The importance of parenting in the development of disorganized attachment: evidence from a preventive intervention study in adoptive families

Femmie Juffer, Marian J. Bakermans-Kranenburg, and Marinus H. van IJzendoorn
Center for Child and Family Studies, Leiden University, The Netherlands

Background: As infant disorganized attachment is a serious risk factor for later child psychopathology, it is important to examine whether attachment disorganization can be prevented or reduced. Method: In a randomized intervention study involving 130 families with 6-month-old adopted infants, two attachment-based intervention programs were tested. In the first program, mothers were provided a personal book, and in the second program mothers received the same personal book and three home-based sessions of video feedback. The third group did not receive intervention (control group). Results: The intervention with video feedback and the personal book resulted in enhanced maternal sensitive responsiveness (d = .65). Children of mothers who received this intervention were less likely to be classified as disorganized attached at the age of 12 months (d = .46), and received lower scores on the rating scale for disorganization than children in the control group (d = .62). In the book-only intervention group children showed lower disorganization ratings compared to the control group, but no effect on the number of infants with disorganized attachment classifications was found. Conclusion: Our short-term preventive intervention program with video feedback and a book lowered the rate of disorganized attachment. The effectiveness of our intervention documents the importance of parenting in the development of infant attachment disorganization. Keywords: Adoption, attachment, intervention, parent–child relationships. Abbreviations: SSP: Strange Situation Procedure; A: insecure avoidant attachment; B: secure attachment; C: insecure ambivalent attachment; D: insecure disorganized attachment.

Most infants develop an organized strategy to deal with the stresses of separations, illness, and other threatening events. Whereas secure (B) as well as insecure avoidant (A) or ambivalent (C) attachment relationships can be considered as organized strategies, adaptive to the child’s environment (Main, 1990), some attachment relationships appear to be characterized by the absence or breakdown of an organized strategy, hence defined as disorganized (D; Main & Solomon, 1990). A meta-analysis of 80 studies (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999) showed that the rate of disorganization in low-risk families is about 15%, whereas in high-risk samples elevated rates (up to 80%) have been found. Several studies have shown that disorganized attachment in infancy is predictive of problematic stress management (e.g., Spangler & Grossmann, 1993), externalizing behavior problems (e.g., Lyons-Ruth, Easterbrooks, & Cibellii, 1997), and dissociated behavior in adolescence (Carlson, 1998). The conclusion that disorganized attachment predicts later child psychopathology (for reviews, see Green & Goldwyn, 2002; Lyons-Ruth & Jacobvitz, 1999) highlights the clinical importance of this pattern of attachment as well as the need to search for determinants of attachment disorganization with the ultimate goal to develop effective interventions.

In a pioneering study Main and Hesse (1990) found an association between unresolved loss or trauma in parents’ state of mind and disorganized behavior in their infants. This finding has been replicated in several subsequent studies and documented in a meta-analysis (van IJzendoorn, 1995). Based on this theoretical model, some studies found evidence that ‘frightening’ or ‘frightened’ parental behavior mediates unresolved mental representation of attachment and children’s disorganization (Abrams, 2000; Lyons-Ruth, Bronfman, & Parsons, 1999; Schuengel, van IJzendoorn, & Bakermans-Kranenburg, 1999; True, Pisani, & Oumar, 2001). Parental insensitivity is supposed to be associated with organized insecurity (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; De Wolff & van IJzendoorn, 1997), and not with disorganized insecurity (Main & Hesse, 1990). However, extreme insensitive parental behavior may have frightening aspects triggering disorganized attachment behavior in children. Indeed, a significant association between parental insensitivity and disorganization was found meta-analytically, although the effect size was rather small (van IJzendoorn et al., 1999). Lyons-Ruth and Jacobvitz (1999, p. 532) hypothesized that Ainsworth’s sensitivity rating scale (Ainsworth, Bell, & Stayton, 1974) may be not differentiated and
Adoption and attachment disorganization

Adopted children may constitute a specific case of attachment insecurity and disorganization. It is important to realize that (internationally) adopted children, in addition to being separated from their birth mother, may have had adverse experiences before being placed for adoption (Johnson, 2000; Rutter et al., 1998; Verhulst, Althaus, & Versluis-den Bieman, 1992). Therefore, adopted children may be at risk for indiscriminate friendliness (Chisholm, 1998) or attachment disorder behavior (O'Connor et al., 1999, 2000). It is yet unclear, however, whether the clinical diagnosis of attachment disorder is partly comparable with the research-based category of disorganized attachment (Howe, 2003; O'Connor & Zeanah, 2003; van IJzendoorn & Bakermans-Kranenburg, 2003).

Adopted children may have experienced ‘fright without solution’ (Main, 1999), resulting from unmet attachment needs or profound lack of response. Therefore, an elevated risk of attachment disorganization could be suspected. Indeed, Vorria et al. (2003), who studied infants in a Greek institution before being placed for adoption, found a high percentage of disorganized attachment (66%), compared to home-reared children and to normative samples. Only when children are placed at a very young age can one assume that disorganized attachment stems from infants’ interactions with their adoptive parents. When children are adopted at an older age, disorganization may be the result of adverse pre-adoption experiences, negative experiences in the adoptive family, or both.

This is illustrated in a study by Chisholm (1998): At the age of four years, Romanian children adopted in Canadian families showed a normative rate of atypical attachment (considered to be comparable with disorganized infant attachment; Solomon & George, 1999) when they had been adopted before the age of 4 months (11%). However, an overrepresentation of attachment disorganization (35%) was found if they were adopted after living at least eight months in an orphanage. Marcovitch et al. (1997) studied 44 children, also adopted from Romania and placed between 0 and 48 months in Canadian families. At the age of four years, 42% of the children were classified as disorganized. In a Dutch study on 55 infants adopted from institutions in five different countries (including Taiwan and China), placed in their adoptive homes before their first birthday, 20 children (36%) were classified as disorganized attached at 13 months (Van Londen, Juffer, & van IJzendoorn, 2001). In the same vein, Dozier, Stovall, Albis, and Bates (2001) found in a sample of 50 foster children placed between 0 and 20 months that 17 (34%) were classified as disorganized. To conclude, adopted children appear to be at risk for attachment disorganization, in particular when they are adopted after their first months of life and experienced enduring understimulating, unresponsive environments before adoption.

Intervention study of (dis)organized attachment and adoption

In an experimental intervention study (N = 130) we investigated the effects of a short-term attachment-based intervention program. The study included two subsamples: adoptive families with and without birth children. In the control groups of the two subsamples, maternal sensitivity and organized infant–parent attachment (A, B, and C) were in the normative range (Juffer & Rosenboom, 1997). In the group of adoptive families without birth children (n = 90) positive effects of intervention were found on maternal sensitivity and organized attachment (Juffer, Hoksbergen, Riksen-Walraven, & Kohnstamm, 1997). Although in adoptive families with birth children (n = 40) short-term effects were not
found on organized attachment (Juffer, Rosenboom, Hoksbergen, Riksen-Walraven, & Kohnstamm, 1997), positive long-term effects of intervention were found on children’s internalizing behavior problems and girls’ ego-resiliency in a follow-up study at age 7 years (Stams, Juffer, van IJzendoorn, & Hoksbergen, 2001). For this subsample, short-term effects of the intervention on maternal sensitivity have not yet been examined.

The videotaped Strange Situation Procedures (SSP; Ainsworth, Blehar, Waters, & Wall, 1978) of the adopted children (both subsamples) were originally coded for organized attachment only, as reliable coders for disorganized attachment were not available at that time. Based on our previous articles, the conclusions regarding the effects of our intervention were therefore restricted to organized attachment only, and could not be extended to the clinically important category of insecure disorganized attachment. This is a serious omission for several reasons: a) Recent research showed that disorganized attachment is a predictor of psychopathology, whereas insecure avoidant and resistant attachment lead to less optimal, but not pathological child adjustment (Solomon & George, 1999). Therefore it is imperative to evaluate attachment-based interventions on their potential value to prevent attachment disorganization; b) Because even secure (B) children are considered insecure when their attachment behavior shows serious signs of disorganization, it is of great relevance for interventions not only to report effects on secure (B) attachment but also on disorganized attachment; c) Puzzling positive long-term effects of intervention were found in one of our subsamples (Stams et al., 2001), although positive short-term effects on organized attachment could not be traced. By examining short-term effects on attachment disorganization we may start solving this paradox; d) As the intervention resulted in divergent effects regarding organized attachment in our two subsamples, it is important to know whether the intervention also resulted in divergent results regarding disorganized attachment. Furthermore, in the current study we examine short-term intervention effects on sensitivity in the subsample of adoptive families with birth children.

In the current study, the videotaped SSPs were coded for attachment disorganization in order to examine effects of our intervention on infant disorganization. Infants adopted at a very young age (mean age of placement: 10 weeks) were included, so we expected the rate of disorganization to be in the normative range (as in Chisholm, 1998). By examining early-adopted children the possibly confounding influence of deprivation is reduced as much as possible. Consequently, the effects of parenting – and changes in parenting as a result of intervention – on attachment disorganization can be studied more adequately. Also, because parents and children are not genetically related in an adoptive sample, genetic transmission of attachment disorganization from adoptive parent to adopted child is ruled out. Thus, the effects of the intervention on disorganized attachment are investigated in a rather optimal context with minimal impact of early deprivation and without possible interference of biological relatedness. However, the risk of a problematic fit between the child and the adoptive parents may be elevated due to a lack of biological relatedness (Brodzinsky, 1987; Leon, 2002). As lack of temperamental fit between parent and adopted child may impede the development of secure/organized attachment relationships in adoptive families, perceived difficult temperament was included in the current study.

This is the first study that evaluates the effectiveness of an attachment-based intervention on the prevention of attachment disorganization in adoptive families. We investigated (a) the base rate of attachment disorganization in this group of early-adopted children; (b) the association between maternal insensitivity and disorganized attachment; (c) the effectiveness of our intervention on infant attachment disorganization, above and beyond effects on maternal sensitivity and organized attachment security; and (d) the contribution of perceived infant difficult temperament to the development of disorganized attachment in this sample of genetically unrelated families.

Method

Participants

Two related intervention studies were combined into one sample (N = 130) in order to increase power and to reduce chance capitalization. The first subsample consisted of 90 families with a first adopted child (Juffer, Hoksbergen et al., 1997), and the second subsample consisted of 40 families with birth children and a first adopted child (Rosenboom, 1994). All families were randomly recruited through adoption agencies, and not selected on (future) problems. Also, to avoid selection, the parents were not aware of the intervention when they entered the study, and they were requested to participate in a study examining the children’s development. The parents did not receive other forms of post-adoption support. The parents were white, and the mother was the primary caregiver in all cases. The families were predominantly from (upper) middle-class backgrounds (Juffer & Rosenboom, 1997).

The adopted children were not selected by, nor matched to, the characteristics of their future adoptive parents. The children, 66 boys and 64 girls, were adopted from Sri Lanka (n = 78), South Korea (n = 39), and Colombia (n = 13). All children came into their adoptive home before the age of 6 months (M = 10 weeks, SD = 4.93, range 2–23 weeks). Country of origin appeared to be associated with age on arrival. This reflected the sending countries’ adoption policy and procedure (Juffer, 1993). We conducted an analysis of variance (ANOVA) to test the age differences between the three countries of origin. The difference was significant, F(2,127) = 105.74, p < .01. Post-hoc Scheffé
tests showed that the infants from Sri Lanka arrived at a significantly younger age (M = 6.7 weeks, SD = 2.5, n = 78) than the children from Korea (M = 14.7 weeks, SD = 3.4, n = 39) or Colombia (M = 14.4 weeks, SD = 4.5, n = 13). As the children from Korea and Colombia did not differ regarding their age on arrival, we decided to treat them as one group in the analyses. This was also justified by the fact that Korean and Colombian children shared a similar pre-adoption background (that is, in a children’s home and/or foster family), which was different from the Sri Lankan infants, who stayed with their biological mother until they moved to the adoptive parents.

**Procedure and measures**

The procedure and measures were identical in the two subsamples. Families were visited at home when the adopted infant was 5, 6, 9, and 12 months old. Mother and child came to the laboratory at 12 and 18 months. The interventions were carried out between 6 and 9 months. In the first subsample two interventions were implemented: (a) a personal book, and (b) three sessions of video feedback and the same book. In the second subsample only one intervention was implemented, identical to the most intensive intervention in the first sample: three sessions with video feedback and the personal book. In both samples, the control group received a booklet on adoption issues. In the first subsample, the interventions were implemented by three female interveners (the first author, being one of them, trained the other two). In the second subsample, two (other) female interveners (trained by the first author) carried out the intervention. At 6 months (pretest) and 12 months (posttest) mother–child interaction was videotaped in the home in order to rate the mother’s sensitive responsiveness. In addition, at 6 and at 9 months, mother–child interaction was videotaped in all families. In the video-feedback group, these videotapes were used in the intervention, whereas in the other groups they were not employed. At 12 months and 18 months, infant–mother attachment was observed in the laboratory.

**Background variables.** Information on several background variables was collected from the family (socio-economic status, parent’s age, adoption motivation, family size) and the adopted child (health condition on arrival, etc.) (Juffer, Hoksbergen et al., 1997; Juffer & Rosenboom, 1997).

**Maternal sensitive responsiveness.** Sensitive responsiveness was observed in an 8-minute free-play situation, videotaped at home at 6 and at 12 months. While the baby was placed in an infant seat in front of a low table with the mother sitting next to him or her, the researcher presented a transparent box containing 10 attractive toys. The mother was instructed to play with her child the way she usually played. When siblings were present the researcher occupied herself with them while the mother was being videotaped (the camera was placed on a tripod in all cases). Sensitive responsiveness was rated with two 9-point rating scales for Sensitivity and Cooperation (Ainsworth et al., 1974). Both scales have the same structure, with negative scores at the lower end of the scale (insensitivity and interference, respectively) and positive scores at the higher end of the scale (sensitivity and cooperation, respectively). Intercoder reliability (three observers) ranged from .75 to 1.0 (Cohen’s kappa; Juffer & Rosenboom, 1997). In the first subsample intervention effects were established upon sensitive responsiveness in the video-feedback group. Intervention mothers were significantly more sensitive and cooperative towards their baby compared to control mothers. The program with the personal book only did not bring about significant changes (Juffer, Hoksbergen et al., 1997). In the second subsample, effects of the intervention on sensitive responsiveness were not yet examined. To avoid multicollinearity, a composite score was computed to indicate sensitive responsiveness (as sensitivity and cooperation were highly correlated, at 6 months: r = .86, and at 12 months: r = .76). The standardized Sensitivity and Cooperation scores were combined into one score for sensitive responsiveness at 6 months and one score at 12 months.

**Infant–mother attachment (A, B, C).** The children were observed in the Strange Situation Procedure (SSP; Ainsworth et al., 1978) at the laboratory. Intercoder reliability ranged from .80 to 1.0 (Cohen’s kappa; Juffer & Rosenboom, 1997). In the first subsample, the book- only intervention did not increase attachment security at 12 months (80% B), compared to the control group (70% B). In contrast, the infants in the intervention group with video feedback were significantly more often securely attached (90% B), compared to their control counterparts (Juffer, Hoksbergen et al., 1997). At the age of 18 months, similar results were found, with again 90% securely attached infants in the video-feedback group (Juffer, 1993). In the second subsample, the intervention did not result in more secure attachment relationships at 12 months. There were 80% securely attached children in the control group, and 53% secure children in the intervention group (Juffer, Rosenboom, Hoksbergen, Riksen-Walraven, & Kohnstamm, 1997). At 18 months, the negative effect had disappeared: there were 79% securely attached children in the intervention group, and 75% secure children in the control group (Rosenboom, 1994).

Because ambivalent (C) children were insufficiently represented, we used a continuous scale for attachment security at 12 months based on the attachment classifications. The most secure infants, B3, were assigned the score 5. The B1 and B2 infants were assigned the score 4, the B4 infants score 3, the A2 and C1 infants score 2, and the A1 and C2 infants score 1 (for a rationale and description of this procedure, see Stams, Juffer, & van Ijzendoorn, 2002, p. 809). Infants classified as B4 were assigned a lower security status than infants classified as B1 or B2 because they have been assigned a ‘borderline status’ in Ainsworth et al.’s (1978) coding system. They are characterized by a high degree of dependent behavior such as crying and clinging but differ from C-children in showing less resistant behavior (van Ijzendoorn, Goossens, Kroonenberg, & Tavecchio, 1985). Intercoder reliability ranged from r = .81 to r = .95 (intraclass correlations), using four pairs of raters (Stams et al., 2002).
Disorganized infant attachment (D). The videotaped SSPs at 12 months were coded to assess disorganization of attachment. Two coders (the second and third authors), who were extensively trained by Drs Mary Main and Erik Hease, scored the tapes, using the Main and Solomon (1990) coding system. The coders had not been involved in the studies at the time that the interventions were carried out, and they were unaware of the experimental group status of the dyads. Owing to technical problems, two cases could not be coded. The classification of disorganized attachment (D versus non-D) as well as the coding of the continuous rating scale for disorganized behavior (Main & Solomon, 1990) showed satisfactory intercoder reliability on 20 cases (for the categorical D classification: 85% agreement; for the continuous D score: \( r = .86 \)). Although the D ratings were only moderately skewed, we explored whether a square root or log transformation improved the distribution (Tabachnick & Fidell, 2001). However, as these transformations resulted in unacceptable kurtosis values, we did not use the transformed variable.

Perceived child temperament. Perceived child temperament was measured at 12 months with the Dutch Temperament Questionnaire (Kohnstamm, 1984), which is an adaptation of the Infant Characteristics Questionnaire (Bates, Freeland, & Lounsbury, 1979). Principal component analysis revealed a one-dimension solution, with an explained variance of 78%, and Cronbach's alpha was \( x = .78 \) \((N = 146)\). A high score indicates that the mother perceived her child as difficult on aspects such as sociability, persistence, mood, and adaptability (Stams et al., 2002). The validity of the construct was substantiated by our finding (reported elsewhere, Stams et al., 2002) that difficult temperament in early childhood predicted adopted children's maladjustment at age 7 years, in particular behavior problems, and less optimal cognitive and social development.

Intervention. The two intervention programs aimed at enhancing sensitive responsiveness, with the ultimate goal of promoting secure infant–parent attachment relationships and infant competence (see also Juffer, Hoksbergen et al., 1997). The following profile was derived from attachment theory (Ainsworth et al., 1978; Bowlby, 1982) and served as the working basis for the intervention. A sensitive mother attunes her behavior to the baby in the following way: (a) She perceives and interprets her baby's signals correctly (Is my baby looking for contact or is he/she exploring the world?), (b) She reacts to these signals promptly and adequately, that is, responding to attachment signals and not interfering in exploration activities, respectively, (c) She creates for her child opportunities to explore and discover the effects of its own behavior (Juffer, Hoksbergen et al., 1997, p. 1043).

In the book-only group, the program consisted of written information focusing on sensitive parenting (see also Riksen-Walraven, 1978; Lambermon & van IJzendoorn, 1989). The written information was offered in a personalized book (that is, the name of the child was integrated in the text). The book comprised suggestions for sensitive parenting and playful interactions. The video-feedback group was supplied with the same book. In addition, this group was provided with three sessions of video feedback. The intervener showed the mother a videorecording of herself interacting with her child, and commented on selected fragments of the film. This intervention was implemented in two home visits at 6 months and one at 9 months, and each intervention session lasted approximately one hour. At 6 months, a videotape of a previous home visit was used for the intervention; at 9 months the intervener used the tape immediately after filming. In her comments the intervener focused upon sensitive responsiveness: providing security by reacting sensitively to the child's attachment behavior, and also offering opportunities for the child's exploration behavior. For example, the intervener verbalized the baby's reactions and (facial) expressions ('speaking for the baby'; Carter, Ososky, & Hann, 1991) or she reinforced the mother's sensitive reactions to the child's behavior. The intervener's comments were adapted to the personal situation of the mother. More information about the video-feedback intervention can be requested from the authors (see also, Juffer, Bakermans-Kranenburg, & van IJzendoorn, in press-a, in press-b).

We checked for background differences (with \( p > .10 \)) between the two intervention groups and the control group. The groups did not differ on family background characteristics, e.g., SES or parent's age, the number of boys and girls, nor the adopted child's health problems on arrival. We did find significant differences between the groups with respect to the interrelated variables country of origin and age on arrival. The book-only group \((n = 30)\) comprised 25 infants from Sri Lanka and 5 from Korea/Colombia, the video-feedback group \((n = 50)\) consisted of 21 infants from Sri Lanka and 29 from Korea/Colombia, the control group \((n = 50)\) comprised 32 infants from Sri Lanka and 18 from Korea/Colombia \((x^2(2) = 13.89, p < .01, N = 130)\). An ANOVA confirmed the differences in age on arrival, \( F(2,127) = 11.95, p < .01 \). Post-hoc Scheffe tests revealed that infants in the video-feedback group arrived at an older age than the children in the book-only or control group \((M_{video} = 12.2\ weeks, SD = 5.5; M_{book} = 7.3\ weeks, SD = 3.3; M_{control} = 9.0\ weeks, SD = 4.1)\).

Results

First, in preliminary analyses we examined the comparability of the two subsamples with respect to disorganization, and we explored associations between disorganized attachment and background variables. Then descriptive statistics of disorganized attachment, organized attachment, and difficult temperament were conducted. Next, the effects of the two intervention programs on sensitive responsiveness and disorganized attachment were tested. Finally, we examined the relations between disorganization and the other constructs with a multivariate approach.

Preliminary analyses

We checked whether the two subsamples differed regarding infant disorganization. The subsamples
did not differ with respect to the continuous D score, \( t (126) = .03, p = .98 \) (first sample: \( M = 2.79, SD = 1.80 \); second sample: \( M = 2.78, SD = 2.06 \)). The same was true for the categorical D classification: 15.7% versus 15.4% children were classified as disorganized in the first and second subsample, respectively \( (X^2(1) = .002, p = .96, n = 128) \). We tested for associations between disorganization and several background variables (with \( p > .10 \)). No significant associations were found.

**Disorganized and ‘organized’ attachment, and temperament**

In the total group, 20 (15.6%) children were classified as disorganized. The mean disorganization score was 2.79 \((SD = 1.87, N = 128)\). Most infants classified as disorganized appeared to have an alternate secure (B) classification: 15 disorganized infants (75%) had alternate B classifications, and 5 disorganized infants (25%) had alternate A or C classifications. This pattern was apparent in both subsamples: in the first sample 11 out of 14 children were classified as D/B (78.6%), and in the second sample 4 out of 6 children were classified as D/B (66.7%). The percentage of D/B attachment was not different in the three experimental groups: 73%, 83%, and 66% for the control group, book-only group, and video-feedback group, respectively. The control group’s outcomes were examined to determine whether this group of adopted children was at risk for disorganized attachment. Eleven infants (22.4%, \( n = 49 \)) were classified as disorganized. This percentage is somewhat elevated compared to the middle-class, non-clinical groups: 15% (van IJzendoorn et al., 1999). However, a binomial test of difference between the current and normative distribution showed a non-significant \( X^2(1) = 2.13, p > .05, n = 49 \).

The children’s ratings in the SSP ranged from 1 (most insecure) to 5 (most secure), with a mean score of 3.36 \((SD = 1.26, N = 130)\). The mean continuous organised attachment score in the combined study group did not differ for the intervention and control groups \((p = .33)\). The scores for difficult temperament ranged from 1 (not difficult) to 4.79, with a mean score of 3.19 \((SD = .63)\). The mean temperament score did not differ for the intervention and control groups \((p = .93)\).

**Intervention effects on sensitive responsiveness**

In Table 1 the mean sensitivity and cooperation scores (6 and 12 months) of the control and intervention groups are shown. To gain power in the final analyses, we left out age on arrival and country of origin as covariates, as these variables were not significant in the exploratory analyses. First, we examined the overall effectiveness of the intervention programs in the total sample, controlling for pretest ratings. We conducted an ANCOVA on the standardized composite score for sensitive responsiveness at 12 months with experimental condition (3 groups: video feedback, book-only and control) as the independent variable and pretest sensitive responsiveness (standardized composite score) as a covariate. A significant main effect of experimental condition was found: \( F (2, 126) = 4.42, p = .01 \). As the omnibus \( F \) was significant, and we were interested in differential effects of the two intervention programs, we continued the analyses with planned comparisons testing two a priori contrasts: the book-only group with the control group and the video-feedback group with the control group. The analysis did not reveal a significant effect of the book intervention, \( F (1, 77) = 3.31, p = .07 \). This result was convergent with earlier findings (Juffer, Hoksbergen et al., 1997). However, a significant main effect of the video-feedback intervention was revealed, \( F (1, 97) = 9.62, p < .01 \). We analyzed whether sensitive responsiveness was equally enhanced in the two subsamples through the video-feedback intervention. We conducted an ANCOVA on sensitive responsiveness at 6 months (pretest) and 12 months (posttest) in the control and intervention groups.

**Table 1 Maternal sensitive responsiveness at 6 months (pretest) and 12 months (posttest) in the control and intervention groups**

<table>
<thead>
<tr>
<th>Sensitive responsiveness</th>
<th>Control group Mean(SD)</th>
<th>Book-only group Mean(SD)</th>
<th>Video-feedback group Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity 6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample (( N = 130 ))</td>
<td>4.92 (1.58)</td>
<td>5.00 (1.51)</td>
<td>5.42 (1.64)</td>
</tr>
<tr>
<td>Without birth children (( n = 90 ))</td>
<td>5.30 (1.44)</td>
<td>5.00 (1.51)</td>
<td>5.60 (1.54)</td>
</tr>
<tr>
<td>With birth children (( n = 40 ))</td>
<td>4.35 (1.63)</td>
<td></td>
<td>5.15 (1.79)</td>
</tr>
<tr>
<td>Sensitivity 12 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample (( N = 130 ))</td>
<td>4.84 (1.71)</td>
<td>5.37 (1.79)</td>
<td>5.64 (1.61)</td>
</tr>
<tr>
<td>Without birth children (( n = 90 ))</td>
<td>5.23 (1.45)</td>
<td>5.37 (1.79)</td>
<td>5.83 (1.42)</td>
</tr>
<tr>
<td>With birth children (( n = 40 ))</td>
<td>4.25 (1.37)</td>
<td></td>
<td>5.35 (1.87)</td>
</tr>
<tr>
<td>Cooperation 6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample (( N = 130 ))</td>
<td>4.30 (1.71)</td>
<td>4.57 (1.83)</td>
<td>5.04 (2.19)</td>
</tr>
<tr>
<td>Without birth children (( n = 90 ))</td>
<td>4.90 (1.47)</td>
<td>4.57 (1.83)</td>
<td>5.30 (1.86)</td>
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<tr>
<td>With birth children (( n = 40 ))</td>
<td>3.40 (1.67)</td>
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<td>4.65 (2.62)</td>
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<tr>
<td>Cooperation 12 months</td>
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<td></td>
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</tr>
<tr>
<td>Total sample (( N = 130 ))</td>
<td>4.12 (1.67)</td>
<td>5.03 (2.19)</td>
<td>5.66 (2.02)</td>
</tr>
<tr>
<td>Without birth children (( n = 90 ))</td>
<td>4.53 (1.53)</td>
<td>5.03 (2.19)</td>
<td>5.87 (1.66)</td>
</tr>
<tr>
<td>With birth children (( n = 40 ))</td>
<td>3.50 (1.73)</td>
<td></td>
<td>5.35 (2.48)</td>
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</tbody>
</table>
responsiveness with the two subsamples (dummy coded: 1 = families without birth children, 2 = families with birth children) and experimental condition (2 groups: video feedback vs. control) as independent variables and pretest sensitive responsiveness as a covariate. The ANCOVA indicated the same main effect for the video-feedback intervention, $F(1, 95) = 10.19, p < .01$ (d = .65), but did not reveal a significant effect of the two subsamples ($p = .15$), nor an interaction effect between the two subsamples and experimental condition ($p = .65$). Post-hoc analyses confirmed that the effects on sensitive responsiveness had the same direction and comparable, medium to strong, effect sizes (Cohen, 1988) in the two subsamples (families without birth children: $d = .65$ and families with birth children: $d = .63$).

### Intervention effects on disorganized attachment

On the categorical level (classification D versus non-D) there was a significant difference between the control and intervention groups, $X^2(2) = 5.52, p = .03$ (see Table 2). Intervention with video feedback, but not with the book only, was effective in preventing disorganized attachment, leading to only 3 disorganized children (of 49 children, 6.1%) in the video-feedback intervention group versus 11 disorganized children in the control group (of 49 children, 22.4%) ($X^2(1) = 5.33, p = .01$). We then examined whether D classifications were equally changed in the two subsamples through the video-feedback intervention. We examined the relations between D-classification (D vs. non-D), experimental condition (video feedback vs. control), and subsample (the two subsamples, dummy coded) in a loglinear analysis (Tabachnick & Fidell, 2001). The analysis revealed the same significant intervention effect (D by condition: z-value: $-2.11$) and showed that the relevant relations (D by subsample, condition by subsample, and D by condition by subsample) were not significant (z-values < .42). Post-hoc analyses confirmed that the direction and effect sizes were comparable in the two subsamples (families without birth children: $d = .39$ and families with birth children: $d = .62$).

With respect to the continuous D ratings, we first examined the overall effectiveness of the intervention programs in the total sample. As age on arrival and country of origin were not significant as a covariate, we eliminated them from the analyses to gain power (age on arrival: $p = .97$; country: $p = .56$). We conducted an ANOVA on the D ratings with experimental condition (3 groups) as the independent variable. A significant main effect of experimental condition was found: $F(2, 125) = 4.93, p < .01$. As the omnibus $F$ was significant, the analyses were continued with planned comparisons for the intervention groups. The first contrast showed that the difference between the group with the personal book and the control group was significant, $t(69, 806) = 1.76, p = .04$ (unequal variances). Children in the book-only group showed significantly lower D-scores than control children (see Table 2). The second contrast also showed a significant difference, $t(83,492) = 3.07, p < .01$ (unequal variances). Children in the video-feedback intervention group showed significantly lower D-scores ($M = 2.28, SD = 1.43$) than control children ($M = 3.41, SD = 2.15$), see Table 2. We then analyzed whether disorganization was equally changed in the two subsamples through the video-feedback intervention. We conducted an ANOVA on the D ratings with the two subsamples (dummy coded) and experimental condition (video feedback vs. control) as the independent variables. The ANOVA indicated the same main effect for the video-feedback intervention, $F(1, 94) = 9.00, p < .01$, but did not reveal a significant effect of the two studies ($p = .85$), nor an interaction effect between the two studies and experimental condition ($p = .89$). Post-hoc analyses confirmed that the effects on disorganization were in the same direction, with comparable effect sizes in the two subsamples (families without birth children effect size $d = .64$ and families with birth children: $d = .61$).

### Relative influence of the intervention and other variables on disorganized attachment

No relation was found between the continuous scores for disorganization and the continuous

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**Table 2** Adoptive families: number of disorganized infants, and disorganization scores at 12 months in the control groups and in the intervention groups

<table>
<thead>
<tr>
<th></th>
<th>Control group</th>
<th>Book-only group</th>
<th>Video-feedback group</th>
<th>Total group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of disorganized children (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample ($n = 128$)</td>
<td>11 (22.4)</td>
<td>6 (20)</td>
<td>3 (6.1)**</td>
<td>20 (15.6)</td>
</tr>
<tr>
<td>Without birth children ($n = 89$)</td>
<td>6 (20)</td>
<td>6 (20)</td>
<td>2 (6.9)</td>
<td>14 (15.7)</td>
</tr>
<tr>
<td>With birth children ($n = 39$)</td>
<td>5 (26.3)</td>
<td>1 (5)</td>
<td>6 (15.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Mean disorganization score (SD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample ($n = 128$)</td>
<td>3.41 (2.15)</td>
<td>2.62 (1.79)*</td>
<td>2.28 (1.43)**</td>
<td>2.79 (1.87)</td>
</tr>
<tr>
<td>Without birth children ($n = 89$)</td>
<td>3.42 (2.03)</td>
<td>2.62 (1.79)</td>
<td>2.33 (1.37)</td>
<td>2.79 (1.80)</td>
</tr>
<tr>
<td>With birth children ($n = 39$)</td>
<td>3.39 (2.39)</td>
<td>2.20 (1.54)</td>
<td>2.78 (2.06)</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01 (compared to the control group).*
organized attachment scores (A, B, C) ($r = -0.03, p = .70, N = 128$). Also, secure (B) children did not have lower or higher scores for disorganization than insecurely attached A or C children ($p = .78$). Maternal sensitivity at 12 months was related to continuous organized attachment, $r = 0.24$, $p < .01$, $N = 130$ (as in De Wolff & van IJzendoorn, 1997).

Perceived difficult child temperament and attachment disorganization appeared to be unrelated: $r = -0.11, p = .22, N = 128$. We also examined the relations between maternal sensitive responsiveness and infant disorganization. The 6-month composite scores for sensitive responsiveness and attachment disorganization at 12 months were related ($r = -0.14, p = .05$, one-tailed, $N = 128$), and a significant association was found between 12-month sensitive responsiveness and disorganization ($r = -0.18, p = .02$, one-tailed, $N = 128$). Both correlations were negative, meaning that infants with higher scores for attachment disorganization had mothers who acted less sensitive during free-play in their homes.

As the video-feedback intervention appeared to be successful with respect to both indices of disorganized attachment, this intervention was used in an analysis that examined the unique influence of the intervention on disorganization. We conducted a hierarchical multiple regression analysis on the continuous D rating, with forced entry of predictors within the hierarchical steps. The analysis was restricted to the control group and the video-feedback group ($n = 100$). As age on arrival and country of origin were highly correlated ($r = 0.77$), only age on arrival was entered in the analysis. We included the scores for sensitive responsiveness at 12 months in the analysis as we intended to examine the effects of the intervention on infant disorganization above and beyond increased sensitivity (due to the intervention). This was warranted because no differences on the pretest were found. The final regression involved five predictors and was thus based on a ratio of predictors to participants of 1 to 20 (Stevens, 2002). Interrelations between the predictor variables are shown in Table 3.

The independent variables were entered in four hierarchical steps: (1) age on arrival in weeks; (2) sensitive responsiveness at 12 months; (3) organized attachment and perceived difficult temperament; and (4) experimental condition (control vs. video-feedback) (Table 3). We found a significant regression equation for attachment disorganization, $F (5, 92) = 2.64, p = .03$, explaining 13% of the variance. Sensitive responsiveness predicted disorganization, adding 5% to the explained variance: $F$ change (1, 95) = 5.54, $p = .02$. Controlling for all variables, the intervention uniquely predicted attachment disorganization, adding 4% to the explained variance: $F$ change (1, 92) = 4.25, $p = .04$. Age on arrival, organized security, and difficult temperament did not significantly contribute to the prediction of disorganization. Entering sensitive responsiveness at 6 months in the regression instead of sensitive responsiveness at 12 months resulted in more unique explained variance for the video-feedback intervention (6% instead of 4%) and less explained variance for sensitive responsiveness (3% instead of 5%). Thus, the intervention appeared to have a distinct, significant influence on attachment disorganization over and above the other predictors, including sensitive responsiveness.

Post-hoc analyses showed that sensitive responsiveness did not mediate changes in attachment disorganization, confirming the unique contribution of the video-feedback intervention. Following Baron and Kenny (1986), mediation was tested through two multiple regression analyses. In the first analysis, the intervention was regressed against the disorganization scores. In the second analysis, the intervention was regressed against the disorganization scores while controlling for sensitive responsiveness. In case of perfect mediation the intervention should contribute no longer to the variance of disorganization in the second analysis. As the intervention still contributed significantly to disorganization, sensitive responsiveness appeared not to mediate the effect of the intervention.

**Discussion**

We implemented two programs that aimed at promoting sensitive responsiveness and infant security in 130 adoptive families. The intervention with video

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Table 3 Correlations between predictor variables and results from the multiple hierarchical regression analysis to test the influence of the video-feedback intervention on attachment disorganization ($N = 100$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R$</th>
<th>$R^2$</th>
<th>$R^2\text{Ch}$</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. age on arrival</td>
<td>1.00</td>
<td>.16</td>
<td>.02</td>
<td>-.16</td>
</tr>
<tr>
<td>Maternal sensitive responsiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. sensitive responsiveness</td>
<td>-.01</td>
<td>.28</td>
<td>.08</td>
<td>.05*</td>
</tr>
<tr>
<td>Attachment and temperament</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. organized attachment</td>
<td>-.13</td>
<td>.29</td>
<td>.09</td>
<td>-.23*</td>
</tr>
<tr>
<td>4. temperament</td>
<td>-.15</td>
<td>.29</td>
<td>.09</td>
<td>-.07</td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. video-feedback intervention</td>
<td>.31**</td>
<td>.35</td>
<td>.13</td>
<td>.04*</td>
</tr>
</tbody>
</table>

*missing: 2; *$p < .05$, **$p < .01$. 
feedback was effective and lowered the number of disorganized infants as well as the continuous disorganization score. We found a moderate effect size of $d = .46$ for the effect on the disorganized attachment classification, and a medium to strong effect size of $d = .62$ for the effect on the continuous disorganization ratings. Considering the absence of an overall intervention effect in a meta-analysis of 15 experimental interventions (Bakermans-Kranenburg et al., in press), this outcome is remarkable.

The book-only intervention did not result in a significant decrease of infant disorganization, although infants in this group had lower disorganization ratings than in the control group. In contrast, the intervention with video feedback showed positive effects on both indices: the number of disorganized infants and the continuous disorganization score. The effects of the video-feedback intervention were comparable in adoptive families with and without birth children. The fact that comparable positive effects were established in the two subsamples increases the reliability of our finding. The outcome that the book-only intervention resulted in lower disorganization scores compared to the control group may indicate that the personal book was one of the possible working ingredients, although in itself not effective enough to bring about change in the number of disorganized children. The video-feedback intervention included the same book, but was expanded with an extra component: three video-feedback sessions. The discovery of a distinct effect of the video-feedback intervention on attachment disorganization is important, as we found in a follow-up of our study that infant disorganized attachment in combination with difficult temperament predicted less optimal cognitive development and less optimal ego-control in middle childhood (Stams et al., 2002).

The video-feedback intervention was not completely successful in changing insecure avoidant and resistant attachment, as we reported in our previous work that differential effects on organized attachment were found in our two samples of adoptive families (Juffer, Hoksbergen et al., 1997; Juffer, Rosenboom et al., 1997). Therefore, it is remarkable that the current study showed that the video-feedback intervention resulted in comparable, positive effects on mother and child: that is, maternal sensitive responsiveness and infant attachment disorganization in both subsamples. The positive short-term effects of the intervention that were revealed in the current study for families with birth children may (partly) explain the positive long-term effects at age 7 reported earlier for this subsample (Stams et al., 2001). The success of the intervention cannot be explained by factors such as post-adoption support, as these services were not available at the time of the study. Anecdotally, we observed that the adoptive families were open to intervention and eager to receive support (Juffer, 1993). Also, there was no attrition between pre- and posttests. We hypothesize that the video-feedback intervention was effective because of its content and format. The medium of video and the use of video fragments enable the intervener to highlight children's signals, thus directing and focusing the parent's attention to the child's actual behavior (see below), and coaching parents to observe their child's behavior in a more accurate way (the first part of Ainsworth et al.'s (1978) definition of sensitive responsiveness). Moreover, by showing and repeating video fragments of the parent's sensitive behaviors, the intervener is enabled to reinforce and encourage adequate and prompt responding to the child's signals (the second part of the definition of sensitive responsiveness, see also Juffer et al., in press-a, in press-b).

As expected, a normative rate of attachment disorganization was found in this group of early-placed adopted children. We found 22.4% disorganized attachment in the control group, which is slightly, but not significantly, elevated compared to the 15% usually found in non-clinical samples (van IJzendoorn et al., 1999). This finding is convergent with earlier findings that this group of early-adopted children showed normative rates of organized attachment security and maternal sensitive responsiveness (Juffer & Rosenboom, 1997). Our base rate data confirm a low rate of attachment disorganization among early-adopted children despite the possibility that children relinquished for adoption might carry a higher genetic risk for various forms of maladaptive behavior than children not given up for adoption. No relation was found between children's difficult temperament and infant disorganization (convergent with van IJzendoorn et al., 1999). Our outcomes indicate that infant disorganization is not predicted by difficult temperament, not even in cases where parents and children do not share similar characteristics (as is the case in this group of unrelated adoptive families).

Most disorganized infants (75%) had alternate secure (B) classifications. It may be easier to bring about positive effects of intervention in families with alternate secure children, compared to families who have children in double jeopardy: being disorganized and insecure ambivalent or avoidant. In the same vein, it cannot be excluded that the effects of the intervention are specific for adoptive families, and cannot be generalized to other samples. Of course, it is important to replicate our findings in non-adoptive samples, and to test interventions specifically designed to change attachment disorganization.

A limitation of our study is that we did not design an intervention that explicitly aimed at changing attachment disorganization. As our intervention aimed at promoting sensitive parenting and secure attachment, the positive effect on disorganization was rather unexpected. However, our intervention may have affected aspects of parenting that are important for disorganized attachment (see below).
Possible explanations of the effects of intervention

Although parental sensitivity is only weakly associated with attachment disorganization, it cannot be excluded that specific types of insensitive parental behavior are linked to disorganization in a much stronger way (see also Lyons-Ruth & Jacobvitz, 1999, p. 531). In some studies with positive effects on attachment disorganization, positive effects were also found on the reduction of insensitive parenting. Cohen and colleagues (1999) found that intervention mothers’ intrusiveness had decreased. Heinicke and colleagues (Heinicke et al., 1999) reported positive effects on intervention mothers’ sensitivity and respect of their child’s autonomy. In our adoption study positive effects on attachment disorganization were accompanied by positive effects on maternal sensitive responsiveness. Also, our sensitive responsiveness variable not only included parental (in)sensitivity but also parental cooperation and the opposite behaviors: parental interference and uninvolvment. Maybe particular types of insensitivity are linked to (subtle) unpredictable and/or frightening parenting behavior, provoking disorganization in infants (Main & Hesse, 1990). As our analyses indicated a unique contribution of the intervention, and sensitive responsiveness was ruled out as a mediator, we hypothesize that the intervention may have influenced unpredictable and/or frightening parenting behaviors related to insensitivity/unresponsiveness.

Another line of reasoning involves the underlying mechanism(s) of attachment disorganization. Schuengel et al. (1999) proposed that parental attention focused on the infant may explain why parents struggling with unresolved loss or trauma but with otherwise secure attachment representations showed a much lower amount of frightening behavior at home in the presence of their infants than their insecure comparisons. Speculating about possible pathways, they suggested that secure but unresolved parents were used to focusing in sensitive ways on their infants’ needs and signals, which may lead the parent’s attention away from the absorbing painful or stressful memories of the past (Hesse & van IJzendoorn, 1998). In a similar vein, effective interventions may successfully affect parents’ attention processes, directing and focusing the parent’s attention to observations of the child in the here-and-now (see also Juffer, van IJzendoorn, & Bakermans-Kranenburg, 1999). For example, in interventions that teach parents to follow their child’s lead (Cohen et al., 1999), or to observe their child on videotape (as in our adoption study), parents learn to concentrate (more) on the child’s behavior. Maybe these techniques help parents to focus and utilize their attention in a more constructive way or even reduce processes of dissociation, at least in the presence of their infants.

A final comment addresses the nature of our sample. Our sample consisted of parents with genetically unrelated, adopted children. The children in our study were not selected but placed by chance, that is, on the basis of the adoptive parents’ place on a waiting list. So, the finding that our video-feedback intervention was successful is not confounded by genetically transmitted risks or protective factors for attachment disorganization. Therefore, our study provides evidence that attachment disorganization may be influenced by nurture processes or environmental factors: disorganization in infants can be changed through parenting interventions.

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Correspondence to

Femmie Juffer, Center for Child and Family Studies, Leiden University, P.O. Box 9555, 2300 RB Leiden, The Netherlands; Email: juffer@fsw.Leidenuniv.nl

References


Main, M. (1990). Cross-cultural studies of attachment organization: Recent studies, changing methodolo-


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