Maternal Unresolved Attachment Status Impedes the Effectiveness of Interventions
With Adolescent Mothers

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Abstract

Children of adolescent mothers are at risk for a variety of developmental difficulties. In the present study, the effectiveness of a brief intervention program designed to support adolescent mothers' sensitivity to their infants' attachment signals was evaluated. Participants were adolescent mothers and their infants who were observed at 6, 12 and 24 months of age. The intervention conducted by clinically trained home visitors consisted of eight home visits between 6 and 12 months in which mothers were provided feedback during the replay of videotaped play interactions. At 12 months, 57% of the mother-infant dyads in the intervention group and 38% of the comparison group dyads were classified as secure in the Strange Situation. Seventy-six percent of the mothers in the intervention group maintained sensitivity from 6 to 24 months compared with 54% of the comparison mothers. Further analyses indicated that the intervention was effective primarily for mothers who were not classified as Unresolved on the Adult Attachment Interview.
Maternal Unresolved Attachment Status Impedes the Effectiveness of Interventions With Adolescent Mothers

In industrialized western societies, pregnancy and motherhood during adolescence place both the mother and child at risk for a broad range of negative psychosocial outcomes. Furstenberg and colleagues (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989; Furstenberg, Brooks-Gunn, & Morgan, 1987) have shown that the social and economic futures of these young women are substantially compromised. Even prior to the pregnancy, teenage mothers often come from a background of poverty, have had conflicts with the law, have dropped out of school, rely on public financial assistance, and display other types of social maladjustment (Furstenberg et al., 1989; Lamb, 1988). This pattern of social, educational, and economic maladjustment may well be the precursor of developmental difficulties in the children of these mothers. Support for an inter-generational pattern of transmission comes from findings that children of adolescent mothers, relative to those born to older mothers, display markedly lower levels of academic achievement and perform less well on assessments of cognitive ability (Coley & Chase-Lansdale, 1998; Corcoran, 1998; Hoforth, 1987). By adolescence, these children show a broad range of maladaptive outcomes, including academic failure, early pregnancy, and a variety of anti-social behavior (Brooks-Gunn & Furstenberg, 1986; Fergusson & Woodward, 1999; Furstenberg, et al, 1987; Grogger, 1997; Hardy, et al., 1997).

Jaffee, Caspi, Moffitt, Belsky, and Silva (2001) proposed that the developmental difficulties shown by children of adolescent mothers could arise from at least two sources. First, adverse outcomes could be a product of the direct social, economic, and familial consequences of early childbearing. They called this source “social influence.” Here, the consequences of adolescent parenthood contribute to a maladaptive developmental environment, increasing the likelihood of poor outcomes for the children. Second, adverse outcomes could be a product of pre-existing maladaptive characteristics of the mother. For example, the same social-emotional difficulties that might have led to a mother’s early pregnancy could predispose her to poor parenting. They called this source “social selection.” Using this model as a framework, Jaffe et al. (2001) analyzed data from a New Zealand cohort born during two months of 1972. They found that the children of adolescent mothers were 2 to 3 times more likely to experience adverse academic and employment outcomes in adulthood, to commit violent offences, and to become adolescent parents themselves. Jaffe et al. also found compelling evidence that negative outcomes for the children of adolescent mothers were associated with both the social influence and social selection mechanisms of transmission. Family circumstances (social influence) and maternal characteristics (social selection) together accounted for 39% of the variance in outcome, with family circumstances and maternal characteristics independently accounting for 18% and 21% of the variance, respectively.

The Jaffe et al. (2001) conclusion that the personal characteristics of adolescent mothers contribute to adverse outcomes for their children, even when the negative social consequences of early childbirth are taken into account, takes on special importance in light of the fact that adolescent mothers are more likely than their peers to have experienced maladaptive parenting in their own childhood, including physical and sexual abuse, (Osofsky, 1990; Osofsky, Osofsky, & Diamond, 1988). Gershenson, Musick, Ruch-Ross & Magee (1989), for example, found that 61 percent of a large sample of adolescent mothers had suffered coercive sexual experiences; in almost one-third of the cases, the perpetrator was a family member. Such findings emphasize the need for new approaches to supporting adolescent mothers that address those aspects of the mother’s behavior that are likely to contribute to adverse developmental outcomes for her child. Based on attachment theory, a good starting point would be the style and quality of her interactions with her infant.

Adolescent mothers have been shown to be less responsive to their infants’ signals, to use
more intrusive and physical interventions, and to provide less verbal stimulation than adult mothers (Culp, Culp, Ososkys, & Ososkys, 1991; Culp, Ososkys & O'Brien, 1996; Garcia Coll, Hoffman, & Van Houten, 1987; Garcia Coll, Vohr, Hoffman, & Oht, 1986). They also attempt to promote independence in their infants prematurely (Osofsky, 1990). Not surprisingly, given such patterns of interaction, infants of adolescent mothers are less likely to form Secure attachment relationships than infants of older mothers. In their meta-analytic review, van IJzendoorn, Schuengel, and Bakersman-Kranenburg (1999) reported that only 40% of the infants in adolescent-mother samples compared to 62% in adult middle class samples had Secure attachment relationships. Further, infants of adolescent mothers displayed more Avoidant (33% versus 15%) and Disorganized (23% versus 15%) attachment relationships.

To summarize, the existing literature suggests that both the personal social and emotional histories of adolescent mothers and the quality of their interactions with their infants puts the infants at increased risk of developing non-Secure attachment relationships. Moreover, the developmental difficulties displayed by children of adolescent mothers are consistent with those associated with non-Secure attachment relationships in general (see Greenberg, 1999, for a review). It seems reasonable, then, that intervention efforts with this population focus on facilitating patterns of mother-infant interaction that are likely to increase the probability of a Secure infant-mother attachment relationship.

Attachment-Based Intervention Programs

All attachment-based early intervention programs are guided by the central claim of attachment theory that the quality of the attachment relationship is in large part determined by the responsiveness and sensitivity of the mother’s interactions with her infant (Ainsworth, Blehar, Waters, & Wall, 1978). Although it has proven more difficult to establish a robust empirical association between sensitive maternal interaction and Secure attachment than anticipated from the theory (see meta-analyses by DeWolff & van IJzendoorn, 1997; Atkinson, et al., 2001), individual studies employing well-established assessments in extended home observations have confirmed a strong association between the two factors (Pederson, Gleason, Moran, & Bento, 1998; Pederson & Moran, 1996). Attachment theory also holds that the mother’s ability to interact effectively with her infant is a function of her own cognitive representations of attachment and intimate relationships (Main, Kaplan, & Cassidy, 1985). It can be argued then that any attempts to modify a mother’s interactive behavior might be limited by the nature of her own representational status, and that intervention, at least for some mothers, might need to focus on the cognitive, intrapsychic level as well as on the behavioral-interactive.

In their meta-analysis of interventions aimed at promoting Secure attachment relationships, van IJzendoorn, Juffer and Duyvesteyn (1995) compared the effectiveness of behavioral and representational approaches and found that longer-term interventions aimed at modifying the mother’s representational structures were less effective than shorter-term interventions that focused directly on enhancing the quality of the mother’s interaction with her infant. The results of interventions were significant but highly variable: the combined effect size on maternal sensitivity was $d = 0.58$, with effect sizes for individual studies ranging from a high of 2.62 to a low of 0.0; effect sizes measuring the impact of the intervention on the security of the attachment relationship were much smaller (combined effect size, $d = 0.17$), again with considerable variability across studies, $d = -0.42$ to $+0.65$. In fact, three studies showed a negative impact of intervention on attachment security, all three involving longer-term, representational approaches. Even within those studies evaluating shorter-term, behavioral approaches, the effects were highly variable and the actual interventions were very diverse.
showing little or no commonality across studies. A more recent meta-analytic review (Bakermans-Kranenberg, van IJzendoorn, & Juffer, 2003) largely replicated the earlier review, confirming that interventions with a clear behavioral focus were the most effective, but added the unexpected conclusion that behavioral intervention programs using only a moderate number of sessions were more effective than more extensive programs. Although both these reviews provide encouragement that successful intervention is possible, understanding the actual mechanisms of success remains a challenge.

A comprehensive study involving the behavioral approach was carried out in the Netherlands by van den Boom (1994). The effect sizes for intervention in this study were dramatically higher than those of any other study reported in both meta-analyses. van den Boom worked with 100 low-income adult mothers and their highly irritable infants. One-half of the mothers received a brief intervention involving three home visits when the infants were between 6 and 9 months of age. The intervention aimed at increasing the mother’s attentiveness to her infant’s signals and at improving her responsiveness in interactions, initially by imitation of the infant’s signals. The results were striking. When infants were 9 months of age, mothers in the intervention group were significantly more stimulating, responsive, attentive, and controlling in interactions with their infants than mothers in the control group. Infants in the intervention group were more sociable, better able to self-soothe, and showed more functional play than their counterparts in the control group. In the Strange Situation when infants were 12 months, 78% of the intervention group dyads were in Secure attachment relationships compared to only 38% of those in the control group. In a follow-up study, van den Boom (1995) found that the effects of the intervention on maternal interactions and on the attachment relationships were sustained in observations carried out when the infants were 18, 24, and 42 months of age. The van den Boom studies provide compelling evidence that a brief, interaction-focused intervention in the first year of an infant’s life can effectively change maternal interactive behavior and facilitate the development of a secure infant-mother attachment relationship. Although these findings hold promise for work with adolescent mothers, the adult mothers in the Dutch sample were very different from most adolescent mothers in North America: almost 100% lived in a nuclear family and their average age was 25 years. As well, their children appear to be different from children of adolescent mothers. Only 10% of the dyads in the Dutch sample had Disorganized attachment relationships, a finding consistent with the conclusion that most of the children were not at high risk for serious developmental difficulties. Within our research group, Krupka (1995) conducted two studies of young, socio-economically disadvantaged mothers for her doctoral thesis. In the first study, developmental changes in the patterns of interaction between the young mothers and their infants were examined. Significant decreases were found in maternal sensitivity over the first year, as well as increases in parenting stress and depression. In Strange Situation assessments, 39% of the dyads were classified as Avoidant and only 37% were classified as securely attached in contrast with the 66% typically reported in samples of middle class older mothers. Based on her review of studies of mother-infant psychotherapy and early intervention programs, Krupka developed a home-based intervention program designed to attenuate the decline in maternal sensitivity that had been observed. In the second study, 23 mothers were randomly assigned to an Intervention group and 23 to a Comparison group. Mothers and infants in the Intervention group received 12 to 16 home visits when the infants were between 6 and 13 months of age. The intervention included a discussion of the mother’s current life experiences especially around parenting, videotaping the mother and infant at play, and reviewing the tape with the mother. The home visitor affirmed the mother’s parenting skills and encouraged her to
reflect on her infant’s thoughts and feelings and to note her own strengths. Mothers and infants in the Comparison group were visited once at 9 months to videotape mother-infant interactions. Maternal sensitivity was assessed in home visits (by independent observers) at 6 and 13 months. The sensitivity scores were comparable for both groups at 6 months. At 13 months, mothers in the Comparison group demonstrated the drop in sensitivity seen in the first study. In contrast, mothers in the Intervention group increased in sensitivity, although levels remained lower than those reported for older mothers in middle class samples. Correspondingly, 68% of dyads in the Intervention group were classified as secure in the Strange Situation assessment of attachment whereas only 35% of the dyads in the Comparison group were secure. The purpose of the present study was to extend Krupka’s (1995) intervention study using a larger sample and including assessments of the mother’s attachment representational system.

Method

Participants

Participants in the present study were adolescent mothers and their infants recruited into a longitudinal intervention study conducted by the Child Development Centre at the University of Western Ontario. Mothers who met the following criteria were initially approached during their postpartum stay in a London, Ontario hospital: less than 20 years of age, uneventful delivery, and infants born at full term with no medical complications. Those who lived in London and had expressed an interest in participating in the study were contacted again when the infant was 5 months of age. Initial assessment visits were conducted when the infants were approximately 6 months of age. By the end of the recruitment process, 100 dyads were involved in the study and, of these, 99 dyads (50 girls and 49 boys) completed the assessments at 12 months and 90 dyads (46 girls, 43 boys) remained in the study through the 24-month assessments.

Demographic information was obtained during the first home visit. Approximately 81% of the sample were Caucasian; the remaining mothers were of Native American (n=5), Middle Eastern (n=5), Latin American (n=1), and Asian (n=1) ethnic backgrounds. Fifty-seven percent were single/never married, 28% were living common law, and 15% were married. Mean age at the time of the infant’s birth was 18.42 (SD = 1.01) with a range from 15.97 to 19.98 years. Annual personal and family incomes were recorded on a scale from 1 to 8, with 1 as “less than $5,000” and 8 as “more than $60,000” (Canadian dollars). The average personal income corresponded to approximately 2 – “between $5,000 and $9,999.” Average household income was only slightly higher, corresponding to approximately 3 – “between $10,000 and $19,999”. The majority of the sample (80%) reported being unemployed or a full time student. According to Statistics Canada, the low income cutoff for a 2 person family living in a city the size of London per year was $18,367 (Paquet, 2001).

Overview of the Procedure

Researchers trained in home observations assessed each mother-infant dyad in their home when the infants were 6, 12, and 24 months of age. The Adult Attachment Interview (AAI, George, Kaplan, & Main, 1985) was also administered at 6 months of age. After the 6-month baseline visit, mothers were randomly assigned to an Intervention or Comparison group. Dyads in the Intervention group received eight home visits between 7 and 12 months; dyads in the Comparison group received one visit at 9 months. When the infant was approximately 12 months of age, each dyad took part in the Strange Situation procedure.

The Intervention Program

Rationale. The intervention program was based on the assumption that the development of a secure attachment relationship is a major developmental task in the last half of the infant’s first year of life. The goal of intervening was to support the mother’s sensitivity to her infant. We focused on maternal sensitivity for three reasons. First, sensitivity is theoretically (Ainsworth, Bell, & Stayton, 1971; Ainsworth, et al., 1978; Bowlby, 1969) and empirically (DeWolff & van IJzendoorn, 1997; Pederson & Moran, 1996; van den Boom, 1994) the primary experiential determinant of attachment security. Second, Krupka (1995) observed a decline in sensitivity over the first year in young mothers. This decline was particularly noticeable in the
latter half of the infant’s first year. Finally, the observation and assessment of maternal sensitivity has been the focus of our research group over the past decade (Moran, Pederson, Pettit, & Krupka, 1992; Moran, Pederson, & Tarabulsy, 1996; Pederson & Moran, 1995, 1996; Pederson et al., 1998). It seemed prudent to target behaviors that we had worked hard to understand.

Although inviting mothers to participate in centre-based parenting groups may have afforded several practical advantages, given the characteristics of adolescent mothers, we decided to use a home visiting program. In our experience, adolescent mothers are wary of institutions, perhaps because of their perception that service providers in hospitals, schools, and government social support agencies judge them negatively. Transportation and other logistic problems also provide practical impediments for mothers on limited income. For these and other reasons, adolescent mothers are seldom enthusiastic participants in centre-based parenting programs. Home visits are labor intensive and initially costly but the low attrition rate in our intervention group (1 out of 50 mothers) indicates that adolescent mothers may be more willing to participate in such programs, resulting in future benefits for the children, the mothers, and society in general.

The word “intervention” was not used to describe our study as it may have had a negative impact on our adolescent mothers. Instead, participants were told that we were interested in seeing how young mothers and babies played together and in trying new ways of playing that would be fun for both mother and baby, with the ultimate goal of developing support programs for adolescent parents. The visits were designed to provide experiences of mutually beneficial play interactions and to support the mother’s enjoyment of her infant. There were four general goals that served as guides to the home visitors. The first goal was to affirm parenting strengths already present in the mother. A second goal was to increase the mother’s awareness of how her behavior influenced her infant’s behavior. The visitors also looked for ways to augment the mother’s awareness of her infant’s signals and for ways to establish positive experiences for both the mother and the infant.

**Intervention procedures.**

Home visits lasted approximately one hour and were carried out by two mature women who had raised their own families and who were also knowledgeable about infant development and attachment theory and research. One visitor had a Ph.D. in child clinical psychology and the second visitor was an early childhood educator with over 10 years’ experience in working with children and families in preschool settings. The first four families were seen by both visitors to be sure that similar approaches were used in conducting the visits. The visitors also met biweekly to review their cases as a check on the uniformity of the intervention procedures.

In the initial part of each visit, the home visitor focused on building rapport with the mother since a trusting relationship plays an important role in any support system. The mother and infant were videotaped for about five minutes while playing with age appropriate toys and the tape was played back for the mother to observe and discuss. During the review, the home visitor commented on maternal behavior that the infant appeared to enjoy and asked for the mother’s interpretation of her infant’s behavior. The discussion focused on identifying positive features of the interactions and on providing the mother with opportunities to ponder her infant’s motivational states. For example, if the mother’s intrusiveness stimulated the infant to turn away, the visitor might note that the infant seemed to be looking away and ask the mother for her interpretation of what the infant might have been thinking or feeling at that time.

A seven-level hierarchy of interaction, adapted by Krupka (1995) from Clark and Seifer (1983) served as a framework for the home visitors. At the low levels of this hierarchy (least sensitive interactional behavior), mothers were under-involved or intrusive. Maternal behavior at the middle levels consisted of monitoring and acknowledging infant behavior. Maternal imitation and elaboration of infant-initiated play constituted the top levels of the hierarchy (most sensitive interactional behavior). Home visitors used descriptions of these ordered levels in planning the goals for a particular home visit and as a framework for providing feedback to the mother. The goal of the eight home visits was to facilitate the mother’s progression along this hierarchy. Funding constraints limited the number of intervention visits in the present study to 8
in contrast with the 12 to 16 intervention visits in the Krupka (1995) study. The first three visits were carried out within one week of each other in order to establish rapport with the mothers. The subsequent five visits were spaced about three to four weeks apart. Each visitor made two or three visits per week and had a case load of 6 or 7 families at any one time. Completing the eight home visits was time consuming and often challenging. Phone calls were always made within 24 hours of a scheduled visit to confirm that the time did not conflict with the baby’s current naptime. Despite this re-confirmation, some mothers would not be at home when the visitor arrived, necessitating a rescheduling of about 20% of the visits. Explanations when offered were typical of adolescents – for example a friend had come by unexpectedly and they had gone to the mall. It took about 2 years to complete the Intervention program for the 49 mothers. Mothers in the Comparison group received one home visit when their infants were 9 months-old. They were interviewed about their current relationships and a videotape was made of infant-mother play, feeding, and other activities of the mother’s choice.

**Measures**

**Strange Situation Procedure.**

At 12 months of age the infant-mother dyads visited the university and participated in Ainsworth’s Strange Situation procedure (Ainsworth et al., 1978). This laboratory procedure, consisting of a succession of separation and reunion episodes between the mother and her infant, was designed to heighten infant attachment behavior. The infant’s behavior at reunion with the mother is of particular interest. Infant-mother relationships were assigned to one of four attachment relationship classifications: Secure, Avoidant, Resistant, and Disorganized/disoriented, based on the infant’s behavior during the Strange Situation (Ainsworth et al. 1978; Main & Solomon, 1990). Secure infants responded to the mother’s return in the reunion episodes by showing a desire for proximity or contact or a wish for interaction. These infants were effective in obtaining comfort from the mother and were then able to resume exploration of the environment. Avoidant infants showed little or no desire for proximity, contact, or interaction with their mothers. In fact, they tended to ignore or avoid their mothers during the reunion episodes. Resistant infants typically fuss during separations and had difficulty resuming play during reunions. They displayed angry behaviors which appeared to interfere with receiving comfort from their mothers and thus failed to use their mothers as a source of security in order to resume exploration. Disorganized/disoriented infants exhibited inexplicable and/or odd behaviors in the presence of their caregivers in the strange situation. They did not appear to have an organized strategy for coping with the stress of the situation. These behaviors included sequences of strong attachment behavior followed by strong avoidance in reunion, lengthy bouts of freezing or stilling, or signs of fear of the mother such as crouching on approach. Infants classified as Disorganized were also assigned to the best fitting Secure, Avoidant, or Resistant classification. The Strange Situations were coded by individuals who had passed the Stroufe and Carlson reliability test for Secure, Avoidant, Resistant and Disorganized classifications. For reliability purposes, 25 Strange Situations were independently coded with 88% reliability for the four classifications (Kappa = .78, p < .001).

**Adult Attachment Interview.**

The Adult Attachment Interview (AAI) (George, et al., 1985) was conducted with the mothers when infants were 6 months of age. The AAI includes questions addressing the mother’s experiences with attachment figures; early childhood and perceptions of her parents at that time; experiences of early emotional and physical upsets; physical and sexual abuse; and, deaths of loved ones. Mothers also were asked to reflect on how these past experiences may have affected their present personalities. In accordance with the AAI coding system (Main & Goldwyn, 1998), each transcript was classified for state of mind with respect to attachment. Autonomous individuals responded to questions about their childhood in a consistent, relevant and coherent manner. Dismissing adults often idealized their childhood experiences, had difficulty providing explicit examples to support their overall positive characterizations of childhood relationships, and sometimes appeared oblivious to clear contradictions in their stories. Preoccupied adults, on the other hand, typically expressed confusion, passivity, anger, and distress when speaking about their attachment figures; interviews often were incoherent and difficult to follow.
Unresolved/disoriented (U/d) individuals exhibited lapses in monitoring of reasoning or discourse during discussions of abuse or loss. Thirty-five interviews were classified independently by coders who had passed the Main and Hesse reliability test procedures with 86% agreement (Kappa = .782, p < .001). Differences were resolved by conferencing.

Maternal Behavior Q-Sort.

Dyads were observed in their homes when infants were 6, 12, and 24 months of age. Following each two-hour semi-structured home visit, trained observers completed the Maternal Behavior Q-sort (MBQS, 3rd edition; Pederson, Moran & Bento, 1998). The MBQS consists of 90 behavioral items that correspond to different aspects of the mother’s interactive behavior. Observers progressively sort these cards into nine equal piles from 1 (most unlike the mother’s behavior) to 9 (most like the mother’s behavior). The mother’s sensitivity score is the correlation between the Q-sort description of her behavior and a description of a prototype of a sensitive mother. Inter-observer correlations of the Q-sort sensitivity scores were 0.89 at 6 months (n = 70), 0.91 at 12 months (n = 78), and 0.87 at 24 months (n = 26).

Results

Intervention and the Quality of the Attachment Relationship

Fifty-seven (58%) of the 99 dyads were classified as Disorganized in the Strange Situation at 12 months, reflecting the high risk nature of this sample. Twenty-eight (54%) of the infants in the Intervention group and 29 (58%) in the Comparison group were classified as Disorganized. The intervention...
who declined in sensitivity to a 24-month sensitivity of less than 0.4, plus four mothers whose sensitivity increased somewhat but remained below 0 at 24 months. A significantly greater number of mothers in the Intervention group (76%) were found to be in the Positive Outcome Group than mothers in the Comparison group (54%) \[\chi^2 (1) = 4.62, p < .05, w = .21\].

The results of the above analyses indicate that the brief intervention had a positive impact on the quality of mother-infant interactions. However, examining the data in terms of Positive and Negative Outcome groups, it became apparent that approximately one-quarter of the mothers participating in the intervention did not appear to benefit. Therefore, further analyses were carried out to identify factors that might account for the variation in the effectiveness of the intervention across individuals. Based on attachment theory and on our understanding of the characteristics of adolescent mothers, two factors were examined more closely: the mother’s state of mind with regard to attachment and the mother’s experience of trauma, as determined by her responses in the Adult Attachment Interview (AAI) when the baby was 6 months-old. *The moderating effect of Unresolved/disoriented state of mind on the effectiveness of intervention.*

Thirty-seven mothers (37%) were classified as Unresolved/disoriented (18 or 37% in the Intervention and 19 or 38% in the Comparison Group). To examine the effectiveness of the intervention in relation to Unresolved/disoriented state of mind on the AAI, chi-square analyses were performed on the frequencies of Secure attachment in dyads in which the mothers were or were not classified as Unresolved/disoriented. For dyads in which the mother was Unresolved/disoriented, 6 of the 18 dyads in the Intervention group and 6 of the 19 dyads in the Comparison group were classified as Secure (33% and 32% respectively, \[\chi^2 (1) = 0.01, ns\]) in the Strange Situation at 12 months. For the mothers who were not classified as Unresolved/disoriented, 22 of the 31 dyads in the Intervention group and 13 of the 31 dyads in the Comparison group were classified as Secure (71% and 42% respectively, \[\chi^2 (1) = 5.31, p < .05, w = .23\]). These data indicate that the intervention was effective in promoting a Secure infant-mother attachment relationship only when the mother was not classified as Unresolved/disoriented on the AAI.

A second set of analyses suggested that the differential effectiveness of the intervention on the quality of the attachment relationship could be traced to the impact of the intervention on the sensitivity of the mothers. Maternal sensitivity scores for Intervention and Comparison groups are presented in Figure 1. Between 6 and 12 months, the period of the intervention, sensitivity dropped for Unresolved/disoriented mothers in both the Intervention and Comparison groups. For mothers who were not Unresolved/disoriented, there also was a drop in sensitivity for mothers in the Comparison Group but not for those in the Intervention group. Between 12 and 24 months, the sensitivity of mothers in the Intervention group who were not Unresolved/disoriented increased markedly to over 0.60. Although the sensitivity of mothers who were Unresolved/disoriented and involved in intervention also increased, scores remained below the levels displayed at 6 months and were considerably less than those of the not-Unresolved/disoriented mothers in the same group. Mothers who were Unresolved/disoriented and in the Comparison group displayed the lowest average level of sensitivity at 12- and 24-months. A repeated measures analysis of variance of maternal sensitivity at infant ages 6-, 12-, and 24-months, with Intervention and Unresolved/disoriented status as between-subject factors, revealed a main effect for infant age [F(2,85) = 6.74, p < .01] and an effect for Unresolved/disoriented status [F(1,86) = 7.12, p < .01] but no significant interaction between the impact of intervention and the mother’s state of mind regarding attachment [F(2,85) = 2.42, p < .095].

This general pattern of results, however, received statistical substantiation by way of an alternative analysis using the same metric of change in sensitivity described above. Mothers participating in the intervention were more likely to be in the Positive Outcome Group (described above) only if they were not classified as Unresolved/disoriented. More specifically, 24 of the 29 mothers in the Intervention Group and 17 of the 30 mothers in the Comparison Group who were not Unresolved/disoriented were in the Positive Outcome Group (83% and 57% respectively; \[\chi^2 (1) = 4.74, p < .05, w = .22\]). In contrast, for mothers who were Unresolved/disoriented, the number of mothers in the Positive Outcome Group did not differ
significantly between Intervention (11 of 17 dyads) and Control Groups (7 of 14 dyads (65% and 50% respectively, \(\chi^2 (1) = 0.68, \text{ns} \)).

The moderating effect of maternal childhood abuse on the effectiveness of intervention.

During the Adult Attachment Interview, 52 mothers reported sexual or physical abuse during childhood (26 in the Intervention and 26 in the Comparison Group) and 47 did not report abuse. There were no significant differences in the frequency of security between Intervention and Comparison Groups when examined separately for mothers who did or did not report abuse. Similarly, a repeated measures analysis of variance revealed a main effect for infant age \([F(2,83) = 5.48, p < .01]\) but only non-significant trends for intervention and childhood abuse and an interaction between these two factors. However, mothers participating in the intervention were more likely to be in the Positive Outcome Group only if they had not reported childhood abuse. Eighty-six percent of mothers in the Intervention group with no history of abuse were in the Positive Outcome group, in contrast to 58% of mothers in the Comparison group. \(\chi^2 (1) = 4.09, \text{p} < .05, w = .30\). For mothers who reported childhood sexual or physical abuse, the intervention had no significant impact on sensitivity change groups (Intervention = 68% and Comparison Group = 50% in the Positive Outcome Group \(\chi^2 (1) = 1.50, \text{ns} \)).

Discussion

This study was prompted by a set of inter-related observations and conjectures: the children of adolescent mothers have been shown to be at risk for later social and emotional problems; there is some indication that the patterns of dysfunctional interaction between adolescent mothers and their infants may contribute to these developmental difficulties; adolescent mothers are likely to have had a history of physical and sexual abuse in their own childhoods that may well underlie their dysfunctional interactions with their infants; and finally, attachment-based interventions in the first year of life have been shown to enhance mother-infant interactions and to promote secure attachment relationships. This study explored the impact of a brief, early intervention on the sensitivity of maternal interactions over the first two years of an infant’s life and on the quality of the attachment relationship in a group of adolescent mothers and their infants. Particular attention was paid to the moderating effect on the intervention of a maternal history of childhood trauma associated with an Unresolved/disoriented state of mind regarding attachment.

The results confirmed that interaction-focused intervention in the first year of life can improve the quality of the relationship between adolescent mothers and their infants and that the improvement in interactions persists into at least the second year of the child’s life. These results parallel and extend published studies of mothers who were not drawn from a high-risk population (van Ijzendoorn, et. al, 1995; van den Boom, 1994, 1995). The study also provides another example of the success of relatively brief, behavior-focused interventions, supplementing those reviewed in the meta-analysis by Bakermans-Kranenburg et al. (2003).

A basic tenet of attachment theory is that early mother-infant interaction is the overriding determinant of the quality of the relationship. Theory and much supporting empirical evidence indicate that this relationship forms a critical foundation for the future social and emotional development of the child and that a failure to develop an organized attachment relationship is associated with developmental risk. Our intervention was directed at the quality of this early interaction and it succeeded in enhancing sensitivity in most adolescent mothers, thus making it more likely that their infants will develop secure attachment relationships. Relatively non-invasive and low-cost programs similar to the one described in this study can provide effective support for infants who might otherwise be at risk for serious developmental difficulties that are likely to be much more resistant to modification later in childhood and adolescence.

Consistent with attachment theory, the increased likelihood of Secure attachment relationships in the Intervention group was associated with a parallel increase in the sensitivity of observed interactions between the adolescent mother and her infant. Unexpectedly, however, a statistically significant difference in sensitivity between those mothers who participated in the intervention program and those who did not was not observed in interactions in the home until the children were 24 months of age. This finding is inconsistent with the fact that the positive impact of the intervention was seen in a relatively higher frequency of Secure attachment
relationships in the Strange Situation at 12 months. It seems likely that these apparently puzzling results are a function of a number of inter-related factors, some reflecting the socio-behavioral processes and others the power of our analyses. As we reported in the introduction, previous work in our research group (Krupka, 1995) suggested that maternal sensitivity in adolescent mothers declines substantially between 6 and 12 months infant age. This trend would tend to mask any positive impact of intervention, perhaps simply eliminating or reducing such a decline rather than producing an increase in sensitivity at 12 months. Perhaps more importantly, as discussed in detail below, the results of this study indicate that some mothers, those with a history of trauma associated with an Unresolved/disoriented state of mind regarding attachment, are resistant to the positive effects of intervention, at least for the intervention mode used in this study. Indeed, only a subset of adolescent mothers involved in the intervention displayed a clear positive impact. Those who were not classified as Unresolved/disoriented maintained their average level of sensitivity from 6 to 12 months sharply increased in sensitivity between 12 and 24 months, and displayed a substantially higher level of sensitivity at the end of the study. The fact that this complex but distinct pattern of change in sensitivity was not revealed in a statistically unambiguous manner in our analyses may be more a function of a loss of power resulting from the division of the sample into relatively small groups than a reflection of lack of robustness of the intervention effect.

The observed variability in the effectiveness of the intervention raises a number of interesting conceptual issues worthy of investigation in future research. The pattern of changes in maternal sensitivity in mothers who did not receive intervention in this study was consistent with that observed in earlier work in our research group. Adolescent mothers displayed a reasonably positive style of interaction with their infants until about six months of age but, in the absence of support, the average level of sensitivity drops dramatically by the time their infants are one year of age (Krupka, 1995). For the majority of mothers receiving intervention in this study, this pattern of decline between 6 and 12 months was not significant and interactions appeared substantially more sensitive at 24 months of age. This overall result was paralleled by a relatively higher percentage of Secure attachment relationships assessed in the Strange Situation at 12 months when compared to the Comparison group of mothers and infants. However, approximately 25% of mothers involved in the intervention failed to show increased sensitivity in their interactions when their infants were two years of age and their interactions remained very dissimilar to those of mothers expected to develop and sustain a secure attachment relationship with their child. Additional analyses revealed that these mothers were more likely to have been classified on the AAI as having an Unresolved/disoriented state of mind associated with childhood experiences of loss or abuse than those who benefited from the intervention. For these mothers, a brief, behavior-focused program of intervention failed to prevent the decline in the quality of the interactions that were critical to the formation of a Secure relationship with their infants. Why might this be so? Within attachment theory, trauma is seen as a necessary but not sufficient condition for the development of an Unresolved/disoriented state of mind, a mental representational state that interferes with a coherent approach to intimate interaction which is essential for an organized relationship. That is, although the trauma of loss or abuse often interferes with the development of an organized state of mind regarding intimate relationships, this maladaptive Unresolved/disoriented representational state is not seen in those who manage to integrate and resolve these experiences. It is the absence of an organized representational state rather than the direct effects of loss or trauma that creates relational and emotional difficulties. Developing this theme, Main and Hesse (1990, Hesse & Main, 1999) and others (Jacobvitz, Hazen, & Riggs, 1997; Lyons-Ruth, Bronfman, & Atwood, 1999; Lyons-Ruth & Jacobvitz, 1999; Schuengel, van IJzendoorn, Bakermans-Kranenburg, & Blom, 1999) have argued that trauma, when associated with an Unresolved state of mind in the mother, gives rise to fear and anxiety. These states, in turn, are likely to be associated with behaviors that interfere with effective interactions with the infant. Such manifestations include fearful and frightening behavior, an inability to repair or correct interactions that might be distorted by such behavior, and a pervasive disruption of the essentials elements of a framework for adaptive mother-infant interaction. Our finding that a maternal Unresolved/disoriented state of mind was associated
with the persistence of insensitive interaction between mothers and infants is consistent with this model. The finding that the Unresolved/disoriented status was also associated with a failure to benefit from Intervention supports the conclusion that the absence of an organized state of mind regarding attachment is a substantial threat to the mother-infant relationship.

A related, emerging body of theory and research provides some clues to the pervasive and persistent impact of maternal Unresolved/disoriented attachment status on early interaction. Lyons-Ruth and Block (1996) have pointed to the possibility that the inability of these mothers to integrate their own childhood trauma within an organized state of mind regarding attachment is likely to be manifest by symptoms of Post Traumatic Stress Disorder (PTSD). They propose a link between the established psycho-emotional characteristics of PTSD and the maladaptive interactions of Unresolved/disoriented mothers and their infants. DeOliveira, Bailey, Moran and Pederson (in press) have elaborated on this suggestion, outlining a model in which the symptoms associated with chronic childhood trauma are reflected in particular deficits in those key aspects of early mother-infant interaction that support the normal development of affect regulation. They argue that the acquisition of organized patterns of affect regulation, a process that is dependent on these early interactions, is critical for the establishment of an organized attachment relationship. Their model, then, posits a complex developmental chain across generations: childhood trauma leading to an Unresolved/disoriented state of mind in the mother, the established psycho-emotional symptoms of PTSD, interference with early mother-infant interactions that are particularly critical to the development of effective affect regulation strategies in the infant, and, ultimately, the development of a Disorganized attachment relationship. The early stage in this development of Disorganized attachment is a pattern of early interaction that is ultimately highly dysfunctional but, at the time, may be an unavoidable outcome of the mother’s Unresolved/disoriented state of mind.

In addition to the relative ineffectiveness of the intervention with mothers who were classified as Unresolved/disoriented or who had experienced trauma as children, it was notable that the intervention had no effect on the likelihood of observing Disorganized patterns of attachment. It appears that the intervention procedures, aimed at enhancing maternal sensitivity, had little impact on those dyads who were destined to develop Disorganized relationships, the category of relationship most often linked to substantial developmental problems for the child. This result constitutes another challenge in conducting research and designing programs of intervention for high-risk populations. As noted by Bakermans-Kranenburg et al. (2003), behavior-focused intervention programs, including the one presented here, have been designed to increase maternal sensitivity and, in turn, the likelihood of Secure attachment relationships. However, the antecedents of a Disorganized attachment relationship may lie in other features of the mother’s behavior and, as a result, may need to be addressed by a distinct intervention program. Several other approaches to intervention with at-risk mother-infant dyads have utilized techniques that move beyond a traditional, sensitivity-based focus and may hold promise for dyads like those who did not appear to benefit in this study. The details of such interventions, however, vary widely, invoking both behavioral and intra-psychic therapeutic techniques. For example, Benoit, Madian, Lecce, Shea, and Goldberg (2001), in their work with a clinical sample of mothers and infants referred with a range of serious developmental problems, utilize video records of interactions to provide the mother with unusually directive feedback regarding the most atypical aspects of her interactions with her child. Heinicke, et al.’s (1999) intervention program for mothers and infants identified as being at substantial developmental risk, in contrast, used well-qualified social workers in a program that focused on relationship formation and the development of a therapeutic atmosphere of trust in which the mother’s personal psychological issues could be addressed. In a final example of a program aimed at assisting at-risk mothers and their infants, Marvin, Cooper, Hoffman, and Powell’s (2002) “Circle of Security” involves an innovative application of basic attachment principles in a group intervention model. Although each of these approaches resulted in positive outcomes, the diversity of the participants and their contrasting techniques provide no clear insight into the psychological mechanisms underlying their success.

A next step towards understanding why an Unresolved/disoriented state of mind poses
such an impediment to both sensitive, effective mother-infant interactions, and to the success of interventions aimed at increasing maternal sensitivity, is to explore the specific nature of the emotional and psychological symptoms associated with the trauma the mothers have experienced. Identification of these symptoms is a pre-requisite to understanding their relation to mother-infant interactions and to designing effective approaches to removing the impediment to mutually beneficial interactions and the formation of an organized attachment relationship. These issues will be addressed in a follow-up to this intervention study, providing initial results of a more detailed study of the childhood experiences of these same adolescent mothers and their reports of trauma-related symptoms.

References


Figure 1. Maternal Sensitivity Related to Intervention and Unresolved Adult Attachment Interview Classification