was associated with disorganized-insecure infant behavior.

These analyses also revealed that maternal frightened and maternal dissociated behaviors had different correlates in infant behavior and should not be combined in a single score as was done in the disorientation subscore of our atypical behavior coding protocol. Dissociated maternal behaviors were related to DI infant behavior, whereas effects of fearful maternal behaviors depended on both the intensity of the fearfulness and the presence of other FR<sup>+</sup> behaviors.

In addition, it is important to note that the FR<sup>+</sup> behaviors on the Main and Hesse (1992) protocol constituted only 17% of the behaviors coded in the larger study as atypical. With all FR<sup>+</sup> behaviors removed from the total atypical behavior score, the remaining atypical behaviors still reliably discriminated mothers of organized and disorganized infants,  $T(46) = 2.69$ ,  $p < .01$ ,  $\eta = .36$ ,  $N = 65$ . In addition, DS and DI mothers did not differ reliably in the display of the remaining atypical behaviors,  $T(21) = 1.89$ ,  $p < .07$ , as they had in the display of FR<sup>+</sup> behaviors. These findings indicate that FR<sup>+</sup> behaviors are embedded in a broader context of disrupted affective communication between mother and infant.

*Is There Cross-Situational Stability for Maternal Behaviors Observed in the Strange Situation?*

In order to assess whether maternal atypical behavior in the Strange Situation was situation-specific or whether it was predictive of similar interactive behavior in other settings, maternal atypical behavior in the Strange Situation was correlated with maternal behavior observed at home. Maternal behavior at home had been coded earlier in the study before infant D behavior had been described (Lyons-Ruth, Connell, Zoll, & Stahl, 1987). Prior analyses of maternal behavior at home had yielded two orthogonal summary factor scores, one indexing degree of involvement with the infant and one indexing extent of hostile-intrusive behavior. These dimensions were similar to two of the subscores contributing to the measure of total atypical maternal behavior in the Strange Situation; the score for withdrawal and the score for negative-intrusive behavior. The other three atypical behavior subscores did not have counterparts in the coding system used for home behavior (role confusion, disorientation, affective communication errors). Both maternal withdrawal and maternal negative-intrusive behavior in the Strange Situation were significantly correlated with similar behaviors observed at home, SS Withdrawal by Home Involvement,  $r = -.29$ ,  $p < .02$ ,  $N = 64$ , SS Negative by Home Hostile-Intrusive,  $r = .33$ ,  $p < .01$ ,  $N = 64$ .

Correspondence in maternal behavior across settings also was assessed at a more general level of analysis. For the home data, a single global dichotomous classification code (Optimal/Non-Optimal maternal behavior) had also been created (see Lyons-Ruth et al., 1991). This code had been created from the two factor scores by designating mothers in the "best" one third of the sample on both factor scores (high in involvement/low intrusiveness) as showing optimal behavior. Mothers who showed optimal behavior at home were significantly more likely to be classified Nondisrupted in the Strange Situation,  $\chi^2(1, N = 64) = 3.95$ ,  $p < .05$ ,  $\Phi = .25$ , with 82% of optimal mothers classified in the Nondisrupted group in the Strange Situation, compared to

49% of nonoptimal mothers. These significant relations between maternal behaviors at home and maternal interaction in the Strange Situation increase confidence that the maternal behaviors coded in the present study were representative of the mother's behavior more generally and were not particular to the constraints of the laboratory situation or to the infants' behaviors in the Strange Situation.

Maternal behavior displayed in the Strange Situation also was significantly related to infant affect displayed at home. Because our only a priori hypothesis regarding infant affect was that more disrupted maternal communication should be associated with less optimal infant affect regulation, the two measures of infant affect at home were analyzed in relation to the maternal level of disrupted communication rating. Increased infant distress at home was associated with higher levels of maternal disrupted communication in the Strange Situation,  $r = .25, p < .05, N = 63$ ; infant anger/resistance at home was not,  $r = .07, ns$ . To examine the specific maternal behaviors contributing to the association with infant distress at home, distress was analyzed in relation to the five maternal atypical behavior scores shown in Table 11. Only the subscore for affective communication errors predicted infant distress at home,  $r = .30, p < .02, N = 63$ .

Given the relation between maternal behavior in the Strange Situation and infant distress at home, it also is notable that infant distress at home was related to the infant's display of disorganized attachment behavior in the Strange Situation,  $F(1, 67) = 4.31, p < .05, \eta = .25$ , while infant anger/resistance at home was not,  $F(1, 67) = .01, ns$ . ( $N = 69$  for these analyses not involving maternal behavior). Frequency of infant distress at home was equally elevated in the two disorganized subgroups, with means of .51 ( $n = 10$ ) and .53 ( $n = 23$ ) for DS infants and DI infants, respectively, compared to a mean of .24 ( $n = 36$ ) for infants displaying organized strategies. Regression analysis further indicated that maternal D behavior and infant D behavior were redundant in predicting infant distress at home, with infant D behavior failing to account for additional variance in infant distress after maternal D behavior was entered, maternal D  $F(1, 61) = 4.21, p < .04$ , infant D  $F_{chg}(2, 60) = 2.53, ns$ . The relation between infant disorganization and infant distress, however, indicates that increased infant distress at home should be viewed as one correlate of a disorganized attachment relationship rather than simply as a correlate of less optimal maternal behavior.

#### *Demographics, Severe Psychosocial Risk, Infant Gender, and Atypical Maternal Behavior*

Demographic factors were not associated with maternal D classification, probably because the sample was homogeneous in low socioeconomic status and because matching of referred and nonreferred mothers on SES variables

mitigated relations between SES variables and other risk factors. Demographic factors alone also have failed to predict other outcomes in this sample (Lyons-Ruth et al., 1990; Lyons-Ruth et al., 1991). The measure of cumulative demographic risk did not approach significance,  $F(1, 63) = .59$ , *ns*. Among the nine separate variables assessed (mother's age at birth of first child, mother's age at birth of this child, per person weekly income, AFDC status, mother's minority status, mother's education, single parent, number of children under 6, infant birth order), the only significant association was in a direction opposite to that expected, in that mothers with more children under 6 were *less* likely to be classified as disrupted,  $\tau = -.26$ ,  $p < .02$ , perhaps because they were more experienced parents. Having more children under six did not lessen the incidence of infant disorganization in the Strange Situation, however,  $\tau = -.03$ , *ns*, so number of children could not account for the earlier relations reported between maternal behavior and infant disorganization. There also were no differences by infant gender, with mothers of boys and mothers of girls equally likely to be classified as disrupted (46% both sexes). Mothers who had a history of psychiatric hospitalization or child maltreatment *were* more likely to be classified disrupted,  $\chi^2(1, N = 65) = 5.00$ ,  $p < .03$ ,  $\Phi = .28$ . Sixty-nine percent of the 16 mothers in this group were classified disrupted, as compared to 37% of other mothers. Again, however, the maltreatment/hospitalization variable was not powerful enough to account for infant disorganization directly,  $\chi^2(N = 65) = 1.37$ , *ns*.<sup>1</sup>

Although there was no main effect of infant gender on maternal behavior, infant gender also was assessed as a potential moderator of the relation between disrupted maternal communication and infant D classification, because at least one study has reported a higher incidence of disorganized attachment behavior among boys (Carlson et al., 1989b). Perhaps male infants are more likely to become disorganized in the presence of disrupted maternal communication than are girls.

In earlier published analyses of all 71 infant attachment tapes, a strong trend toward a gender difference in infant attachment classification did not reach significance because the two sexes were equally likely to be classified secure, 30% (m) versus 36% (f); Lyons-Ruth et al., 1991).<sup>2</sup> Further analyses,

<sup>1</sup> Lyons-Ruth et al. (1991) did find an association between maternal psychosocial problems, a variable that included maternal depressive symptoms and clinical referral for supportive services as well as maltreatment and hospitalization, and the DI subtype of infant disorganization, but the association was significant only among families who did not receive home-visiting services (see also Lyons-Ruth et al., 1990).

<sup>2</sup> In the current sample of 65, the gender effect on disorganized infant classification did reach significance, because the six tapes of the original 71 that could not be recoded for maternal behavior included a higher proportion of D females (2 D girls and 1 D boy),  $\chi^2(1, N = 65) = 4.13$ ,  $p < .05$ .

however, revealed a significant gender difference *among insecure infants only*, with insecure girls more likely to be classified avoidant (50%), while insecure boys were more likely to be classified disorganized (82%) rather than avoidant (18%),  $\chi^2(1, N = 48) = 5.61, p < .02, \Phi = .34$ . In addition, using the scaled (1–9) scores for overall level of infant disorganized behavior (rather than the final infant classifications), there was a robust gender effect in the full sample,  $F(1, 69) = 8.50, p < .01, \eta = .33$ , indicating that boys displayed more disorganized attachment behaviors in general whether or not they were classified as D. Therefore, although an overall gender effect on classification failed to reach significance in the full sample, our data show some influence of male gender consistent with that in the Carlson et al. (1989b) study.

A hierarchical log-linear analysis testing for the significance of the moderator (interaction) effect of infant gender on the relation between maternal classification and infant classification did not reach significance,  $\chi^2(1, N = 65) = .265, ns$ , indicating that the maternal effect on infant disorganized classification and the gender effect on infant disorganized classification (which was marginal in this sample overall) are best viewed as additive. Maternal disrupted classification doubled the rate of infant disorganization, and male gender almost doubled the rate, as shown in Figure 1. Using the

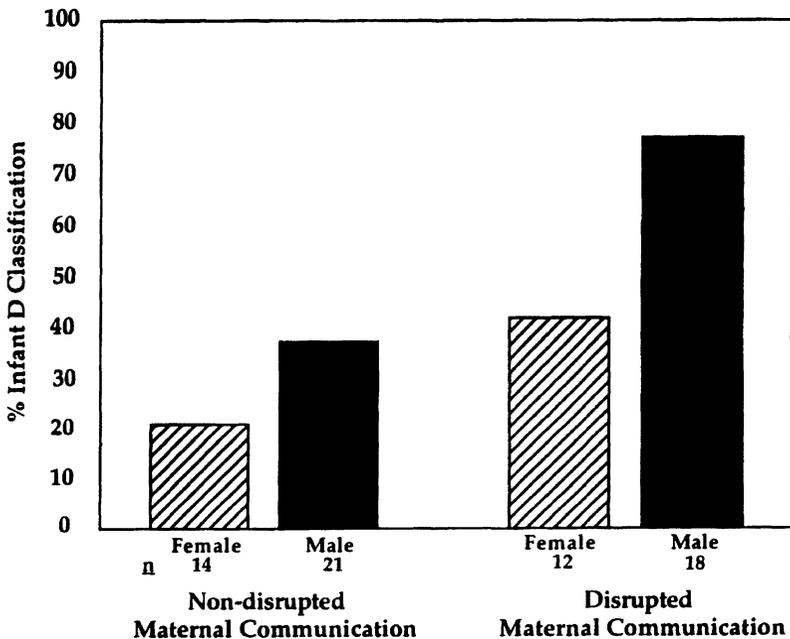


FIGURE 1. Infant disorganized attachment by maternal disrupted communication and infant gender

scaled score for infant disorganization, which was more sensitive to infant gender effects, similar results were obtained: Infant gender,  $F(1, 61) = 9.08$ ,  $p < .01$ ,  $\eta = .34$ ; maternal D,  $F(1, 61) = 10.70$ ,  $p < .01$ ,  $\eta = .36$ ; infant gender  $\times$  maternal D,  $F(1, 61) = .06$ ,  $ns$ , multiple  $R = .50$ ,  $R^2 = 25\%$ .

## DISCUSSION

The results of the validity study indicate that mothers whose infants are classified disorganized exhibit an elevated level of atypical maternal behaviors in the Strange Situation. When the subtypes of atypical maternal behaviors were examined, mothers whose infants were classified disorganized were particularly likely to display more affective communication errors, errors that included offering contradictory messages in their own communications as well as responding inappropriately or not at all to clear communications by the infant. In addition, the findings underscored the presence of distinct maternal subgroups within the overall disorganized classification. The two D subgroups did not differ significantly in rates of affective communication errors or in rates of disoriented behaviors. Mothers of DI infants, however, displayed significantly higher frequencies of negative-intrusive behaviors and role confusion, as well as higher overall frequencies of both FR' behaviors and total atypical behaviors, compared to mothers of DS infants and to mothers of infants with organized attachment strategies.

In contrast, mothers of infants with DS classifications showed a significantly elevated rate of withdrawing behaviors compared to mothers of DI infants and maternal withdrawal correlated with infant disorganization in analyses with DI infants excluded. On analyses of Main and Hesse's (1992) inventory of frightened and frightening behaviors, mothers of DS infants displayed a behavioral pattern of predominant mild fearfulness that significantly distinguished them both from mothers of organized infants and mothers of DI infants. This combination of fearful behavior and withdrawal bears at least surface similarity to the "helpless" stance described by George and Solomon (1996) as characterizing the behavior of mothers whose 6-year-olds were classified as displaying a controlling attachment strategy (the later counterpart of infant disorganization). Clearly, further work is needed to describe maternal caregiving in the DS subgroup, particularly since a majority of disorganized infants in lower risk samples have displayed DS behavior. Jacobvitz, Hazen, and Riggs (1997) and Schuengel and his colleagues (in press) also have reported elevated rates of frightened and frightening behavior among DI mothers, using maternal unresolved AAI classifications as the basis for the DS/DI distinction rather than infant classifications.

The associations obtained in the present study do not rule out the possibility that the mother's display of atypical behavior occurs because the infant's disorganized attachment behavior or the infant's distress at home is so difficult to read or to manage. The coding protocol, however, emphasized the parent's repeated failures to respond appropriately to clear infant signals, and coders did not experience difficulty making judgments about the communicative intentions of the 18-month-olds in the study. Reading through the list of serious interactive errors in Table 13 also reveals the unambiguous nature of many of the infant affective cues in question, for example, laughs while infant distressed, does not offer comfort when infant falls, removes toy despite infant engagement. Many of the maternal role-reversing and disoriented behaviors also had an out-of-context quality that appeared uncorrelated with the infant's current behavior. In addition, although the stranger's behavior vis-à-vis the infant in the Strange Situation was not coded, casual inspection suggests that atypical behaviors of the kind detailed in the coding protocol were uncommon in the stranger's interactions with the infant even when the infant was displaying difficult behavior. Comparisons of mother-infant and stranger-infant interaction might be informative in future studies.

In general, parental attempts to modify their behavior based on infant cues, even when the infant's cues were ambiguous, could be clearly discriminated from parental behavior that was unresponsive or intrusive. Thus, the present results document a parental contribution to the disorganized attachment relationship that appears not to be driven entirely by the immediacies of the infant's behavior but to have partial roots in parental history (Lyons-Ruth, 1992; Lyons-Ruth & Block, 1996; Lyons-Ruth, Zoll, Connell & Grunebaum, 1989). The infant's distress and disorganized behavior also may be influenced by other intrinsic or extrinsic factors not addressed here, however, and are likely to introduce additional difficulties into the parent's attempts to regulate the interaction between them. Perhaps not surprisingly, then, mutual cycles of coercion (Greenberg et al., 1991; Main et al., 1985) and mutual rejection of the other's overtures (Hann et al., 1991) appear to characterize the subsequent developmental pathways of a subset of disorganized infants and their parents.

The behaviorally detailed nature of the coding protocol and the lack of coder familiarity with the complex coding procedures for classifying infant disorganized attachment behavior also work against the possibility that coders assigned a high rating to a parent based on their judgment of the infant's attachment status. The high correlation between the frequency count for maternal atypical behaviors and the rating for level of disrupted communication,  $r = .83$ , indicates that the more qualitative coding judgments were closely tied to specific maternal behaviors.

*Maternal Atypical Communication and Infant Gender*

The pattern of gender effects in the data is open to two interpretations—male infants may be more likely than females to display overt conflict behaviors when caregiving is inadequate or, alternatively, male infants may exhibit some excess reactivity, displaying disorganized behavior even when maternal caretaking is adequate. The data indicated that 78% of male infants displayed disorganized behavior when their mothers were classified disrupted, compared to only 42% of females. Eight male infants, however, also were classified disorganized while their mothers were classified not disrupted, compared to only three females. Because we have multiple converging sources of data on the families in the current sample, we find the first interpretation more consistent with the data as a whole, namely, that male disorganized attachment behavior more accurately reflected the quality of caregiving than female disorganized attachment behavior. In seven of the eight male cases where the child's behavior was classified D while the mother's was not, we have reason to believe that the mother's atypical behaviors were not captured in our coding system. Of the eight male infants, five were in the DS group in which maternal behavior was more withdrawing and we misclassified these mothers as a group as not D. Of the three remaining boys, all in the DI group, AAI protocols of two of these mothers were designated *cannot classify* because of their unusual characteristics. Only in the eighth case was the male infant's D behavior not readily accounted for. In addition, among the nine maltreating mothers in the sample, four of five male infants displayed D behavior while only one of four female infants did so. Therefore, we are inclined to see male infants as more likely to display conflict behavior related to caregiving inadequacies while female infants appear equally likely to display forms of avoidant behavior as to display overt D behaviors even when maternal behavior is judged by observers as maltreating or disrupted.

*Future Directions for Work on Atypical Attachments*

The results reported here indicate that a fearful and withdrawing maternal stance may result in a lower overall frequency of atypical maternal behaviors (see also Schuengel et al., in press, for partially converging data). Therefore, fearful and withdrawing behavior needs to be weighted more heavily in frequency counts than it was in this study, perhaps by recoding withdrawal at intervals if it persists. Greater weight also needs to be given to fearful and withdrawing behaviors in rating and classifying maternal disrupted communication, and coding protocols are currently being revised with this in mind. Greater weighting of the serious interactive errors displayed in Table 14 also appears to improve the concordance between maternal and infant classification in the DS subgroup as revealed by comparison

between Tables 11 and 14. Using only serious interactive errors to classify maternal behaviors improved the concordance rate in the DS subgroup from 30% to 50%, which was unanticipated. Thus, weighting fewer salient behaviors more heavily seems likely to improve the discrimination between mothers of DS infants and mothers of organized infants. Additional statistical and descriptive analyses of maternal behavior patterns in the DS subgroup are reported in Lyons-Ruth, Bronfman, and Atwood (in press).

Results of the study also support Main and Hesse's (1990) hypothesis that frightened or frightening maternal behaviors are associated with the disorganization of infant attachment strategies. Results further indicate that differential patterning of maternal FR behavior results in differential patterning of infant attachment behavior within the disorganized spectrum. Predominant mild maternal fearfulness was associated with DS infant attachment behavior, infant behavior that in our sample also often appeared hesitant, fearful, or helpless. In contrast, as maternal behavior became extremely frightened or predominantly frightening, or included disoriented or role-reversed behavior, the infant was more likely to display disorganized conflict behaviors that included marked avoidant or resistant behavior. The current results also indicate that maternal affective communication errors constitute part of the broader context in which maternal FR behavior occurs and that these affective communication errors also should be included in protocols for scoring maternal behavior. Because infant attachment behavior is observable in the Strange Situation, it will be important in future work to evaluate whether parental behavior in settings other than the Strange Situation is equally predictive of infant disorganized attachment status. Future work should include coding of maternal interactive behavior at home with the current protocol and evaluation of the link between disrupted maternal communication and maternal AAI classification. Both studies are currently underway in our laboratory.

### *Theoretical Integration*

The two profiles of atypical behavior that characterized mothers of disorganized infants in this study converge with findings of other studies to offer an emerging overall typology of subgroups within the larger D classification. Integrating recent studies of controlling 6-year-olds by George and Solomon (1996) and Solomon, George, and DeJong (1995) with the body of prior work on infant disorganization, two subgroups emerge within the disorganized/controlling spectrum: a helpless, fearful subgroup and a hostile, punitive subgroup. These two subgroups appear to have different manifestations in infant attachment behavior, in maternal caregiving behavior, in preschool attachment behavior, and in preschool symbolic play, while they

also share certain core features central to the conceptualization of the disorganized classification.

In the present study sample the DI subgroup has been best delineated, with DI infants showing an atypical mix of attachment behaviors, often including distress at separation combined with avoidance and resistance, and other conflict behaviors at reunion. Mothers of DI infants also appear to display a "mixed" caregiving strategy in which behavioral tendencies usually viewed as characteristic of different organized attachment patterns are combined. Their behaviors toward the infant included a correlated mix of role-reversing and negative-intrusive behaviors. Milder forms of these stances are thought to characterize distinct organized strategies, with the tendency to turn the child's attention *toward* attachment issues, including the needs of the parent, thought to constitute a core feature of the preoccupied parental stance (Cassidy & Berlin, 1994), whereas the tendency to discourage the child's seeking of close emotional contact through subtle negative cues, including intrusive behavior (Belsky, Rovine, & Taylor, 1984) and suppressed anger (Main, Tomasini, & Tolan, 1979), has been found to characterize avoidant dyads. Thus, the mother's mixed caregiving strategy, in which attachment cues are both heightened and rejected, appears to complement the infant's inability to adopt a single strategy in relation to the attachment figure. In contrast, mothers of DS infants were more fearful and withdrawing in relation to their infants without displaying active rejecting behaviors. Their infants continued to approach them for contact, but also displayed signs of conflict, apprehension, uncertainty, helplessness, or dysphoria.

We speculate further that these two infant dyadic groupings correspond to the two stances observed among controlling children at age 6 by Solomon, George, and DeJong (1995). They described one group of controlling 6-year-olds as extremely inhibited in play while the other group played out frightening and chaotic scenes with no positive resolution. In their reunion behavior with parents, controlling children also have displayed two identifiable strategies, a solicitous, caregiving stance or a coercive, punitive stance (Main et al., 1985). In addition, Solomon et al. (1995) found that children inhibited in play were more likely to be classified as caregiving, while children with more chaotic play scenarios were more often classified as punitive. Longitudinal data to evaluate these postulated links between the two D subgroups in infancy and the two controlling subgroups during the preschool period are still lacking, however. Along with Main et al. (1985) and Solomon et al. (1995), we view these two stances as different behavioral strategies for responding to similar core representational and affective themes, namely a disruption in the regulatory function of the caregiving system that exposes the child to inadequately modulated fear.

As noted, Main and Hesse (1990) have related the child's fearful affect to the parent's own unresolved fear. Empirical support for this conception has

come from the repeated finding that disorganized/controlling child behavior is related to indices of parental unresolved loss or trauma on the AAI (van IJzendoorn, 1995). Main and Hesse (1990) further speculated that maternal frightened or frightening behavior toward the infant might mediate the link between unresolved maternal trauma or loss and infant disorganization. Lyons-Ruth and Block (1996) have broadened Main and Hesse's conceptualization of frightened or frightening maternal behavior to include the disruptions in maternal affective communication documented here that leave the infant little effective influence over the caregiver's behavior. In support of this conception, Lyons-Ruth and Block (1996) demonstrated an association between violence or abuse in the parent's past and an increased tendency for infant insecure attachment behaviors to take disorganized rather than avoidant or ambivalent forms. In addition, Lyons-Ruth and Block (1996) demonstrated that violence or abuse in mother's childhood was associated with two somewhat different patterns of maternal interaction with the infant at home. Violence or harsh punishment in mother's childhood was associated with more hostile and intrusive behaviors toward her infant, while the overall severity of trauma, including sexual abuse, was related to increased withdrawing behaviors. The data reported here further relate withdrawing or hostile-intrusive caregiving behaviors to infant disorganization and emphasize the common link of both caregiving patterns to a basic disruption in affective communication processes between mother and infant.

In agreement with Main and Hesse (1990), we see this disruption in mother-infant affective discourse as one manifestation of the mother's attempt to maintain coexisting but unintegrated representations of her childhood experiences (see Lyons-Ruth & Block, 1996). The maintenance of unintegrated representations of past experiences, in turn, interferes with the development of a flexible internal working model for relating the range of human emotions to their sources in experience, or, in the terminology of Fonagy, Steele, Steele, Moran & Higgitt (1991), interferes with the gradual development of a psychologically sophisticated theory of mind.