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DIFFERENTIAL ATTACHMENT RESPONSES OF MALE AND FEMALE INFANTS TO FRIGHTENING MATERNAL BEHAVIOR: TEND OR BEFRIEND VERSUS FIGHT OR FLIGHT?

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Abstract

Taylor and colleagues (2000) proposed that males tend to display fight or flight responses to threat while females are more likely to display affiliative “tend or befriend” responses. In light of this hypothesis, gender differences in infant attachment behaviors were examined in a sample of 65 low-income mother–infant dyads, half of whom were referred to a home-based intervention service because of concerns about the quality of caregiving. Attachment behaviors were assessed in the Ainsworth Strange Situation when infants were 18 months old, and maternal behaviors were coded both for frightened or frightening behaviors, using the Main and Hesse (1992) coding inventory, and for disrupted affective communication using the Atypical Maternal Behavior Instrument for Assessment and Classification assessment tool (AMBIANCE; Lyons-Ruth, Bronfman, & Parsons, 1999). Results indicated that as maternal behavior became more frightening, female infants tended to approach their mothers more than male infants. These gender differences in response to maternal frightening behavior also were evident in the clinically referred subsample. The results suggest that gender-based differences in tendencies to show affiliative behaviors to threat may complicate interpretation of attachment behavior in clinical contexts.

A large body of research on fearful arousal has documented the range of individual coping responses to pain or fear displayed by different individuals when exposed to severe stressors. These responses have been captured by the summary label “fight or flight” (e.g., Jansen, Nguyen, Karpitsky, Mettenleiter, & Loewy, 1995). In addition, Seligman (1975) and others described “freezing” and “learned helplessness” as responses occurring when more active coping responses are unavailable or ineffective.

Interestingly, this entire array of coping or defensive responses appears in some form in the behaviors that are part of the disorganized/controlling spectrum of infant and child attachment behaviors, as can be seen in Table 1. For example, freezing, huddling on the floor, and other depressed behaviors are part of the coding criteria for disorganized behaviors, as are contradictory approach–avoidance behaviors that often mix angry resistance with very marked avoidant behaviors such as running away or hiding under a chair.

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Shelly Taylor and colleagues (2000) recently advanced a “tend or befriend” hypothesis regarding primary responses to threat among social primates, arguing that “fight or flight” may be more relevant to the stress responses of males while various forms of affiliative responses may be more common stress responses of females. While Taylor et al. did not directly investigate attachment strategies among human infants, the authors do postulate that the hormones facilitating maternal caregiving behaviors and attachment processes between mother and child, particularly oxytocin, are those implicated in the female tendency to affiliate when under stress. Taylor's hypothesis, then, would predict a higher rate of affiliative, approach behaviors to stress among female infants than male infants.

Gender differences have rarely been observed in infant attachment behaviors in low-risk samples (van IJzendoorn, 1995). However, some gender differences have emerged in high-risk cohorts where environmental threat is marked. For instance, Carlson, Cicchetti, Barnett, and Braunwald (1989) reported that disorganized attachment patterns were more frequent among boys in a low-income, maltreated sample. In a second high-social-risk sample, Lyons-Ruth, Bronfman, and Parsons (1999) also found that boys displayed significantly more disorganized attachment behaviors using the continuous rating scale for extent of disorganized behavior. Thus, these earlier studies indicated that gender may play a role in the manifestation of disorganized behavior patterns in high-risk samples.

In addition, in high-risk samples, gender differences may extend beyond the disorganized category alone. Lyons-Ruth, Bronfman, and Parsons (1999) found that insecure male infants were significantly more likely to be classified as disorganized in comparison to insecure female infants, who were more likely to be classified as avoidant. Lyons-Ruth, Bronfman, and Parsons also noted informally that maltreated boys' attachment classifications tended to be more congruent with the quality of observer-rated mother–infant interaction than were girls' classifications.

In a related observation, Turner (1991) found other differences in behaviors for boys and girls with insecure attachment classifications. Specifically, the author found that insecure 4-year-old boys displayed both more attention-seeking and more disruptive and aggressive behavior when interacting with peers than did secure boys. In contrast, 4-year-old insecure girls displayed more compliance and dependence as well as more positive affiliative behaviors such as smiling and expressing pleasure than did securely attached children. Although Turner did not employ the disorganized classification scheme in her analysis, these data indicate a gender-related tendency for insecure boys to engage in more aggressive and self-referential behavior and for insecure girls to attempt to please others.

The “tend or befriend” hypothesis also would predict gender-based differences in the patterning of behavior *within* the disorganized spectrum. For instance, one of the puzzling aspects of disorganized attachment patterns that has needed explanation is why 52% of disorganized infants displaying the conflict behaviors listed in Table 1 continue to approach the caregiver and seek comfort while other disorganized infants do not show such attempts at affiliative behavior (NICHD Study of Early Child Care, K. McCartney, personal communication, October 13, 2003). To date, these differences in infant behavior within the disorganized classification have been handled by assigning a secondary classification to all disorganized infants. The secondary classification identifies the organized attachment strategy that the disorganized infant's behavior most closely resembles. Thus, infants who continue to approach, seek comfort, and find soothing from their mothers while also displaying disorganized conflict behaviors are assigned a secondary classification of secure while infants who mix avoidant and/or resistant behavior with disorganized behavior are given secondary insecure (avoidant or ambivalent) classifications. Table 2 summarizes these infant subtype differences.

While these subclassifications more fully describe infant reactions in the Strange Situation, they do not address the mechanisms underlying the differentiation of disorganized-secure and disorganized-insecure behavior patterns. In the present article, following Taylor et al.'s (2000) findings, we hypothesize that gender also is associated with the tendency to show either affiliative (D-secure) or fight or flight (D-insecure) behaviors within the disorganized spectrum.

MATERNAL FRIGHTENED, FRIGHTENING, AND WITHDRAWING BEHAVIOR

Consistent with Taylor et al.'s (2000) hypothesis, one would expect such gender differences in behavior to become pronounced only under conditions of environmental threat. Main and Hesse (1990) advanced the hypothesis that disorganization of infant attachment strategies is related to parental unresolved fear, fear that is transmitted to the infant through parental behavior that appears frightened or that is frightening to the infant. Table 3 gives examples of the types of parenting behaviors that are part of the Main and Hesse (1992) coding instrument for frightened or frightening parental behavior. According to Main and Hesse's (1990) reasoning, if the parent herself arouses the infant's fear, this will place the infant in an unresolvable paradox regarding whether to approach the parent for comfort, precisely because in this situation the parent serves as both the source of the infant's fear and his or her potential haven of safety in the face of this feeling.

A few recent studies have explored the Main and Hesse (1990) hypothesis that mothers of disorganized infants display various types of frightened and/or frightening (FR+) behavior. This work has demonstrated that high levels of maternal frightened or frightening behaviors are associated with disorganized infant behavior (Jacobvitz, Hazen, & Riggs, 1997; Lyons-Ruth, Bronfman, & Parsons, 1999; Schuengel, Bakermans-Kranenburg, & van IJzendoorn, 1999); however, disorganized infant behavior was accounted for by frightening behaviors alone. Maternal frightened behaviors toward the infant were not individually related to infant disorganized attachment, nor were sexual/spousal behaviors. Dissociative behaviors alone were related in one study (Schuengel et al., 1999), but not in another (Lyons-Ruth, Bronfman, & Parsons, 1999). In addition, frightening maternal behaviors were related only to the D-insecure subtype of infant disorganized behavior, not to the D-secure subtype (Lyons-Ruth, Bronfman, & Parsons, 1999).

Lyons-Ruth, Bronfman, and Atwood (1999) advanced a somewhat broader hypothesis regarding the maternal behaviors likely to be associated with infant disorganization. In this view, infant fear that is not directly provoked by the parent will nonetheless be potentially disorganizing to the infant's attachment behaviors if the parent fails to respond to the infant's need for comfort. These failures to comfort can occur in a variety of ways. For instance, the parent can give contradictory responses to the infant's cues or give self-referential responses that focus on the parent's needs rather than the infant's needs. The parent also can withdraw and thereby fail to respond altogether. To operationalize this broader hypothesis, the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE; Bronfman, Parsons, & Lyons-Ruth, 1993) was developed to assess a wider range of parental behaviors than were coded on the initial Main and Hesse (1992) inventory for frightened or frightening behavior. Specifically, the behaviors assessed by the AMBIANCE included maternal withdrawing behaviors, affective communication errors, negative-intrusive behaviors, disoriented behaviors, and role-confused behaviors. Examples of these behaviors are shown in Table 4.

This broader set of maternal disrupted communication behaviors coded by the AMBIANCE inventory, which included all the Main and Hesse (1992) behaviors, expanded the results using the FR coding system alone. As predicted, the overall frequency of disrupted communication behaviors differentiated organized infants (i.e., secure, avoidant, or anxious-ambivalent

infants) from disorganized infants (Lyons-Ruth, Bronfman, & Parsons, 1999). Notably, the percentage of mothers classified as showing disrupted affective communication on the AMBIANCE scale was the same for boys as for girls (Lyons-Ruth, Bronfman, & Parsons, 1999).

In addition, when the subtypes of maternal disrupted communication in Table 4 were examined, the maternal behaviors that were elevated across both subgroups of disorganized infants (D-secure and D-insecure) were affective communication errors and disoriented behaviors (see also Schuengel et al., 1999, for converging results); however, the disrupted communication codes also revealed differences in other maternal behaviors that were associated with the two subtypes of infant disorganized behavior (D-secure vs. D-insecure behavior). While mothers of D-insecure infants were frightening, negative, and self-referential, mothers of D-secure infants were primarily withdrawing, with low rates of negative behaviors (Lyons-Ruth, Bronfman, & Atwood, 1999). Thus, the maternal behaviors that best discriminated between the two disorganized subgroups were frightening behaviors and withdrawing behaviors.

Given Taylor et al.'s (2000) theoretical arguments for the possible influence of gender on responses to fear-arousing situations, we hypothesized that the male and female infants in our sample would show differential responses to frightening maternal behaviors. As stated before, we speculated that female infants would be more likely to exhibit an affiliative behavioral strategy intended to maintain some type of proximity to the caregiver, consistent with the tend or befriend hypothesis, whereas male infants would be more likely to exhibit the conflicted, disorganized behaviors characteristic of the D-insecure subgroup, in keeping with an alternating fight or flight behavioral repertoire.

Additionally, given the prior finding that maternal withdrawal was particularly associated with patterns of infant attachment disorganization that included approach behaviors, we hypothesized that male and female infants also would show differential responses to withdrawing maternal behaviors, with female infants more likely than males to display approaching behavior patterns. Finally, we speculated that these gender differences would be especially marked within the clinically referred families in the current sample, in which environmental threats to the infant's overall security and development were the most marked. The other dimensions of maternal disrupted or FR behavior included in Tables 3 and 4 also were tested for differential interactions with gender, but were considered to have weaker links to the "tend or befriend" hypothesis.

METHOD

Participants

Participants in the study were 65 low-income mothers and infants (39 boys, 26 girls; 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 ($n = 37$) had been referred to a home-based clinical-intervention service because of concerns about the quality of the caregiving environment. The other half of the sample ($n = 28$) consisted of low-income women from the community who had been screened for maltreatment or psychiatric histories and 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 both to overrepresent mother–infant dyads considered at risk and to ensure a sizable number of adequately functioning mothers.

Sixty-six percent of mothers in the sample 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. Nine infants in the sample (14%) were being followed by state

social-service workers for abuse or neglect of the target child or an older sibling. Additional descriptive information is available in Lyons-Ruth, Connell, Grunebaum, and Botein (1990).

Procedures

Infant attachment security—At 18 months of age, mothers and infants were videotaped in the Ainsworth Strange Situation (Ainsworth, Blehar, Waters, & Wall, 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 the three organized infant attachment classifications as described by Ainsworth et al. (1978) and for disorganized/disoriented behaviors as described by Main and Solomon (1990). As directed by Main and Solomon, all disorganized classifications also were assigned a secondary best-fitting organized classification.

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 ($M = .86$). 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; for additional details, see Lyons-Ruth, Connell, Zoll, & Stahl, 1987; see also reference in Richters, Waters, & Vaughn, 1988) and by a coder trained by M. Main. Agreement between the two sets of classifications was 86%. 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 $r = .84$.

All 4 infants classified as ambivalent at 18 months also met criteria for the disorganized category and, therefore, were classified as disorganized-insecure. Hence, there were no infants who displayed organized ambivalent attachment patterns in this sample. Instead, all infants who were classified as insecure, but *not* disorganized, were classified as avoidant. The distribution of attachment classifications was Secure: $n = 22$, Avoidant: $n = 13$, and Disorganized: $n = 30$ (D-Secure = 10; D-Insecure = 20, of which 4 were D-Ambivalent, and 16 were D-Avoidant).

Atypical maternal behavior in the Strange Situation—Maternal behavior observed in all episodes of the Strange Situation was coded using the AMBIANCE (Bronfman, Parsons, & Lyons-Ruth, 1993). Validity data in relation to infant disorganization, maternal unresolved classification, and maternal and infant behavior at home are available from several studies (Lyons-Ruth, Bronfman, & Parsons, 1999; Goldberg, Benoit, Blokland, & Madigan, 2003; Grienenberger & Kelly, 2001; Kelly, Ueng-McHale, Grienenberger, & Slade, 2003; Madigan, Pederson, & Moran, 2003). The coding protocol yielded an overall measure of frequency of total atypical behaviors as well as five subtotals for affective communication errors, role confusion, negative-intrusive behavior, disorientation, and withdrawal. This atypical maternal behavior coding system also included all items from Main and Hesse's (1992) coding system for frightening, frightened, dissociated, or disorganized behavior on the part of the parent.

The Main and Hesse (1992) items were distributed on the AMBIANCE subscores of maternal atypical behavior as follows: Frightening behaviors constituted a subset of behaviors contributing to the negative-intrusive behavior score, frightened and dissociated behaviors constituted a large proportion of behaviors contributing to the disorientation score, sexual/spousal behaviors constituted a small subset of behaviors contributing to the role-confusion score, and there was very little overlap between the AMBIANCE withdrawal or the AMBIANCE affective communication errors scores and the Main and Hesse (1992) behaviors.

Fifteen randomly selected tapes were coded by two coders to assess reliability. Intraclass correlation coefficients were $r_1 = .75$ for the Total Atypical Behavior Score, $r_1 = .75$ for the Affective Communication Errors Subscore, $r_1 = .76$ for the Role-Confusion Subscore, $r_1 = .84$ for the Negative-Intrusive Behavior Subscore, $r_1 = .73$ for the Disorientation Subscore, and $r_1 = .73$ for the Withdrawal Subscore.

Separate counts of the behaviors on the Main and Hesse (1992) coding instrument for FR behavior also achieved reliability (frightened behavior: $r_1 = .76$; frightening behavior: $r_1 = .65$; dissociated behavior: $r_1 = .65$; and sexual/spousal behavior: $r_1 = .58$).

Demographic risk—Nine demographic variables were coded from maternal interviews: 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, mother's minority status (Black or Hispanic), 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 also was computed from maternal interview data by summing the presence of the following factors: no high school diploma; AFDC recipient; no male partner; mother under 20 years at birth of first child; mother minority status; and more than two children under age 6.

RESULTS

Socioeconomic Factors and Maternal and Infant Behavior

Cumulative demographic risk was unrelated to infant attachment classification in this uniformly low-income sample (Lyons-Ruth, Repacholi, McLeod, & Silva, 1991). SES variables also did not relate to the maternal behaviors analyzed here, with the exception of number of children under age 6. Mothers with more young children were less likely to exhibit overall disrupted affective communication than mothers with fewer young children, $\phi = -.26$, $p < .02$ (Lyons-Ruth, Bronfman, & Parsons, 1999); however, this relation did not account for nor interact with any of the findings to be reported and therefore was not analyzed further.

Infant Gender, Infant Attachment Classification, and Maternal Behavior

Regression analyses were conducted to investigate whether female infants were more likely to display approaching forms of attachment behavior under stress than male infants when maternal behavior became more frightening or more withdrawing. To maintain maximum power for the initial analyses, the infant attachment classification variable was ordered by approach-oriented behavior as follows: secure = 4, disorganized-secure = 3, avoidant = 2, and disorganized-insecure = 1. More specific comparisons followed a significant finding with this ordered variable. Regression analyses were then computed on the ordered attachment variable by first entering maternal behavior and infant gender (male = 1, female = 2) as a block, so that the effect of each was computed with the other controlled, and then entering the Infant Gender \times Maternal Behavior interaction term. Because the two main effects were entered as a block, individual t statistics are reported rather than the F_{chg} statistic, which combines effects of both variables.

Frightening behavior—Results of the first regression analysis indicated that there was a significant negative main effect of maternal frightening behavior on approaching infant attachment behaviors, $t(61) = -2.79$, $p < .01$, $r_{\text{partial}} = -.33$. There was no main effect of infant gender on tendency to approach, $t(61) = .98$, n.s., $r_{\text{partial}} = .12$. These main effects were modified by a significant Gender \times Maternal Frightening Behavior interaction term, indicating that as

maternal behavior became more frightening, girls were more likely to approach than boys, $t(61) = 2.71, p < .01, r_{\text{partial}} = .33$. Figure 1 displays these relations among maternal frightening behavior, infant gender, and infant attachment behaviors.

To further explore the interaction effect, Holmbeck's (2002) recommendations for examining interaction terms were followed. The sample was divided into two groups based on whether maternal frightening behavior was above the sample median or at or below the sample median. In the full sample, the median score for maternal frightening behavior was 0. Separate regression analyses then assessed whether there was a significant gender effect on approaching attachment behaviors when frightening maternal behaviors were absent and when frightening behaviors were more frequent. Results indicated that female infants were significantly more likely to approach their mothers under conditions of more frequent frightening behavior, gender $t(30) = 3.12, p < .01, r = .50$, but there was no gender difference under conditions of no frightening behavior, gender $t(31) = -1.10, n.s., r = -.19$.

Given Taylor et al.'s (2000) hypothesis that gender differences would emerge in relation to environmental threat, we also hypothesized that gender differences might be stronger in the clinically referred portion of the sample than in the community control portion of the sample. Evaluating the reliability of a three-way interaction effect between gender, maternal behavior, and case-control status turned out not to be possible due to the presence of empty cells. These occurred primarily among the community control families, where disorganized attachment patterns were much less frequent. Therefore, the regression analyses were repeated using only families who were clinically referred because of the importance of assessing whether one might expect gender differences in response to frightening behavior among infants presenting to clinical services. The clinically referred group ($n = 37$) consisted of families whose caregiving interactions with the infant were of sufficient concern to clinicians to prompt a clinical referral for home-visiting services.

When families in the clinically referred group were examined separately, a similar Gender \times Maternal Frightening Behavior interaction effect emerged, $t(33) = 2.19, p < .05, r_{\text{partial}} = .36$; however, the Maternal Frightening Behavior \times Infant Gender interaction was strong enough in the clinical group to render insignificant the negative main effect of maternal frightening behavior on infant approach behavior observed in the full sample, $t(33) = -1.37, n.s., r_{\text{partial}} = -.23$. The interaction effect for the clinical group is displayed in Figure 2. Because inspection of Figure 2 reveals that avoidant behavior by female infants also was contributing to the obtained effect in the clinical sample, the analysis was repeated with the avoidant group omitted. The interaction term remained significant, $t(27) = 2.037, p < .05, r_{\text{partial}} = .37$.

Follow-up regression analyses for the interaction effect in the clinical group were conducted separately for maternal frightening behavior above the median and for maternal frightening behavior below the median. In the clinical group, the median was 1. Results indicated that when mothers displayed higher levels of frightening behavior, female infants were significantly more likely than males to display approach behavior toward mother, gender $t(14) = 2.91, p < .01, r = .61$. This gender effect also remained significant with the avoidant group omitted, $t(11) = 3.66, p < .01, r = .74$. When mothers exhibited lower levels of frightening behavior, gender differences were not significant, gender $t(19) = -1.16, n.s., r = -.26$. In fact, the negative sign indicates that the gender trend was in the opposite direction when maternal frightening behavior was low, with male infants nonsignificantly more likely to show approach behavior than female infants.

The tendency revealed in Figure 2 for clinically referred girls to show more organized avoidant behavior when mothers were more frightening was unexpected. Additional analyses were conducted to assess whether the gender interaction effect also was reliable in relation to girls'

tendency to show organized avoidance. Comparing the disorganized-insecure group to the avoidant group only, a logistic regression analysis confirmed that as mothers' behavior became more frightening, girls were more likely to be classified avoidant than disorganized-avoidant while boys showed the opposite tendency. This was significant in the full sample, where power was adequate, but could not be tested in the clinically referred group due to small n (full-sample frightening behavior: Wald(1, 29) = 3.00, $p < .08$; gender: Wald(1, 29) = 2.22, n.s.; Gender \times Frightening Behavior interaction: Wald(1, 29) = 3.86, $p < .05$).

No other maternal behaviors on the Main and Hesse (1992) Frightened or Frightening Behavior inventory, including frightened behaviors, sexual/spousal behaviors, or dissociative behaviors, were associated with Gender \times Maternal Behavior interaction effects, $t_s(61)$ ranging from $-.31$ to $.18$, partial r_s ranging from $-.03$ to $.04$, all n.s.; however, there was an overall main effect indicating that maternal dissociative behavior was associated with fewer approach behaviors across both genders, $t(61) = -2.78$, $p < .01$, $r_{\text{partial}} = -.33$.

Maternal withdrawing behavior—Contrary to prediction, maternal withdrawing behavior was not related to infant approach behavior overall, $t(61) = 1.27$, n.s., $r_{\text{partial}} = .16$, nor did maternal behavior interact with infant gender, $t(61) = .47$, n.s., $r_{\text{partial}} = .06$, as displayed in Figure 3; however, when clinically referred families were examined separately, a main effect of withdrawing behavior on infant approach behavior was significant, $t(33) = 2.18$, $p < .04$, $r_{\text{partial}} = .35$, as displayed in Figure 4. As is evident from the figure, this main effect was contributed to by both male and female infants, so there was no significant gender main effect, $t(33) = .58$, n.s., and no significant interaction term, $t(33) = .35$, n.s. As maternal behavior became more withdrawing, infant approach behaviors became more pronounced so that, surprisingly, the highest rates of maternal withdrawal occurred among infants who were classified fully secure.

Inspection of Figure 4 reveals that there did appear to be a greater likelihood that girls of withdrawing mothers would be classified fully secure compared to boys of withdrawing mothers, however. Because of the potential clinical importance of such an effect, follow-up analyses evaluated its reliability. Logistic regression analyses comparing the likelihood of classification in secure versus disorganized-secure categories confirmed that girls were more likely to be classified fully secure rather than disorganized-secure as mothers became more withdrawing while boys were more likely to be classified disorganized-secure rather than fully secure. This effect was reliable with the greater power of the full sample and approached reliability in the smaller clinical group (full-sample withdrawing behavior: Wald(1, 28) = .98, n.s.; gender: Wald(1, 28) = .16, n.s.; Gender \times Withdrawing Behavior: Wald(1, 28) = 3.93, $p < .05$; clinical-group withdrawing behavior: Wald(1, 14) = .04, n.s.; gender: Wald(1, 14) = .27, n.s.; Gender \times Withdrawing Behavior Wald = 3.04, $p < .08$).

Additional Disrupted Maternal Behaviors

In contrast to the lack of differential gender responses to maternal withdrawing behavior, two other types of maternal behavior assessed by the AMBIANCE instrument did interact with infant gender in predicting approaching behaviors. Over the sample as a whole, findings for the maternal negative/intrusive behaviors score mirrored the findings for frightening behavior, which is not surprising since frightening behaviors on the Main and Hesse (1992) instrument constituted a subset of the items contributing to the negative/intrusive score, Negative/Intrusive Behavior \times Gender interaction, $t(61) = 1.99$, $p < .05$, $r_{\text{partial}} = .25$.

In addition, over the entire sample, an interaction effect occurred between maternal affective communication errors and infant gender, $t(61) = 2.29$, $p < .03$, $r_{\text{partial}} = .28$. Consistent with previous data, inspection of the means for the full sample revealed that as mothers' affective communication errors became more pronounced, males were classified disorganized-insecure

somewhat more than females, and females were classified secure somewhat more than males. Follow-up regression analyses, again involving a median split of the maternal affective communication errors data (median = 4.00), did not definitively clarify the nature of the effect. When mothers exhibited levels of affective communication errors above the median level, infant gender did not quite reach significance as a predictor of approach behaviors, $t(28) = 1.8$, $p < .09$, $r = .31$. When mothers exhibited levels of affective communication errors equal to or below the median level, there was no trend for infant gender to predict approach behaviors, $t(33) = .29$, n.s. Remaining maternal behaviors on the AMBIANCE inventory, including role confusions and dissociated behaviors, did not interact with infant gender, t s ranging from -1.08 to 1.23 , r s partial ranging from $-.14$ to $.16$, all n.s.

DISCUSSION

Consistent with Taylor et al.'s (2000) hypothesis about gender differences in behavioral responses to threat, female infants of frightening mothers were significantly more likely than male infants to show approach behaviors. As revealed in Figure 1, among male infants, higher levels of maternal frightening behavior were associated with disorganized-insecure behaviors characterized by combinations of pronounced avoidance, resistance, and conflict behavior. Among girls, higher levels of maternal frightening behaviors were associated with disorganized-secure behaviors. Girls who were classified disorganized-secure continued to approach their mothers while also displaying disorganized conflict behaviors such as hesitation, fearfulness, or freezing. These gender differences did not occur under low levels of maternal frightening behavior.

In contrast to these gender differences in response to frightening maternal behavior, clinical levels of maternal withdrawing behavior were associated with approaching forms of attachment behavior by both male and female infants. Therefore, a different theoretical lens may be needed for understanding responses to the attachment threat embodied in maternal withdrawal compared to that entailed in frightening behavior.

A second, unexpected set of findings also emerged indicating that as maternal behavior became more inadequate, males were more likely to display overt conflict behaviors than were females. This tendency occurred both in relation to frightening behavior and in relation to withdrawing behavior, with girls of frightening mothers more likely than boys to display behaviors classified as organized avoidant while girls of withdrawing mothers were more likely than boys to be classified as fully secure.

These gender differences in the likelihood of being classified disorganized are consistent with the greater incidence of disorganized attachment behavior among boys than girls reported by Carlson et al. (1989) in a maltreatment sample and by Vondra, Hommerding, and Shaw (1999) in a low-income sample. Notably, similar gender differences have not been reported in low-risk samples. The current results extend those findings by revealing that these gender differences only emerge as maternal behavior becomes more inadequate.

The gender-related differences found here also made sense of several aspects of the infant attachment data from this cohort that have been noted to be anomalous and puzzling in previous articles. First, high rates of maternal withdrawing behavior, as well as maternal Unresolved AAI classifications, have been noted among infants classified secure in this sample (Lyons-Ruth, Melnick, & Yellin, 2001). Second, in the sample as a whole, insecure girls were significantly more likely to be classified avoidant (50% D, 50% A) than insecure boys, who were more likely to be classified disorganized (82% D, 18% A; Lyons-Ruth, Bronfman, & Parsons, 1999). Finally, Lyons-Ruth, Bronfman, and Parsons (1999) observed that various aspects of the data, such as the data on attachment behaviors of maltreated boys versus girls, pointed to the conclusion that boys' attachment classifications were more reflective of the

quality of the mother–infant interaction, as judged by external observers, than were girls' classifications (80% of maltreated boys classified D compared to 25% of maltreated girls). The relations shown here between maternal withdrawal and girls' secure behaviors and maternal frightening behavior and girls' avoidant as well as D-secure behavior begin to systematize those puzzling observations and confirm that these are reliable effects. The important clinical caveat that emerges from these findings is that girls' attachment behaviors, as currently classified in the strange situation, may underrepresent the degree of difficulty in the mother–daughter relationship. Boys' attachment responses, in contrast, are likely to be reliable indicators of the quality of the mother–son interaction as coded by external observers.

Of course, we cannot infer causal direction from these associations. It is plausible that disorganized insecure boys might elicit more frightening behavior from mothers than disorganized insecure girls, for example. And it is possible to reason that secure behaviors by infants provoke more withdrawal from mothers in clinical samples than more avoidant behaviors. Importantly, however, maternal behaviors were quite similar toward boys and girls overall, in that an identical proportion of mothers were classified as displaying disrupted affective communication toward their infants in previous analyses (Lyons-Ruth, Bronfman, & Parsons, 1999). Therefore, the interpretation that frightening maternal behavior elicits different attachment responses from male and female infants seems most consistent with the data.

Girls' greater tendencies to seek proximity to a frightening mother may represent examples of Taylor et al.'s (2000) “tend and befriend” responses designed to cope with fearful arousal. Our tentative interpretation is that, when frightened, girls are more likely either to display affiliative behavior or to submit and inhibit both attachment and exploratory behavior, and that at times, these variations of fearful infant behaviors may be currently classified as secure or avoidant rather than disorganized.

Longitudinal data are needed to examine whether certain types of secure-appearing or avoidant-appearing behavior among infants of frightening or withdrawing mothers may function as precursors to the controlling-caregiving and compulsive-compliant behaviors seen among high-risk preschoolers. Crittenden's (1995) theoretical view places both the compulsive-caregiving (A3) and compulsive-compliant (A4) behavioral variants as more extreme forms of avoidant adaptations. Since Crittenden does not use the disorganized terminology, it is not clear where the pattern we term disorganized-secure would be placed in her system; however, the continued tendency to approach the parent in the D-secure group as well as the display of fearful or depressed, but not angry, affect also would seem to position these female infants of frightening mothers to move into compulsive-caregiving or compulsive-compliant patterns of attachment during the preschool years.

One infant, in particular, whose attachment responses had long puzzled us, illustrates these findings well. This infant, whose mother was highly withdrawing, was classified D-secure at 12 months, when she attempted to approach her mother at reunion but collapsed on the floor en route to her mother when her mother stepped back from her approach; however, by 18 months, she was classified avoidant because she was silent and immobile throughout the Strange Situation procedure. She exhibited the “frozen watchfulness” or combined hypervigilance and inhibition that have been described among traumatized children (for related case material, see also Jacobsen & Miller, 1998).

This child was at the extreme of the sample, but her behavior illustrates the possible developmental connections among D-secure conflicted approach behaviors and a variant of “avoidant” behavior characterized by extreme fearful inhibition of both attachment behavior and other exploratory behavior. We speculate that this “frozen watchfulness” may constitute a first step en route to compulsive-compliant or controlling-caregiving attachment adaptations.

Closer descriptive analysis of the types of disorganized conflict behaviors and fearful-inhibited behaviors displayed by male and female infants in high-risk samples are needed.

The stronger association between boys' disorganized behavior and mothers' frightening or withdrawing behavior is consistent with a large literature on boys' greater vulnerability to exhibit behavior problems in response to stressors. In contrast to girls, boys may react to fear with more action-oriented and more visible fight or flight behavior (e.g., Pahlavan, Duda, & Bonnet, 2000). Therefore, boys' negative and contradictory behaviors may be more pronounced and more obvious in relation to their caregivers, leading to a higher rate of placement in the disorganized category. In addition, their contradictory behaviors are more closely related to the stressful nature of the parent-child interaction, as quantified here by observer ratings of maternal behaviors.

Though not working from an attachment perspective, Murray, Woolgar, Briers, and Hipwell (1999) found similarly large gender differences in a high-risk group of school-age children of depressed parents. In a doll-play assessment, girls of depressed mothers were coded as exhibiting the most optimal play characteristics while boys of depressed mothers displayed the least optimal play scores. Both boys and girls of nondepressed parents received intermediate play scores and did not differ from one another. These data again suggest that gender differences are more likely to occur in at-risk samples and that female at-risk children may display affiliative and compliant behaviors and be successful in suppressing or controlling the expression of fearful or hostile affect while male at-risk children may display these negative affects more openly.

The capacity of female infants to maintain secure-appearing approach behaviors in the face of maternal withdrawal also may contribute to the pattern of findings obtained by Radke-Yarrow (1998). In that study, young children of unipolar depressed mothers were often classified secure in infancy, but did quite poorly over time in longitudinal follow-ups. In fact, young children classified secure were often rated in other situations as having behavior problems, at roughly the same time that their attachment patterns were being assessed (i.e., 1½–3½ years of age).

In summary, it becomes particularly important to examine gender-related differences in attachment behaviors in high-risk cohorts since it appears that gender differences may be exacerbated under more fear-arousing conditions. These findings also point to the possibility that infant attachment assessments may overestimate the security of girls in high-risk samples. At older ages as well, girls may be more prone to affiliative or caregiving behaviors in response to stress, and these caregiving behaviors also may be mistaken for better than average functioning when not viewed from an attachment perspective. We conclude that more work is needed to understand the early developmental trajectories of high-risk girls, trajectories that we know eventuate in early pregnancies, high rates of depression, and elevated rates of caregiving inadequacy in relation to their own infants.

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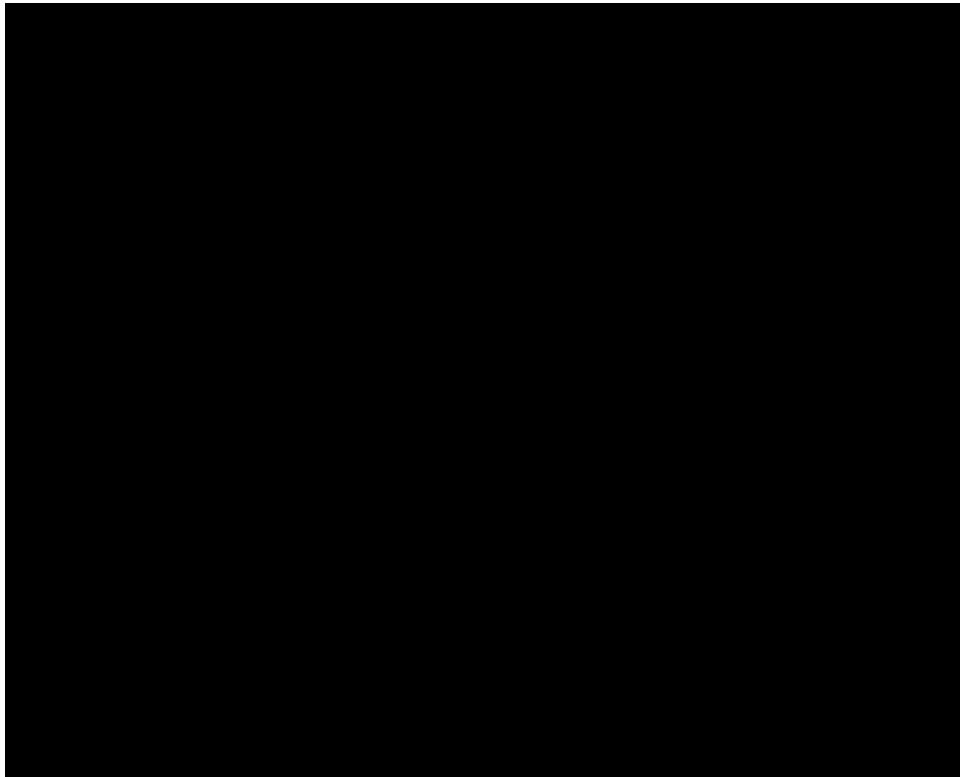


Figure 1.
Maternal frightening behavior, infant gender, and attachment behavior.

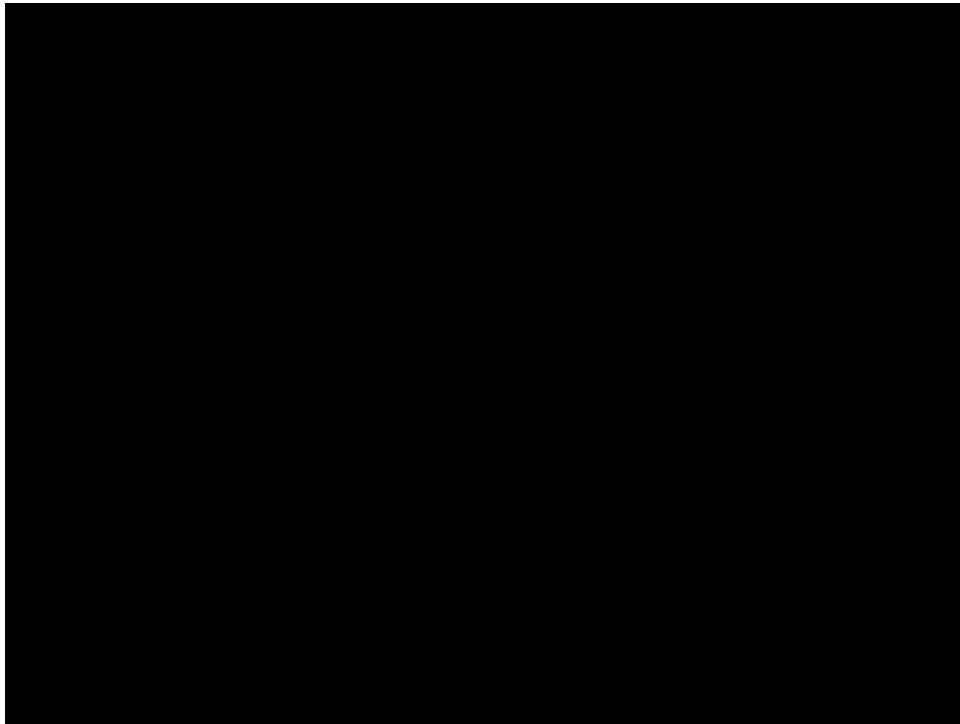


Figure 2. Maternal frightening behavior, infant gender, and infant attachment behavior: Clinically referred families only.



Figure 3. Maternal withdrawing behavior, infant gender, and infant attachment behaviors.



Figure 4. Maternal withdrawing behavior, infant gender, and infant attachment behaviors: Clinically referred families.

TABLE 1

Indices of Disorganized-Disoriented Infant Attachment Behavior

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- | | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Sequential display of contradictory behavior patterns, such as very strong attachment behavior suddenly followed by avoidance, freezing, or dazed behaviors. |
| 2 | Simultaneous display of contradictory behaviors, such as strong avoidance with strong contact-seeking, distress, or anger. |
| 3 | Undirected, misdirected, incomplete, and interrupted movements and expressions, for example, extensive expressions of distress accompanied by movement away from, rather than toward, the mother. |
| 4 | Stereotypes, asymmetrical movements, mistimed movements, and anomalous postures, such as stumbling for no apparent reason and only when the parent is present. |
| 5 | Freezing, stilling, and slowed “underwater” movements and expressions. |
| 6 | Direct indices of apprehension regarding the parent, such as hunched shoulders, fearful facial expressions. |
| 7 | Direct indices of disorganization and disorientation, such as disoriented wandering, confused or dazed expressions, or multiple, rapid changes in affect. |
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From “Procedures for Identifying Infants as Disorganized/Disoriented during the Ainsworth Strange Situation,” by Main & Solomon (1990). In M. Greenberg, D. Cicchetti, & E.M. Cummings (Eds.), *Attachment in the Preschool Years: Theory, research and intervention* (pp. 121–160). Copyright 1990 by the University of Chicago Press.

TABLE 2

Disorganized Attachment in Infancy: Subgroups

<i>Disorganized-Secure "Pseudo-secure"</i>	<i>Disorganized-Insecure "Avoidant-Resistant (A/C)"</i>
<ul style="list-style-type: none"> • Disorganized behaviors • Little avoidance or resistance • Distress to separation • Seeks proximity to parent • Calms to contact with parent • May appear passive, depressed, aimless, hesitant, or apprehensive 	<ul style="list-style-type: none"> • Disorganized behaviors • Avoidance, resistance, or both • Often appears quite conflicted • May combine separation distress with marked avoidance at reunion

TABLE 3
Main and Hesse (1992) Frightened or Frightening Coding Dimensions

1	Frightening parental behaviors e.g., Sudden “looming” into head/eye area; assumption of “attack” postures
2	Frightened parental behaviors e.g., Shows frightened facial expression or vocalization
3	Dissociative or trancelike behaviors e.g., “Haunted” voice tone; inexplicable state shifts
4	Sexual/spousal behaviors toward child e.g., Extended sexualized kissing or fondling

TABLE 4
Dimensions of Disrupted Maternal Affective Communication

1	Affective Errors
a.	Contradictory cues (e.g., invites approach verbally then distances)
b.	Nonresponse or inappropriate or mismatched responses (e.g., does not offer comfort to distressed infant; mother smiling while infant angry or distressed)
2	Disorientation (includes items from Main & Hesse, 1992)
a.	Confused or frightened by infant (e.g., exhibits frightened expression; quavering voice or high, tense voice)
b.	Disorganized or disoriented (e.g., sudden loss of affect unrelated to environment; trancelike states)
3	Negative-Intrusive Behavior (includes 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; bared teeth; looming into infants face; attacklike posture)
4	Role Confusion (includes items from Sroufe, Jacobvitz, Mangelsdorf, DeAngelo, & Ward, 1985; Main & Hesse, 1992).
a.	Role-reversal (e.g., elicits reassurance from infant)
b.	Sexualization (e.g., speaks in hushed, intimate tones to infant)
c.	Self-referential statements (e.g., a. "Did you miss me?"; "Ok, he doesn't want to see me.")
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)
