Published in final edited form as:
Prev Sci. 2007 June ; 8(2): 161–170. doi:10.1007/s11121-007-0066-5.

Intervention Effects on Foster Preschoolers' Attachment-Related Behaviors From a Randomized Trial

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Abstract

This study examines change in attachment-related behaviors among foster preschoolers participating in a randomized trial of the Multidimensional Treatment Foster Care Program for Preschoolers (MTFC-P). Measures of secure, resistant, and avoidant behaviors were collected using a caregiver-report diary at 3-month intervals during the 12 months following a new foster placement. Children randomly assigned to the MTFC-P intervention condition (n = 57) showed significant increases in secure behavior and significant decreases in avoidant behavior relative to children assigned to a regular foster care condition (n = 60). Both groups showed significant decreases in resistant behavior over time. Analyses also revealed a significant interaction between treatment condition and age at first foster placement on change in secure behavior. Results are discussed in terms of the importance of early intervention and prevention services for foster preschoolers.

Keywords

foster care; attachment; intervention; preschoolers

Secure attachment exerts a powerful influence on a child's healthy development, enabling children to better utilize caregivers as reliable bases from which to explore the environment and to seek out caregivers for comfort when distressed (Sroufe, 1988). Secure attachment also buffers against environmental risk factors such as poverty and stress (Rutter, 1979). Conversely, insecure attachment limits the potential for positive adjustment in infancy and childhood (Fagot & Kavanagh, 1990).

The development of secure attachment requires sensitive and responsive caregiving (Howes, Galinsky, & Kontos, 1998; van IJzendoorn, 1995), maternal warmth (Bates, Maslin, & Frankel, 1985), and emotional availability (Biringen, 2000). Much of the initial research on attachment focused on caregiver-child interaction in infancy. However, attachment continues to be important throughout development, even as its expression changes. During the preschool years, with the development of cognitive and linguistic skills, preschoolers have more advanced means of managing the attachment relationships; they seek to communicate with their attachment figures (e.g., follow the attachment figure or signal their desires) and to manage their desire for proximity (Crittenden, 1992). As a result, attachment shifts from being a

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Support for this manuscript was provided by the following grants: P20 DA017592, NIDA, U.S. PHS; and R01 MH059780, NIMH, U.S. PHS. The authors thank the staff and families of the Early Intervention Foster Care Program, Kristen Greenley for project management, Mary Dozier for consultation on use of the Attachment Diary, and Matthew Rabel for editorial assistance.

primarily caregiver-driven function to a more reciprocal process, which has been characterized as "goal-corrected partnership" (Bowlby, 1969/1982).

It is not surprising that foster care is an especially challenging context for the development of attachment security. In addition to experiencing maltreatment in the family of origin, foster children undergo prolonged and sometimes permanent separations from their primary caregivers. They experience long-term uncertainty about the stability of their living situations and often go through multiple foster placements before being reunified with birth parents or being adopted. Indeed, many children never achieve permanency, remaining in foster care until age eighteen (Nollan & Downs, 2001). These experiences may compromise a foster child's ability to utilize foster parents as secure bases or to seek them out when distressed (Fish & Chapman, 2004). Maltreated children often show high rates of disorganized/disoriented attachment, characterized by dissociative or freezing responses (Carlson, Cicchetti, Barnett, & Braunwald, 1989). Lieberman (2003) noted a lack of foster children's trust in the availability of a caregiver, which might exert a long-term negative impact on relationships with foster parents. Foster children's poor attachments to caregivers have also been associated with behavioral disturbance and conduct disorder in adolescence (Leathers, 2002).

It is noteworthy that foster children's insecure and disorganized attachment strategies often carry forward, even when environmental conditions improve. Stovall and Dozier (1998) suggested that transactional models, characterized by reciprocal influences from both members of the dyad, might explain the persistence of these attachment-related behaviors in foster care. Especially for children who enter foster care after 12 months of age, when a stable attachment has typically formed, shifting from insecure to secure attachment can be challenging (Dozier, 2005; Rushton, Mayes, Cherilyn, & Quinton, 2003). Schofield and Beek (2005) described foster children as "warily self-reliant"— perhaps a necessary behavioral strategy, given their maltreatment and relationship disruption histories, but one that renders children potentially rejecting of foster parents' efforts to establish relationships.

Potential of Interventions to Affect Attachment-Related Behaviors

Although maltreated children's attachment difficulties appear to persist in foster care, the response of the public sector systems to these problems has been marginal. In general, the mental health services available to foster children involve individual therapy to address behavior problems and trauma but not relationship issues (Garland, Landsverk, Hough, & Ellis-Macleod, 1996; Landsverk, Garland, & Leslie, 2002). Equally concerning are estimates that more than 90% of current public sector service systems for children and families do not deliver evidence-based practices. In short, despite clear documentation that foster children often struggle with attachment-related issues, it appears that little is being done to effectively address these problems.

At present, it is not clear whether interventions can alter foster children's attachment-related behaviors. Systematic attachment-based interventions for maltreated children (Hughes, 2004) and foster children (Howe & Fearnley, 2003; Pearce & Pezzot-Pearce, 2001; Sheperis, Renfro-Michel, & Doggett, 2003) have been developed but are not currently being widely implemented. Moreover, there is not yet an evidence base to support these interventions. Nilsen (2003) noted that most effective interventions for foster children have emphasized the management of problematic behavior by supporting foster parenting techniques that help to maintain a positive and consistent environment. Similarly, other researchers have noted the importance of a safe and stable environment for improving foster child outcomes (Harden, 2004; Schofield, 2002). However, Nilsen pointed to a lack of clarity regarding whether such interventions could impact foster children's attachment difficulties.

One important issue to address in developing evidence-based attachment interventions is the manner in which to measure attachment. Typically, assessments of attachment have relied upon laboratory-based paradigms in which the child experiences separations and reunions with their caregiver (e.g., Strange Situation; Ainsworth, Blehar, Waters, & Wall, 1978). However, this assessment requires an adult that the child considers to be his/her primary caregiver. Foster children might not identify their foster parents as such, thereby limiting the validity of this assessment strategy. As an alternative to laboratory assessments, attachment-related behaviors in foster care have been studied using the Parent Attachment Diary (PAD; Stovall-McClough & Dozier, 2000), which measures secure, resistant, and avoidant attachment-related behaviors by asking caregivers to indicate how their child responds to situations in which he/she was frightened, hurt, or separated from the caregiver. Stovall-McClough and Dozier (2000) found that coherent patterns of attachment-related behaviors for foster infants typically emerged within 2 months of a new placement and that these patterns were generally convergent with infants' attachment classifications obtained from the Strange Situation laboratory paradigm. Stovall-McClough and Dozier (2004) found that two variables—being placed in foster care at a younger age and being placed with foster parents who showed high levels of autonomy on measures of adult attachment—were associated with more secure, less avoidant, and more coherent attachment-related behaviors on the PAD. However, these variables were not associated with change in attachment-related behaviors during the placement.

In the present study, we examined whether foster preschoolers' attachment-related behaviors could be positively impacted within the context of a randomized trial to evaluate the effectiveness of Multidimensional Treatment Foster Care for Preschoolers[1] (MTFC-P; Fisher, Ellis, & Chamberlain, 1999). Fisher, Burraston, and Pears (2005) reported that MTFC-P decreased the permanent placement failure rate and mitigated the effects of multiple foster placements on risk for permanent placement failure. We examined whether MTFC-P facilitated the child's ability to seek out the caregiver when distressed, thereby producing reports of increased secure behavior and decreased resistant and avoidant behaviors.

In light of Stovall-McClough and Dozier's (2004) report that younger age at first foster placement was associated with a number of indicators of secure behavior, we also examined whether age at first placement was associated with differential effectiveness of the intervention on attachment outcomes. We expected to replicate Stovall-McClough and Dozier's finding of a main effect for age at first placement, with children placed later showing less secure behavior. We also investigated whether children first placed at an older age exhibited larger improvements in attachment-related behaviors in response to the intervention.

Method

Participants

The sample consisted of 3- to 5-year-old foster preschoolers entering a new foster placement under the care of the Lane County Branch of the Oregon Department of Human Services, Child Welfare Division. This included children new to foster care, reentering care, and moving between foster placements. To be eligible for the study, the current placement had to be expected to last for 3 or more months. Recruitment occurred continuously over a 3.5-year period.

Eligible participants were randomly assigned to the MTFC-P experimental condition or to the regular foster care (RFC) comparison condition. Notably, randomization occurred prior to recruitment into the study. Although this procedure is somewhat atypical for clinical trials, it

[1]MTFC-P was referred to in prior publications as the Early Intervention Foster Care (EIFC) Program. The new name has been in effect since 2005.

represented an effort to match methodology to context. Randomization in a community setting with such a highly vulnerable population is, by definition, quite challenging. The plan for randomization was developed via a collaborative partnership between the research team and the county child welfare system leaders to reduce uncertainty among eligible foster parents regarding the conditions of their participation and to reduce the number of caseworker contacts needed to complete recruitment.

Once randomization was completed, a staff member contacted the child's caseworker (i.e., the legal guardian while the child is in care) and requested consent for the child to participate in the project. A staff member then contacted the foster parent(s) for recruitment purposes. To be successfully recruited, the caseworker and the foster family had to consent to participation. All research staff members involved in data collection were blind to the study conditions of children and foster parents. Overall, 137 eligible children were randomized (MTFC-P $n = 64$; RFC $n = 73$). Of these children, consent to participate was obtained for 57 in the MTFC-P group and 60 in the RFC group, resulting in a sample of 117 children (MTFC-P $n = 57$; RFC $n = 60$). The refusal rate was not significantly different between groups ($\chi^2 = 1.291$, $df = 1$, $p = .26$), suggesting that randomization prior to recruitment did not introduce sampling bias into the study.

Participants were assessed across five 3-month intervals: baseline (T1) and 3 months (T2), 6 months (T3), 9 months (T4), and 12 months (T5) postbaseline. Across the two study conditions, retention of participants was good, especially given the high-risk nature of the population. Retention rates for the RFC group were 93.3% ($n = 56$) at T2, 88.3% ($n = 53$) at T3, 83.3% ($n = 50$) at T4, and 70.0% ($n = 42$) at T5. Retention rates for the MTFC-P group were 100% ($n = 57$) at T2 and T3, 93.0% ($n = 53$) at T4, and 86.0% ($n = 49$) at T5. The retention rates tended to be slightly higher for the MTFC-P group at T2 ($\chi^2 = 3.94$, $df = 1$, $p = .05$), at T3 ($\chi^2 = 7.07$, $df = 1$, $p = .01$, and T5 ($\chi^2 = 4.31$, $df = 1$, $p = .04$). However, there were no systematic differences between those who remained in the study and those who did not in terms of attachment-related behaviors and other internalizing and externalizing problem behaviors assessed at baseline. There were no differences between groups on mean child age, gender, or ethnicity at T1. The mean age in years at T1 was 4.34 ($SD = 0.83$) in the RFC group and 4.54 ($SD = 0.86$) in the MTFC-P group. Boys made up 58% ($n = 35$) of the RFC group and 49% ($n = 28$) of the MTFC-P group. The ethnic breakdown across groups was 89% European American, 1% African American, 5% Latino, and 5% Native American. On average, children had spent 171 days in foster care prior to T1; there was no group difference in the mean time spent in foster care. There were also no group differences in the type of current foster placement at T1. Finally, there was no group difference in the number of permanent placements that occurred during the course of the study period.

Intervention Procedure

MTFC-P has been specifically tailored to meet the developmental and social-emotional needs of foster preschoolers. As per MTFC-P protocol, the intervention was delivered via a team approach to the children, foster parents, and permanent placement resources (birthparent and adoptive relative/nonrelative). Before receiving a foster child, each foster parent completed 12 hours of intensive training. After placement, foster parents worked with a foster parent consultant and received support and supervision through daily telephone contacts, weekly foster parent support group meetings, and 24-hour on-call staff availability. The foster parent consultant worked with the foster parent to maintain a positive, responsive, and consistent environment through the use of concrete encouragement for positive behavior and clear limit setting for problem behavior. The children received services from a behavior specialist working in preschool/daycare and home-based settings. Additionally, the children attend weekly therapeutic playgroup sessions designed to facilitate school readiness and in which behavioral,

social, and developmental progress was monitored and addressed. The program staff was largely composed of clinicians with bachelor's and master's degrees and a licensed psychologist as the clinical supervisor. Group supervision occurred weekly, with consultation provided as needed.

Whenever possible, a family therapist worked with birth parents or adoptive relative/nonrelative parents to familiarize them with the parenting skills used by the foster parents in the program. This helped to facilitate consistency between settings. Children typically received services for 9–12 months, including the period of transition to a permanent placement (or, if the child was in long-term foster care, until his/her behavior stabilized and the risk of placement disruption appeared to have been mitigated). Treatment fidelity for all MTFC-P components was monitored via progress notes and checklists completed by the clinical staff. There were no adverse events from participation in the intervention.

The RFC children received routine services in state foster homes, which commonly involved individual psychotherapy. Some RFC children also received developmental screening and, if found to be delayed, referrals for services. The birth families and relative/nonrelative adoptive families in the RFC condition typically received social service support, substance abuse treatment, mental health treatment, and/or parent training (not through our center).

Assessment Measures

Attachment-related behaviors—Children's attachment-related behavior toward foster parents was assessed at five 3-month intervals beginning at entry into the study using the PAD (Stovall-McClough & Dozier, 2000, 2004). Although the PAD was originally developed for infants and toddlers, the content and format of the measure is also appropriate for assessing characteristic of attachment in the preschool years. Dozier and her colleagues (1999) found significant associations between the PAD and classifications from the Strange Situations; proximity seeking ratings from the Strange Situation was significantly correlated with diary security scores (r = .48) and avoidance scores (r = -.42), and avoidance ratings from the Strange Situation was correlated with diary avoidance scores (r = .44) and security scores (r = -.54). In a more recent study, Stovall-McClough and Dozier (2004) further reported significant concordance between the PAD and Strange Situation scales, especially for secure and avoidant behaviors, confirming the validity of the PAD. The foster parents indicated how the child responded to being physically hurt and frightened (14 items) and how the child responded to being separated (13 items). These items were coded as one of three attachment-related behaviors: secure (e.g., proximity seeking or contact maintenance such as moving toward or signaling to the caregiver), avoidant (e.g., ignoring or moving away from the caregiver), or resistant (e.g., displaying angry behaviors toward the caregiver). At each assessment, the foster parents used a checklist of situations to record their child's typical response to each situation for the prior 2 weeks. Percent of secure behavior was calculated by summing the number of secure behaviors and dividing by the total number of behaviors reported. We used the same method to calculate percent of avoidant behavior and percent of resistant behavior.

Due to the percentage scoring method used for the PAD, the three attachment-related behavior measures were expected to be somewhat intercorrelated. Across the T1 to T5 assessment intervals, significant correlations (r = -.57 to -.73) were obtained between secure and avoidant behavior. Secure behavior was less strongly correlated with resistant behavior (r = -.09 [*ns*] to -.39). Finally, avoidant behavior was not significantly related to resistant behavior at any assessment interval. These patterns of association indicate that, although attachment-related behaviors assessed the PAD are not completely independent of each other, the three measures assess distinct phenomena. Thus, we performed separate analyses of each behavior.

Age at first foster placement—Age at first foster placement was obtained from child welfare case files, which include demographic information and sequential dated records (start and end dates for each placement). Research staff members recorded the placement data from these files for each child. There was no group difference in mean age at first placement (RFC $M = 3.58$, RFC $SD = 1.14$, MTFC-P $M = 3.25$, MTFC-P $SD = 1.66$), $t = 1.262$, $df = 115$, $p = .21$.

Analysis Plan

We employed latent growth curve (LGC) modeling using Mplus (Muthén & Muthén, 2004) to examine changes in attachment-related behavior from T1 to T5. We also examined the main effects of treatment, age at first foster placement, and interaction effects of treatment with age at first placement on the changes in attachment-related behaviors over time. Foster parent ratings on the PAD at T1–T5 were used to estimate two latent factors (intercept and slope) on measures of secure, resistant, and avoidant behaviors. The intercept factor was centered at T5 (12 months postbaseline), allowing us to use the intercept factor as a comparison of secure, resistant, and avoidant behaviors at the end of the study. The slope factor represents the rate of change in attachment-related behavior.

Owing to participant attrition and occasional instances in which it was not possible to complete an assessment at a particular wave of data collection, the dataset was missing some data. Complete PAD data across all time points was available on 81 participants (69.2%). One or two time points were missing on 19 participants (16.3%), and three or more time points were missing on 17 participants (14.5%). Models were estimated using the full information maximum likelihood estimator in Mplus, which allows for the inclusion of participants with partial data on dependent variables. Therefore, data from all 117 participants were analyzed.

The sample contained a number of sibling groups—the RFC group had 4 sibling dyads and 2 sibling triads, and the MTFC-P group had 10 sibling dyads, 1 sibling triad, and 1 sibling tetrad. To address the interdependence of sibling data, we used maximum likelihood with robust standard errors (MLR) estimators in Mplus, which compute standard errors and a chi-square test statistic that are robust to non-normality and nonindependence of observations (Muthén & Muthén, 2004).

The latent growth analyses involved two steps. First, we fitted a LGC model with the treatment effect to examine main effects of the intervention on the trajectories of attachment-related behaviors. Second, we added age at first foster placement and the interaction between treatment and age at first placement to the model to examine the importance of age at first placement in relation to treatment in predicting the initial levels and changes in attachment-related behaviors.

Results

Mean percentages of secure, avoidant, and resistant attachment from T1 to T5 for both groups are shown in Table 1. There were no significant group differences on any of the measures at T1. Over the study period, percent of secure behavior increased for MTFC-P children and decreased for RFC children, percent of avoidant behavior decreased for MTFC-P children and increased for RFC children, and percent of resistant behavior decreased for both groups.

Trajectories on Attachment Behaviors From T1 Through T5: Testing Intervention Effects

Analyses on individual growth in the three attachment-related behaviors indicated that the trends of all three behaviors were linear, suggesting that the LGC model would adequately capture change over time. However, the growth plots indicated that there were individual variations in the developmental patterns of attachment-related behaviors during the study

period. To address these variations, we fitted a linear spline model to the data. This allowed us to accommodate potential nonlinearity for some individuals in the sample. In the spline model, the intercept factor loadings were all fixed at 1. The slope factor loading for T1 was fixed at -1, and the slope factor loading for T5 was fixed at 0; the remaining slope factor loadings were freely estimated. (For more information on linear spline model, see Stoolmiller [1995].) We first fitted an unconditional LGC model for each attachment-related behavior to confirm that the linear spline model adequately described the observed change in attachment-related behaviors over time and then added the treatment condition to examine the main effects of treatment on attachment-related behaviors. A dummy variable for treatment status (1 = RFC; 2 = MTFC-P) was included in the models for secure, resistant, and avoidant behaviors. The results of the analyses examining main effects of intervention are presented in Table 2.

Intervention effects on secure behavior trajectories—The unconditional linear spline model for secure behavior fit the data well, $\chi^2(3) = .57$, $p = .90$, RMSEA = .00, suggesting adequate fit for the subsequent prediction models. The means of the intercept and slope factors were .68 ($z = 18.44$) and .00 ($z = .51$), respectively. These values represent sample means of mean level at T5 (i.e., intercept factor) and growth rates during the study period. The nonsignificant slope factor mean indicates that there was no change in the mean level of secure behavior over time when treatment condition was not considered. The intercept factor, .03 ($z = 1.16$), and slope factor, .02 ($z = .47$), variances were nonsignificant, suggesting that the individual variability at T5 and the slope factor was nonsignificant. When the intervention effect was added to the unconditional model, the model similarly fit the data, $\chi^2(6) = 1.78$, $p = .94$, RMSEA = .00. The effect was nonsignificant for the mean level at T5 but significantly predicted change over time, .18 ($z = 2.29$), indicating that MTFC-P children tended to show more secure behavior over time than RFC children.

Intervention effects on avoidant behavior trajectories—The unconditional linear spline model for avoidant behavior also fit the data well, $\chi^2(5) = 2.97$, $p = .70$, RMSEA = .00. The means of the intercept factor and slope factor were .19 ($z = 7.49$) and .01 ($z = .03$), respectively. The nonsignificant slope factor indicated an absence of change in avoidant behavior over time when treatment condition was not considered. The intercept factor, .07 ($z = 3.80$), and slope factor, .07 ($z = 3.39$), variances were significant, suggesting that there were considerable individual variations in the initial level and slope for avoidant behavior. The linear spline model with the treatment effect also fit the data well for avoidant behavior, $\chi^2(8) = 4.05$, $p = .85$, RMSEA = .00. As with secure behavior, the effect was not significantly predictive of group differences in T5 avoidant behavior but was significantly related to change over time, -.13 ($z = -2.34$). Specifically, MTFC-P children exhibited significantly greater decreases over time than RFC children in percent of avoidant behavior.

Intervention effects on resistant behavior trajectories—The unconditional linear spline model for resistant behavior also fit the data well, $\chi^2(6) = 3.70$, $p = .72$, RMSEA = .00. The intercept factor and slope factor means were .06 ($z = 5.37$) and -.06 ($z = -3.08$), respectively. The significant negative slope factor indicates that there was a downward trend in percent of resistant behavior for the overall sample. The intercept factor, .01 ($z = 3.49$), and slope factor, .02 ($z = 2.24$), variances were significant, indicating that there were considerable individual variations in the initial level and slope for resistant behavior. The linear spline model that included the treatment effect fit the data well $\chi^2(9) = 10.97$, $p = .28$, RMSEA = .04. However, unlike with secure and avoidant behaviors, treatment was associated with neither T5 resistant behavior nor change over time. Rather, decreasing resistant behavior best characterized the data for both groups.

Effects of age at first foster placement on attachment-related behavior trajectories—The results of the analyses that included age at first foster placement are presented in Table 3. As is shown in the table, the fit for secure behavior remained strong, $\chi^2(15) = 11.38$, $p = .73$, RMSEA = .00. In addition, age at first placement, -.20 ($z = -2.55$), was significantly and negatively related to the change rates, suggesting that foster preschoolers placed earlier tended to show greater increases in secure behavior over time. Notably, the interaction between age at first placement and the intervention, .12 ($z = 2.15$), was significantly and positively related to change in secure behavior over time. As is shown in Figure 1, the association for RFC children between age at first placement and change in secure behavior over time was negative; the younger the children were at first placement, the greater their increases in secure behavior over time. In contrast, MTFC-P children showed the opposite pattern of association; those who were older at first placement showed greater increases in secure behavior.

The model fit for avoidant behavior was also good, $\chi^2(14) = 12.99$, $p = .53$, RMSEA = .00. However, as is shown in Table 3, when age at first foster placement and the interaction of intervention and age at first placement were added, no predictor was significant.

The model fit for resistant behavior in the presence of age at first foster placement remained strong, $\chi^2(15) = 16.95$, $p = .32$, RMSEA = .03. The intervention was significantly and negatively related with T5 resistant behavior, -.10 ($z = -2.09$), and the interaction between age at first placement and intervention was positively associated with T5 resistant behavior, .04 ($z = 2.90$). Further analysis showed that age at first placement was not significantly associated with RFC children's T5 resistant behavior. In contrast, age at first placement was positively associated with MTFC-P children's T5 resistant behavior, $r = .27$, $p < .05$; those placed later tended to show higher levels of T5 resistant behavior.

Discussion

These results suggest that positive changes in attachment-related behaviors are possible in foster care and may be facilitated by family-based interventions designed to improve caregiver—child interaction. The basis for this conclusion is especially evident in the results for secure and avoidant behaviors over time. The growth model for secure behavior indicated a significant divergence between groups, with MTFC-P children exhibiting significantly more secure behavior over time than RFC children. Moreover, the mean percentages of secure behavior over time increased for MTFC-P children and decreased for RFC children. The opposite pattern of results was obtained for avoidant behavior. MTFC-P children exhibited significantly less avoidant behavior over time than RFC children, and the mean percentage of avoidant behavior over time decreased for MTFC-P children and increased for RFC children. In contrast, the results for resistant behavior indicated significant decreases in both groups. As the magnitude of change in resistant behavior was similar for the two groups, analyses revealed no group differences.

Taken together, these results indicate that the MTFC-P intervention impacted all three domains of attachment-related behaviors. The intervention appeared to increase children's ability to rely on foster parents for comfort when distressed and to employ fewer insecure strategies. As we elaborate on below, this could facilitate a positive foster parent—child relationship.

In contrast, the RFC group showed more mixed results. In particular, trends for secure and avoidant behaviors were the opposite of those observed in the MTFC-P group. Only resistant behavior showed a trend indicative of positive change for RFC children. In short, although the RFC children did not appear to become more able to rely on foster parents when distressed, their rejection of the foster parents' efforts under these conditions appeared to decrease.

Although this pattern might not signal fundamental change on the part of the child's ability to rely on the foster parent as a source of support when distressed, it might indicate reduced risk in this area.

Age at First Foster Placement

The analyses including age at first foster placement produced a number of interesting results. Across both groups, age at first placement was a significant predictor of change, with children placed at younger ages experiencing greater increases in secure behavior over time. This replicates prior observations of foster infants placed at younger ages showing more secure behavior (Stovall-McClough & Dozier, 2000, 2004). It also extends this research by indicating that the attachment-related behaviors of children first placed at younger ages might be more pliable. These results support the notion that the amount of time spent in adverse conditions, rather than a critical period during which first placements occur, might have the greatest impact on a foster child's attachment-related behaviors. Additional research is needed to clarify the respective roles of these variables.

Also noteworthy was the significant interaction between age at first foster placement and intervention condition. As is illustrated in Figure 1, this interaction resulted from opposite associations between age at first placement and secure behavior for MTFC-P and RFC children. Older age at first placement was related to greater increases in secure behaviors for MTFC-P children, whereas the opposite was true for RFC children. One interpretation of these results is that MTFC-P is particularly effective for children placed later and might mitigate the negative effects of early adversity in the family of origin.

The results of the analyses that included age at first foster placement for avoidant and resistant behaviors were more equivocal. For avoidant behavior, age at first placement did not show a significant main effect. Its inclusion reduced the main effect of the intervention to a nonsignficant level; however, in this case, there was not a significant interaction between age at first placement and intervention condition. To a certain extent, this was not surprising given that the magnitude of group differences in change in avoidant behavior over time was less than that for secure behavior. For resistant behavior, the inclusion of age at first placement produced significant effects at T5. There were no main or interaction effects on change in resistant behavior over time. Less anticipated was the association between later age at first placement and higher levels of MTFC-P resistant behavior at T5. One explanation for this is that children who spend more time in their families of origin before placement have the greatest difficulty moving away from resistant strategies (despite the potential for interventions such as MTFC-P to increase secure behavior). Clarifying this issue is an important direction for future research.

Overall, the results of analyses that included age at first foster placement provide some evidence of intervention effects. In contrast to the RFC group and the results of prior studies, MTFC-P children who were older at first placement showed the greatest increases in secure behavior, although these trends were not matched on the resistant and avoidant measures. Thus, the ability of the MTFC-P intervention to mitigate the negative effects of later first placement might be limited (at least in the short-term) to increasing secure behavior. Nonetheless, our findings indicate that intervention programs for foster children could be tailored based on age at placement to ensure better outcomes for the children. Further efforts are needed to explicate foster children's heterogeneous and complicated profiles, which are likely to be affected by the severity and types of maltreatment experiences, the children's developmental stages, and the children's foster care placement history. This work has the potential to help to identify the most vulnerable children and to develop more effective intervention strategies for such children. We continue to follow the sample in this study longitudinally, gathering data on attachment-related behaviors, other areas of psychosocial adjustment, and academic and peer relations during the transition to elementary school. In the context of this work, we will observe

whether the mitigation of the negative effects of older age at first placement on MTFC-P children's secure behavior continues to be associated with positive outcomes.

Implications, Limitations, and Conclusions

In reviewing the evidence for interventions designed to affect attachment-related behaviors, van Ijzendoorn, Juffer, and Duyvesteyn (1995) observed that, although there was evidence of impact on maternal sensitivity, there was not strong support for the ability of these interventions to improve attachment security. In the ensuing decade, a burgeoning evidence base has shown that, in addition to a multitude of other health and mental health disparities, foster children are at risk for poor caregiver attachment. Despite this, to our knowledge, there have been no published reports from randomized trials involving foster children of intervention effects on attachment-related behaviors. Thus, this study can be considered a first step in developing empirical support that foster children's attachment-related behaviors can improve under the proper conditions.

One limitation of the present study involves the process of randomization prior to recruitment of participants. As was noted previously, this approach represented a balance between utilizing the most robust scientific methodology and limiting stress to highly vulnerable participants in a very sensitive context. On the positive side, refusal rates in both conditions were low and did not differ significantly between groups. It should also be noted that the present study was based on parent-reports only to examine foster children's attachment related behaviors. Multimethod approaches including observational data in various contexts would provide a better understanding of behavioral changes over time. In addition, these findings should be interpreted with a caution, as RFC children showed higher attrition rates than MTFC-P children over time. Most of the attrition cases involved children who moved out of area to be with biological relatives. Although those who dropped out of the study did not differ in terms of problem behaviors when assessed at baseline, we cannot rule out the possibility that changes in attachment-related behaviors for those children might have been different than those observed for the children who were retained. Information on children's preplacement attachment-related behaviors would have provided additional information on behavioral changes due to placement experience for foster children. However, given the sensitivity of the foster care context, it was not possible to gather this information. Despite these limitations, and in the absence of other randomized trials on foster children, this study provides initial evidence that attachment-related behaviors can improve in foster care

Studies have consistently indicated that young foster children typically experience developmental and mental health problems, as well as high rates of physical health problems (Landsverk et al., 2002; Pears & Fisher, 2005a, 2005b). Failure to provide effective care for foster preschoolers places them at greater risk for such negative outcomes as academic failure and juvenile system involvement. These outcomes have financial and psychosocial implications. Therefore, it is beneficial to society and individuals to employ an early intervention approach to address developmental and psychosocial difficulties of foster preschoolers. Such efforts might help to mitigate these negative outcomes. In spite of the recognition of these issues, only a small proportion of the services in the CWS are evidence based (Elliott, 1998; Rones & Hoagwood, 2000). The results from the current study suggest that MTFC-P is an efficacious approach to intervening with foster preschoolers in the key area of attachment-related behaviors. Taken together with prior evidence that this approach also supports placement permanency (Fisher et al., 2005), it appears that MTFC-P will result in long term benefits and cost-reduction.

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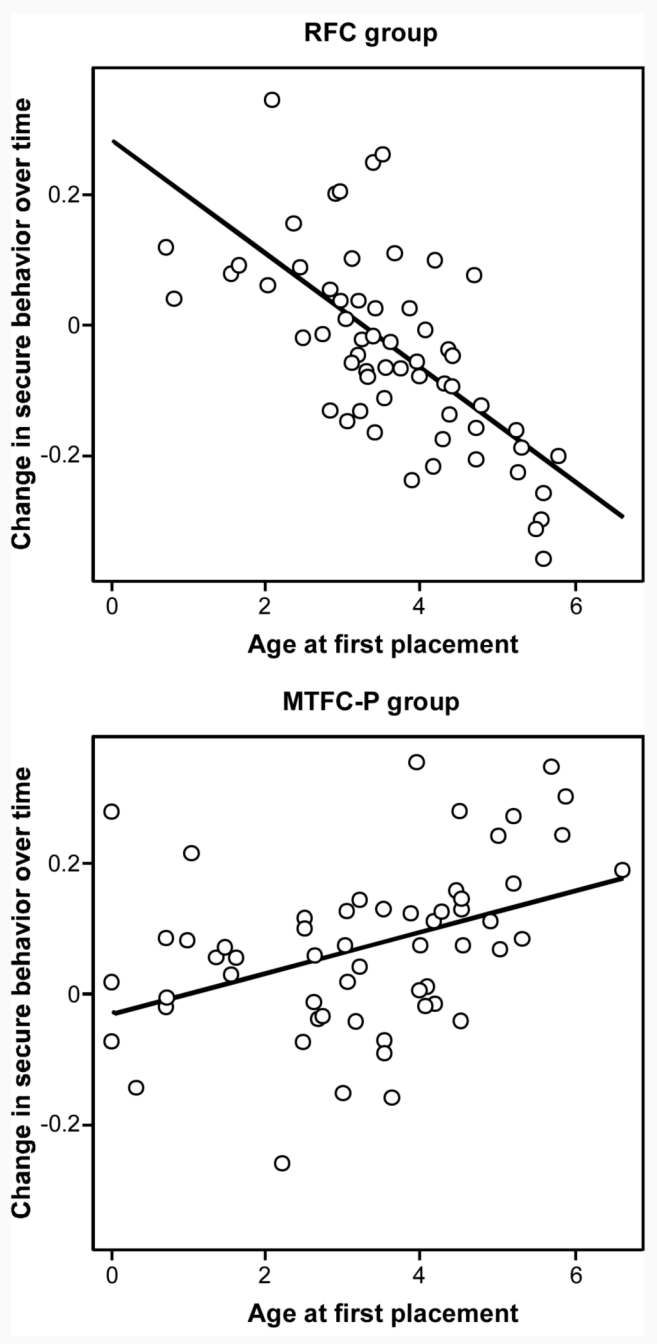

Figure 1.
Relationship between age at first placement and changes in secure behavior over time by condition groups.

Table 1

Mean Percent of Attachment-Related Behaviors by Group, Baseline Through 12 Months

	M (SD)	*M (SD)*
	RFC	**MTFC-P**
Secure behavior		
Baseline	0.71 (.31)	0.61 (.32)
3 months	0.66 (.33)	0.67 (.33)
6 months	0.74 (.31)	0.67 (.36)
9 months	0.65 (.41)	0.70 (.36)
12 months	0.66 (.33)	0.71 (.33)
Avoidant behavior		
Baseline	0.18 (.25)	0.21 (.25)
3 months	0.16 (.26)	0.15 (.25)
6 months	0.16 (.25)	0.22 (.30)
9 months	0.23 (.34)	0.13 (.24)
12 months	0.25 (.30)	0.15 (.22)
Resistant behavior		
Baseline	0.08 (.13)	0.13 (.19)
3 months	0.10 (.14)	0.12 (.15)
6 months	0.08 (.16)	0.06 (.12)
9 months	0.02 (.08)	0.08 (.15)
12 months	0.05 (.09)	0.05 (.12)

Note. RFC = regular foster care; MTFC-P = Multidimensional Treatment Foster Care for Preschoolers.

Table 2

Parameter Estimates, Standard Errors, and Critical Ratios for the Model Testing Main Effects of Intervention

	Secure behavior			Avoidant behavior			Resistant behavior		
	Estimates	***SE***	**Critical ratio**	**Estimates**	***SE***	**Critical ratio**	**Estimates**	***SE***	**Critical ratio**
Intervention effects on intercept	0.07	0.07	1.07	-0.09	0.05	-1.75	0.03	0.02	1.76
Intervention effects on slope	0.18*	0.08	2.29	-0.13*	0.06	-2.34	0.01	0.04	0.07
Intercept factor mean	0.56*	0.11	5.08	0.33*	0.1	3.49	0.01	0.03	0.21
Slope factor mean	-0.26*	0.13	-2.08	0.21*	0.1	2.13	-0.06	0.05	-1.23
Intercept residual variance	0.05	0.04	1.13	0.07*	0.02	3.97	0.01*	0.01	3.64
Slope residual variance	0.02	0.06	0.28	0.07*	0.02	3.49	0.02*	0.01	2.2
Factor correlation	0.03	0.05	0.63	0.07*	0.02	3.72	0.02*	0.01	3.56

* $p < .05$

Table 3

Estimates, Standard Errors, and Critical Ratios for the Multivariate Model

	Secure behavior			Avoidant behavior			Resistant behavior		
	Estimates	***SE***	**Critical ratio**	**Estimates**	***SE***	**Critical ratio**	**Estimates**	***SE***	**Critical ratio**
Effects on intercept									
Intervention	-0.07	0.15	-0.45	-0.09	0.13	-0.65	-0.1*	0.05	-2.09
Age at first placement	-0.08	0.09	-0.87	0.01	0.18	0.14	-0.05*	0.02	-2.13
Intervention x Age at First Placement	0.02	0.05	0.33	-0.01	0.04	-0.04	0.04*	0.01	2.90
Effects on slope									
Intervention	-0.3	0.16	-1.92	-0.03	0.14	0.17	-0.1	0.06	-1.71
Age at first placement	-0.2*	0.08	-2.55	0.04	0.09	0.51	-0.05	0.03	-1.75
Intervention x Age at First Placement	0.12*	0.05	2.15	-0.03	0.04	-0.75	0.03	0.02	1.43
Mean									
Intercept	0.96*	0.27	3.56	0.29	0.26	1.13	0.18*	0.09	1.98
Slope	0.58*	0.23	2.48	.06	0.28	-.23	0.13	0.1	1.28
Residual variance									
Intercept factor	0.03	0.01	1.78	0.07*	0.02	4.20	0.01*	0.01	3.81
Slope factor	0.04	0.09	0.41	0.07*	0.02	3.58	0.02*	0.01	2.54
Factor correlation	0.01	0.02	0.8	0.07*	0.02	3.91	0.02*	0.01	3.83

* $p < .05$

Prev Sci. Author manuscript; available in PMC 2008 September 12.