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Prevention of Behavior Problems for Children in Foster Care: Outcomes and Mediation Effects

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Abstract

Parent training for foster parents is mandated by federal law and supported by state statues in nearly all states; however, little is known about the efficacy of that training, and recent reviews underscore that the most widely used curricula in the child welfare system (CWS) have virtually no empirical support (Farmer et al., 2007; Grimm, 2003). On the other hand, numerous theoretically-based, developmentally-sensitive parent training interventions have been found to be effective in experimental clinical and prevention intervention trials (e.g., Kazdin & Wassell, 2000; McMahon & Forehand, 2003; Patterson & Forgatch, 1987; Webster-Stratton et al., 2001). One of these, Multidimensional Treatment Foster Care (MTFC; Chamberlain 2003), has been used with foster parents of youth referred from juvenile justice. The effectiveness of an intervention based on MTFC was tested in a universal randomized trial with 700 foster and kinship parents in the San Diego County CWS. The goal of the intervention was to reduce child problem behaviors through strengthening foster parents' skills. The trial was designed to examine effects on both child behavior and parenting practices, allowing for specific assessment of the extent to which improvements in child behavior were mediated by the parenting practices targeted in the intervention. Child behavior problems were reduced significantly more in the intervention condition than in the control condition, and specific parenting practices were found to mediate these reductions, especially for high-risk children (i.e., those with more than 6 behavior problems per day at baseline).

Keywords

parent management training; foster parents; effectiveness trial

Child welfare services are estimated to cost $20 billion per year (Allphin et al., 2001), yet very little *experimental* research has been used to guide the interventions used within that system. In a systematic review of research on children in foster care, Wulczyn et al. (2005) found that most existing studies were descriptive in nature. They and other researchers (e.g., Courtney, 2000) have called for experimental research to improve practices in the child welfare system (CWS), particularly for children in out-of-home care. In this study, we tested

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the effectiveness of an intervention designed to strengthen foster parents' parenting skills through the implementation of a theoretically-based intervention that had been shown in previous randomized studies to have positive short- and long-term effects on child outcomes (Chamberlain et al., 1992; Chamberlain & Reid, 1991; Leve et al., 2005). The intervention was expected to lead to improvements in foster parent child management skills, which were expected to result in fewer child behavior problems. Previous work has shown that behavior problems (particularly externalizing behaviors) are of high concern to foster parents and relate to damaging outcomes at the individual child level.

Numerous reviews have concurred that children in foster care are at high risk for psychological problems and that these problems present serious challenges to foster parents (Landsverk & Garland, 1999; Landsverk et al., 2001). Foster parents trying to help such children often do not receive meaningful or relevant consultation on methods for dealing with child behavior and mental health problems. Several recent surveys indicate that difficulty in understanding and managing child problem behaviors (particularly externalizing behaviors) is a primary reason foster parents decide to stop providing foster care (Peer Technical Assistance Network, 1998). The CWS is under extreme stress due to its inability to recruit and retain enough foster parents to meet the demand for placing an increasing number of children, particularly those with serious behavior and mental health problems.

Over the past two decades, research has consistently linked child and adolescent externalizing problems with ineffective parenting practices (Gelfand & Teti, 1990; Laub & Sampson, 1988). Interventions that focus on teaching and supporting parents to use more effective parenting methods have emerged as a mainstay of empirically grounded prevention efforts. These interventions have targeted specific parenting practices that operate as either protective or risk factors. Protective factors included practices such as parental reinforcement and positive mentoring (Catalano et al., 2004; Eddy & Chamberlain, 2000). Risk factors included the use of harsh or overly lax discipline, inadvertent reinforcement of coercive behaviors, and lack of involvement (Patterson, 1982). Improvement in parenting practices has been shown to decrease child behavior problems (Eddy et al., 2005; Patterson et al., 2004), yet these interventions have not been evaluated in the CWS.

Multidimensional Treatment Foster Care (MTFC) has been used with foster care providers to provide treatment to adolescents referred by juvenile justice as an alternative to placement in group or residential care (Chamberlain, & Reid, 1998; Leve et al., 2005). MTFC has been adapted for use with children with severe mental health disorders who are being discharged from inpatient psychiatric care (Chamberlain & Reid 1991) and with high-risk preschoolers in foster care (Fisher et al., 2005). Although originally developed for children and adolescents with severe clinical problems, MTFC was modified for use in regular foster care and was tested in a small efficacy trial in three Oregon counties (Chamberlain et al., 1992). Children with externalizing problems (as identified by caseworkers) were enrolled. Results showed that participation in the intervention was associated with significantly greater decreases in child behavior problems. The current study extends that efficacy trial in five ways.

First, the intervention was designed as an effectiveness trial, was modified to be culturally relevant, and was tested with a culturally diverse sample. Second, it was designed as a universal intervention offered to foster parents of all eligible children receiving a new foster care placement. Third, it was extended to include kinship parents, who represent an estimated 40% of the foster placements in the U.S. Fourth, it was designed to examine effects on both child behavior and parenting practices, allowing for specific assessment of the extent to which improvements in child behavior were mediated by the parenting practices targeted in the intervention. Finally (and not reported here), it was designed to examine the effects of two training conditions for the interventionists (with and without the direct supervision of the model developers; see Chamberlain, Price, Reid, & Landsverk, 2006, for results).[1]

Four specific hypotheses based on the intervention goals were examined: whether foster parents in the experimental condition (compared to those in the control condition) would increase their rate of positive reinforcement relative to their rate of discipline; whether children in the experimental condition would show greater reductions in behavior problems; whether changes in positive reinforcement would mediate reductions in behavior problems affected by the experimental intervention; and whether children's initial level of behavior problems would moderate the intervention effects.

Methods

Participants

Eligible study participants included all foster and kinship parents receiving a new child, aged 5 to 12, from the San Diego County Department of Health and Human Services (DHHS) child welfare system (CWS) between 1999 and 2004. Families were randomly assigned to an intervention or control (usual caseworker services) condition. Children included those being placed in foster care for the first time and those being moved because they were disrupting from a previous foster care placement or were returning to foster care from another setting (e.g., group care, re-entering foster care). The resulting sample consisted of 700 foster families (34% kinship, 66% non-relative). As shown in Table 1, there was only one significant difference in baseline demographic characteristics examined between intervention and control families: fewer intervention foster parents spoke English. The ethnically diverse sample was 21% African American, 33% Latino, 22% Caucasian, 22% mixed ethnic, 1% Asian American, and 1% Native American.[2]

Recruitment Methods

DHHS's data systems facilitated recruitment and were reviewed weekly to identify eligible children and foster families. Eligibility criteria were that the child (a) had been in a kin or non-kin foster care placement for a minimum of 30 days, (b) was 5 to 12 years old, and (c) was not “medically fragile.” Exclusionary criteria were minimal because this was an

[1]Because no differences were found between the two training conditions on child behavior or parenting change outcomes, cases trained in both conditions were combined for the present analyses.

[2]The models were also run controlling for the demographic variable in Table 1 that was significantly different across groups (i.e., speaking English). The overall pattern of results remained unchanged.

effectiveness trial designed to map onto "real world" CWS conditions. Eligible foster families were randomly assigned to either the intervention or control (caseworker services as usual) conditions regardless of relative status (i.e., kinship or non-relative). Foster parents received a brief overview of the project by phone. Of those contacted, 62% agreed to participate and 38% declined. Reasons for declining included: too busy, too much work, and/or too many children, 50%; not interested, 43%; family health problems, 2%; and concerns about participating in research, 5%. Although decliners did not consent to participate, de-identified system data was available on the number of previous placements for children in participating and declining foster homes. The number of previous placements is considered to be a valid indicator of level of child risk (James et al., 2004). ANOVA comparisons indicated no significant differences in the number of prior placements between participating (M = 3.1, SD = 2.9) and declining (M = 2.9, SD = 2.9) groups. Foster parents received a home interview, a detailed project description, consent information, and a *Participant's Bill of Rights*. The investigation was conducted in compliance with the University Institutional Review Board (IRB), as verified through random site checks by the IRB administration.

Intervention

Participants in the intervention group received 16 weeks of training, supervision, and support in behavior management methods. Intervention groups consisted of 3 to 10 foster parents and were conducted by trained facilitator and co-facilitator teams. Detailed program manuals for the group facilitators and for the foster parents were used that specified the meeting topics and contained accompanying materials to be covered in each session. Curriculum topics were designed to map onto protective and risk factors found in previous studies to be developmentally relevant and malleable targets for change (Eddy & Chamberlain, 2000). The focus was on increasing foster and kin parents' positive reinforcement relative to the amount of discipline they used. A 4 to 1 rule was taught and practiced in the foster parent group sessions and was recommended as part of regular home practice assignments (attempt to reinforce the child at least 4 times for every 1 correction/discipline). Parents were also taught to use non-harsh discipline methods, such as brief time outs or privilege removal over short time spans (e.g., no bike riding for 1 hour). Sessions were structured so that the curriculum content was integrated into group discussions. Illustrations of primary concepts were presented using role-plays and videotapes.

The group meetings lasted 90 minutes with approximately 15 minutes devoted to didactic presentations by facilitators. During the remainder of the session, facilitators worked to integrate primary curriculum concepts into the ongoing group discussions and to provide support for implementing the recommended parenting strategies in the foster home. The facilitators were given flexibility to adjust the pace of the curriculum presentation. There were two floating "free" sessions built into the manuals where facilitators could deal with spillover from previous sessions or conduct reviews of past topics. Each week, a home practice assignment related to the topics covered during the session was given at the conclusion of the meeting. These assignments were intended to assist parents in specific ways to implement the behavioral procedures taught in the group meeting. If foster parents missed a parent training session, material from the missed session was delivered during a

home visit at a time convenient for them (20% of the sessions). This method of transmitting information has been found to be an effective and feasible means of increasing the intervention dosage for families who miss intervention sessions (Reid et al., 1999).

Parenting groups were conducted in convenient locations and childcare was provided. Strategies used to maintain parent involvement included (a) providing childcare, (b) receiving credit toward yearly licensing requirements for attending, (c) reimbursing parents $15 per session for expenses, (d) providing refreshments, and (e) providing home visits for missed sessions. Attendance rates were high; 81% of the sample completed at least 75% of the group sessions, and 75% of the sample completed at least 88% of the group sessions.[3]

The intervention was intentionally implemented by paraprofessionals who had no previous experience with the MTFC model or with other parent-mediated interventions. Interventionists with group experience and good interpersonal skills were selected and trained during a 5-day session. Throughout the implementation of the groups, videotapes of the sessions were viewed each week during supervision meetings. During those meetings the integrity of the intervention relative to the manualized curriculum was monitored and facilitators received feedback and direction on dealing with group process and sensitive or difficult clinical issues.

Measures

Baseline (study entry) and termination (5 months post-baseline) measures were collected for child behavior problems and for the proportion of positive reinforcement to discipline.

Child behavior problems—Child behavior problems were measured using the Parent Daily Report Checklist (PDR; Chamberlain & Reid, 1987), a 30-item measure of child behavior problems delivered by telephone to parents during a series of three consecutive or closely spaced days (1 to 3 days apart). A trained interviewer asked the parent “Thinking about (child's name), during the past 24 hours, did any of the following behaviors occur?” Parents were asked to recall only the past 24 hours and to respond “yes” or “no” (i.e., the behavior happened at least once or did not occur). The PDR was designed to avoid aggregate recall or estimates of frequency thought to bias estimates (Stone et al., 2000). It has been used in previous outcome studies (e.g., Kazdin & Wassell, 2000; McClowry et al., 2005) and has been shown to have concurrent validity compared to home observations and stability over time (Weinrott et al., 1979). In a separate analysis with this sample using PDR scores from the control group only, the mean number of child behaviors reported at baseline was strongly related to risk of later placement disruption (Chamberlain, Price, Reid et al., 2006). Children with 6 or fewer behavior problems per day were found to be at low risk for subsequent disruption; the hazard of disruption increased by 17% for every child problem behavior reported over 6.

[3]We found no relationship between attendance rates and study outcomes, possibly due to the overall high attendance rates (i.e., the correlation between the percentage of sessions attended and termination report of child behavior problems was $r = .044$; with the proportion positive reinforcement variable, it was $r = .044$, both *ns*).

Baseline and termination behavior problem scores for each child were computed by summing the number of behaviors reported per day (of a possible 30) on each call and dividing by the number of calls.[4] For analyses testing the hypothesis about the moderating role of the child's initial risk status, the sample was split into two risk groups. The split was made based on prior research (Chamberlain, Price, Reid, Landsverk, Fisher et al., 2006); 'high risk' for children with more than 6 behavior problems at baseline versus 'low risk' for children with 6 or fewer behavior problems at baseline. Inter-call reliability of the PDR measure was acceptable (alpha = .84 at baseline, .83 at termination).

Proportion positive reinforcement—Proportion positive reinforcement was measured using a ratio score of foster parent positive reinforcement and discipline behaviors. The amount of positive reinforcement and discipline per day was computed by aggregating foster parent responses to standardized questions during a 2-hour foster parent interview, and foster parent reports of the use of reinforcement and discipline on the PDR. The foster parent interview items included measures of the frequency of positive reinforcement (How often do you use rewards?) and discipline (How often do you have to discipline TC?). Each item was rated on a 7-point Likert-type scale, ranging from "don't use this strategy" to "3 or more times per day." PDR items included the number of incentives the foster parent reported using per day (positive reinforcement) and the total number of disciplines used per day (discipline). Correlations between the foster parent interview and PDR scores were significant (r = .20–.28 for positive reinforcement and r = .48–.51 for discipline). An average from the two sources provided a multimethod index of these dimensions of parenting. To assess the hypotheses regarding the extent to which positive reinforcement methods increased in proportion to discipline rates, a ratio of total daily positive reinforcement to total daily positive reinforcement plus discipline was computed. This variable indexed the foster parents' proportion of positive reinforcement and was used in further analyses. Means, standard deviations, and effect sizes for variables used in the model testing are shown in Table 2.

Results

Overview

Four questions were addressed in the analyses. (a) Is the intervention condition more effective than the control condition at increasing foster parents' proportion positive reinforcement? (b) Is the intervention condition more effective than the control condition at decreasing child behavior problems? (c) Does the proportion positive reinforcement mediate intervention effects on child behavior problems? (d) Are the intervention effects moderated by the child's initial risk status? A series of path models were tested using LISREL version 8.7 (Jöreskog & Sörbom, 2004) to examine these hypotheses. Prior to model tests, child age, gender, ethnicity, foster parent kinship/non-kinship status, number of prior foster placements were entered in a multiple regression analysis to test for possible effects on primary criterion

[4]Three calls were attempted at each assessment; 2.98 (.15) calls were completed at baseline and 2.93 (.35) at termination. There were no significant differences in the number of calls completed by condition—baseline 2.98 (.15) intervention, 2.97 (.16) control; termination 2.92 (.38) intervention, 2.94 (.31) control.

variables considered in the present study. Of these variables, only child age appeared statistically significant ($p<.05$) and was therefore retained in the subsequent path analyses.

The first three hypotheses were tested using Baron and Kenny's (1986) framework for establishing mediation. Four conditions were tested in the path models: (a) a direct effect of the intervention group on the proportion positive reinforcement at termination (the first hypothesis);[5] (b) a direct effect of intervention group on child behavior problems at termination in the absence of the positive reinforcement mediator (the second hypothesis); (c) a direct effect of the proportion positive reinforcement at termination on child behavior problems at termination; and (d) a significant reduction of the direct path from intervention group to child behavior problems at termination in the presence of the positive reinforcement mediator. The latter condition was assessed by testing the significance of the indirect path coefficient from intervention group to termination child behavior through termination parents' proportion positive reinforcement; because the total effect of the intervention on child behavior is made up of both direct and indirect (through the mediator) effects, an indirect path coefficient significantly greater than zero means that there has been a significant reduction of the direct path in the presence of the parenting mediator. The practical relevance (significance) of this pathway can then be assessed statistically using procedures outlined by Sobel (1982) and recently extended by Mackinnon, Lockwood, Hoffman, West, & Sheets (2002) LISREL offers an easy and straightforward means to assess the statistical significance of any indirect effect. Using the product-of-coefficients approach and the standard error formula described by Sobel (1982), an estimate of the product coefficient linking X1 to X2 to Y (in any three variable example) can be derived and interpreted according to standard probability conventions. Using this approach to significance testing, a significant pathway linking the intervention condition to child behavior problems via parenting was observed in the present study.

To test the final hypothesis, the sample was split into the two risk groups (6 or fewer baseline behavior problems versus more than 6 behavior problems), and stacked multigroup models with varying equality constraints were run to assess whether intervention effects operated differently depending on the child's initial risk status. Each step is described in greater detail below. Standardized beta coefficients are presented with their accompanying *t* value to indicate the significance level of each analysis.

Missing Data

Of the 700 parents who completed the baseline interview, 81% ($n = 564$) provided data at termination. Comparisons of missing and non-missing cases on baseline measures showed a significant difference in foster parents' proportion positive reinforcement, $t(696) = -2.95$, $p = .003$; cases with missing data at termination were higher on this variable at baseline. There were no significant differences between the intervention group and the control group on attrition and missing data rates. Given the stability of behavior, we can tentatively conclude that foster parents who did not complete the termination interview were higher on this positive reinforcement dimension, and that the following analyses emphasize foster parents

[5]Change in proportion positive reinforcement and child behavior problems was indexed by the termination score, controlling for baseline score.

for whom this intervention was targeted; those who used more discipline as compared to positive reinforcement. An analysis of the existing dataset with Little's Missing Completely at Random Test indicated that the data were not missing completely at random, χ^2 (13) = 25.62, p = .02. Although data may still have been missing at random, the likelihood that missing values differed from observed values made it inadvisable to impute them. The following analyses were thus conducted with the sample having both baseline and termination data.[6]

Intervention Effects on Child Behavior Problems and Proportion Positive Reinforcement

An initial model that excluded proportion positive reinforcement but included paths from baseline intervention group, child behavior problems, and child age to termination child behavior problems was fit to establish the unconditional direct path from intervention group to termination child behavior problems, controlling for initial levels of behavior problems (the second hypothesis). This path was significant, *Beta* = -.14, t = -4.36, confirming that the parenting intervention reduced child behavior problems more than the control condition. A model that excluded child behavior problems but included paths from baseline intervention group, proportion positive reinforcement, and child age to termination proportion positive reinforcement showed a significant path from intervention group to termination proportion positive reinforcement controlling for initial levels of reinforcement, *Beta* = .13, t = 3.50, confirming that the intervention improved parenting relative to the control condition (the first hypothesis). With this foundation in place, we proceeded to test mediation (the third hypothesis).

Mediational Model

The mediational model included four direct paths, from (a) intervention group, (b) proportion positive reinforcement (at baseline and termination), (c) baseline child behavior problems, and (d) child age, to the termination child behavior problem score. An indirect path from intervention group to termination child behavior problems through termination proportion positive reinforcement was also included (see Figure 1) to test the significance of the mediated pathway. In addition, a path from baseline child behavior problems to termination proportion positive reinforcement was included to control for this child characteristic in the mediational analysis. This model provided an excellent fit to the data as demonstrated by the RMSEA value of < .001 (RMSEA < .08 is considered a reasonable error of approximation).

The indirect path between intervention group and termination child behavior problems through proportion positive reinforcement was significant, *Beta* = .047, t = -3.64, p < .05; that is, to a significant degree, the effect of intervention group on decreases in child behavior problems was transmitted via increases in proportion positive reinforcement. The effect is best characterized as partial mediation, since the direct path from intervention group to change in child behavior problems remained significant though reduced in magnitude from *Beta* = -.14 (p < .001) without the mediator, to *Beta* = -.09 (p < .01) with the mediator. In

[6]A parallel set of analyses using all cases after multiple imputation with the expectation-maximization (EM) algorithm in PRELIS yielded nearly identical results to those reported here.

other words, about one third of the total effect of intervention group on termination child behaviors was mediated through termination levels of proportion positive reinforcement. Significant paths from baseline to termination proportion positive reinforcement (*Beta* = .25, $p < .01$) and child behavior problems (*Beta* = .52, $p < .001$) indicated stability in these constructs. The path from child age to termination child behavior problems was nonsignificant, and fixing the path to zero did not cause a significant decrement in model fit, $\Delta\chi^2$ (1) = 1.77, *ns*. Although child age did not add to the overall model, because it could relate differentially to outcomes in high- versus low-risk groups, it was retained for the multigroup analyses discussed next.

The Moderating Effects of High- versus Low-risk Status

The levels of positive reinforcement, discipline, and proportion positive reinforcement were compared between high- and low-risk children. T-test comparisons indicated that foster parents of children in the high-risk group reported significantly greater rates of positive reinforcement at baseline, $t(696) = -5.10$, $p < .001$, and at termination, $t(565) = -4.27$, $p < .001$; significantly greater rates of discipline at baseline, $t(696) = -18.74$, $p < .001$, and at termination, $t(565) = -12.08$, $p < .001$; and significantly lower proportion positive reinforcement at baseline, $t(696) = 13.20$, $p < .001$, and at termination $t(562) = 9.34$, $p < .001$. In other words, parents of children with more than 6 behavior problems issued somewhat higher rates of positive reinforcement and much higher rates of discipline than parents of children with 6 or fewer behavior problems.

The same mediational path model described above was tested in a multigroup design (group 1 = low-risk children; group 2 = high-risk children). First, all model parameters (except variances/covariances among the predictor variables) were constrained to be equal across the two risk groups; then, all parameters were allowed to vary freely across groups. Change in model fit was used to determine whether the paths could be assumed invariant across groups. A significant improvement in model fit associated with dropping the equality constraints, $\Delta\chi^2$ (10) = 130.19, $p < .001$, indicated that the modeled relationships differed for high- versus low-risk groups. A more targeted model comparison evaluated fit change associated with fixing only the direct and indirect paths from intervention group to change in child behavior problems to be equal across groups. This change also proved significant, $\Delta\chi^2$ (3) = 19.12, $p < .001$, confirming that the intervention effect itself was different for high- versus low-risk children. The final preferred model, which allowed freely varying model parameters across groups, showed excellent fit to the data by both the chi-square statistic and the RMSEA conventions, χ^2 (2) = 3.59, $p = .17$, RMSEA = .048.

Estimated path values supported indirect intervention effects on decreases in child behavior problems through increases in proportion positive reinforcement in both risk groups (i.e., direct effects were significantly reduced in both groups), but a stronger indirect effect was present in the high-risk group (*Beta* = -.088, $t = -3.88$, $p < .01$) compared to the low-risk group (*Beta* = -.039, $t = -2.03$, $p < .05$). Whereas the remaining direct path from intervention group to termination child behavior problems remained significant for the low-risk group in the presence of the mediator (*Beta* = -.08, $p < .05$, reduced from *Beta* = -.11, $p < .01$ in the absence of the mediator), it was reduced to nonsignificance in the presence of the mediator

for the high-risk group (*Beta* = -.11, *ns*, reduced from *Beta* = -.22, $p < .01$ in the absence of the mediator). Put another way, the indirect effect of the intervention on reductions in child behavior problems made up approximately half of the total effect for the high-risk group, but only about one third of the total effect for the low-risk group. Furthermore, the intervention failed to impact change on proportion positive reinforcement in the low-risk group, as shown by the nonsignificant path from intervention group to termination proportion positive parenting for that group. Thus, increases in proportion positive reinforcement mediated the intervention effect in the high-risk sample only, with the indirect effect being modest in size (see Figure 2 for the full path model in each group).

In summary, the results suggest that the intervention related to improvements in parenting (specifically, to an increase in the proportion positive reinforcement) and to decreases in foster children's behavior problems. The decrease in child behavior problems was partially due to an increase in the proportion of positive reinforcement. This effect was most evident for families where children had relatively high levels of initial behavior problems.

Discussion

The study examined the effectiveness of a universal intervention aimed at providing support and training to foster and kinship parents in an ethnically diverse urban child welfare system (CWS) during weekly groups designed to strengthen parenting skills. Positive reinforcement and discipline skills were taught and practiced. Parents were coached and supported to emphasize their attention to positive, appropriate, and normative child behavior while also using non-harsh contingent discipline methods. Results showed that, compared to the control condition, participation in the intervention group increased parental effectiveness in these skills, which related to decreased child behavior problems, especially for children with higher levels of initial problems.

The finding reported here of greater mediation for the high-risk group relates to the issue of who needs the intervention and who benefits from it. This issue of variation in impact is discussed by Brown et al. (2007) as being an important consideration that helps to refine intervention theory in prevention trials. In this sample of children in foster care, it is not surprising that the mediation effect was found for those children with more than 6 problem behaviors per day at baseline; a rate that has been shown in other studies to be above the normal range (Chamberlain, 1990; Chamberlain, Price, Reid, & Landsverk, 2006). This finding begs the question of whether it is optimal to apply the KEEP (Keeping Foster Parents Trained and Supported) intervention universally as we did here, or to target it on a selected group (i.e., those foster placements where the children have higher rates of behavior problems). In the case of the CWS, the argument for using a universal application of a parenting intervention is that foster parents typically have several children placed in their homes; in this sample, an average of 2.35 (*SD* 1.38) children were placed in each foster/kin home, and foster parents had an average of 13.36 (*SD* 4.91) previous placements.

The present study did not test for the generalization of parenting effects to non-study foster children, nor did it test for sustainability of changes in parenting over time; however, both of these questions would have implications for decisions about whether to implement KEEP in

universal or targeted populations within the CWS. Studies that address questions about generalization to other children in the foster home and sustainability of positive parenting effects would have broad relevance for the CWS, which often struggles to provide care to children with challenging problems. Such research would also inform policy makers about the potential costs and benefits of the intervention.

Another question about the potential generalizability of the findings was that 38% of the eligible foster parents declined to participate. Although the analysis of child risk based on previous placement rates showed equivalence between participators and decliners, there may have been important unmeasured differences in the foster family environments of declining families that could affect the usefulness of the intervention for them and for foster parents in the CWS, generally.

Another limitation is that although the key dimensions of parenting were assessed using a multimethod index, all methods were based on parent reports as was the measure of child behavioral problems. Use of the PDR measure may obviate this limitation somewhat in that it relies on repeated observations over a short time period (the past 24 hours). It has been found to relate to observed child behavior in several studies (Forgatch & Toobert, 1979) and to predict more distal outcomes such as arrests and placement disruption (Chamberlain, Price, Reid, Landsverk, Fisher et al., 2006). Because the current measurement strategy is practical and inexpensive, it could be used by CWSs to compare effects found here with future replications. In such replications, it would be beneficial to include additional measures such as teacher ratings. There is a substantial body of evidence that children and adolescents in foster care fare very poorly in school (Eckenrode et al., 1993; Wodarski et al., 1990). Interventions that integrate parenting and school domains could have large and lasting prevention effects.

As is always the case in mediational models when the variables of interest are measured at the same time point, it is possible that the directionality of the mediated relationships could be reversed. In the present study, it is possible that changes in child behavior problems mediated or drove the observed association between intervention condition and the increases in the proportion of positive reinforcement. Because the intervention focused on changing parenting behaviors and there was no direct contact with the foster children in these homes, this reverse relationship seems unlikely.

Finally, the analyses showed that the changes in child behavior were only partially mediated by the changes in parenting that we measured. Other non-measured parenting factors such as the attachment bond between parent and child (Fisher & Kim, 2007) or other non-parenting factors such as level of family and parental stress or parental depression (DeGarmo & Forgatch, 1997; Lueng et al., 2006) could account for additional variance in improvements in child behavior.

Although parent management training interventions are among the most thoroughly evaluated interventions in the clinical research literature (Nock, 2003), these and other evidence-based interventions have not been well integrated into child welfare services (Chaffin & Friedrich, 2004). To our knowledge, this is only the second study[7] to focus on

using a research-based parenting training approach with foster parents and is the largest attempt to date. Other studies have shown links between specific parenting practices and child behavioral outcomes (e.g., Reid et al., 2004), but none of these have been sited in the foster care system where the history of the parent-child relationship is typically relatively recent, and therefore, the context for parent-child interactions differs from that in previously published parent-mediated prevention and treatment studies. Although the effects achieved here were modest, the study represents an important first step toward using research-based parenting interventions to inform the training and support of foster parents.

The intervention was conducted within the San Diego County CWS by paraprofessionals who were employed by collaborating researchers and supervised by the developers of the intervention. Although the intervention was implemented with regular state foster parents who were not specially selected, the interventionists were not employed independently from the study in county or community agencies. Therefore, the results obtained most closely map onto what have been described as early-stage effectiveness trials where developers maintain some control over the intervention (versus advanced-stage trials where there is complete local ownership of the intervention and developers are not involved; August et al., 2006).

If the goal is to empower public child service systems to implement evidence-based interventions into routine practice, next steps would involve studies that examine questions related to embedding interventions into public agencies, including examining models for training agency employees and supervisors to conduct the interventions and evaluations. This study represents an effort to demonstrate that the capabilities of foster and kinship parents can be enhanced to positively impact outcomes for the children in their care.

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References

Allphin S, Barth RP, Simmons B. A comparative study of the public cost of raising a foster child in California: Adoption versus long-term foster care. Children & Youth Services Review. 2001; 23:865–891.

August GJ, Bloomquist ML, Lee SS, Realmuto GM, Hektner JM. Can evidence-based prevention programs be sustained in community practice settings? The Early Risers' advanced-stage effectiveness trial. Prevention Science. 2006; 7:151–165. [PubMed: 16555143]

Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology. 1986; 51:1173–1182. [PubMed: 3806354]

[7]Chamberlain et al. (1992) tested a parent training intervention in three counties in Oregon.

Brown CH, Wang W, Kellam SG, Muthén BO, Petras H, Toyinbo P. Methods for testing theory and evaluating impact in randomized field trials: Intent to treat analyses for integrating the perspectives of person, place, and time. Drug and Alcohol Dependence. in press.

Catalano RF, Berglund ML, Ryan JAM, Lonczak HS, Hawkins JD. Positive youth development in the United States: Research findings on evaluations of positive youth development programs. Annals of the American Academy of Political and Social Science. 2004; 591:98–124.

Chaffin M, Friedrich B. Evidence-based treatments in child abuse and neglect. Children and Youth Services Review. 2004; 26:1097–1113.

Chamberlain P. Comparative evaluation of Specialized Foster Care for seriously delinquent youths: A first step. Community Alternatives: International Journal of Family Care. 1990; 2:21–36.

Chamberlain, P. Treating chronic juvenile offenders: Advances made through the Oregon Multidimensional Treatment Foster Care model. Washington, DC: American Psychological Association; 2003.

Chamberlain P, Moreland S, Reid K. Enhanced services and stipends for foster parents: Effects on retention rates and outcomes for children. Child Welfare. 1992; 5:387–401. [PubMed: 1521497]

Chamberlain P, Price JM, Reid JB, Landsverk J. Cascading implementation of a foster parent intervention: Partnerships, logistics, and sustainability. 2006 Manuscript submitted for publication.

Chamberlain P, Price JM, Reid JB, Landsverk J, Fisher PA, Stoolmiller M. Who disrupts from placement in foster and kinship care? Child Abuse & Neglect. 2006; 30:406–424.

Chamberlain P, Reid JB. Parent observation and report of child symptoms. Behavioral Assessment. 1987; 9:97–109.

Chamberlain P, Reid JB. Using a Specialized Foster Care treatment model for children and adolescents leaving the state mental hospital. Journal of Community Psychology. 1991; 19:266–276.

Chamberlain P, Reid JB. Comparison of two community alternatives to incarceration for chronic juvenile offenders. Journal of Consulting and Clinical Psychology. 1998; 6:624–633. [PubMed: 9735578]

Courtney ME. Research needed to improve the prospects for children in out-of-home placement. Children and Youth Services Review. 2000; 22:743–761.

DeGarmo DS, Forgatch MS. Confidant support and maternal distress: Predictors of parenting practices for divorced mothers. Personal Relationships. 1997; 4:305–317.

Eckenrode J, Laird M, Doris J. School performance and disciplinary problems among abused and neglected children. Developmental Psychology. 1993; 29:53–62.

Eddy JM, Chamberlain P. Family management and deviant peer association as mediators of the impact of treatment condition on youth antisocial behavior. Journal of Consulting and Clinical Psychology. 2000; 5:857–863. [PubMed: 11068971]

Eddy, JM.; Reid, JB.; Fetrow, RA.; Lathrop, M.; Dickey, C. The Linking the Interests of Families and Teachers (LIFT) prevention program for youth antisocial behavior: Description, outcomes, and feasibility in the community. In: Epstein, MH.; Kutash, K.; Duchnowski, AJ., editors. Outcomes for children and youth with emotional and behavioral disabilities and their families: Program and evaluation best practices. 2nd. Austin, TX: Pro-Ed, Inc.; 2005. p. 479-499.

Farmer EMZ, Barth RP, Dorsey S, Chamberlain P, Kelleher K, Reid J, Landsverk J. Current status and evidence base of training for foster and treatment foster parents. 2007 Manuscript submitted for publication.

Fisher PA, Burraston B, Pears K. The Early Intervention Foster Care program: Permanent placement outcomes from a randomized trial. Child Maltreatment. 2005; 10:61–71. [PubMed: 15611327]

Fisher PA, Kim HK. Intervention effects on foster preschoolers' attachment-related behaviors from a randomized trial. Prevention Science. 2007; 8:161–170. [PubMed: 17340186]

Forgatch MS, Toobert DJ. A cost-effective parent training program for use with normal preschool children. Journal of Pediatric Psychology. 1979; 4:129–145.

Gelfand DM, Teti DM. The effects of maternal depression on children. Clinical Psychology Review. 1990; 10:329–353.

Grimm B. Foster parent training: What the CFS reviews do and don't tell us. Youth Law News. 2003:3–29.

James S, Landsverk J, Slymen DJ, Leslie LK. Predictors of outpatient mental health service use: The role of foster care placement change. Mental Health Services Research. 2004; 6:127–141. [PubMed: 15473100]

Jöreskog, KG.; Sörbom, D. LISREL 8.7 for Windows. Lincolnwood, IL: Scientific Software International; 2004.

Kazdin AE, Wassell G. Therapeutic changes in children, parents, and families resulting from treatment of children with conduct problems. Journal of the American Academy of Child & Adolescent Psychiatry. 2000; 39:414–420. [PubMed: 10761342]

Landsverk, J.; Garland, AF. Foster care and pathways to mental health services. In: Curtis, PA.; Grady, DE., editors. The foster care crisis: Translating research into practice and policy. Nebraska: The University of Nebraska Press; 1999. p. 193-210.

Landsverk, JA.; Garland, AF.; Leslie, LK. Mental health services for children reported to protective services. In: Myers, JEB.; Hendrix, CT.; Berliner, L.; Jenny, C.; Briere, JN.; Reid, T., editors. APSAC handbook on child maltreatment. 2nd. Thousand Oaks, CA: Sage; 2001.

Laub JH, Sampson RJ. Unraveling families and delinquency: A reanalysis of the Gluecks' data. Criminology. 1988; 26:355–381.

Leve LD, Chamberlain P, Reid JB. Intervention outcomes for girls referred from juvenile justice: Effects on delinquency. Journal of Consulting and Clinical Psychology. 2005; 73:1181–1185. [PubMed: 16392991]

Lueng D, Slep W, Smith AM. Predicting inept discipline: The role of parental depressive symptoms, anger, and attributions. Journal of Consulting and Clinical Psychology. 2006; 74:524–534. [PubMed: 16822109]

MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. Psychological Methods. 2002; 7:83–104. [PubMed: 11928892]

McMahon, RJ.; Forehand, RL. Helping the noncompliant child. New York: Guilford; 2003.

McClowry SG, Snow DL, Tamis-LeMonda CS. An evaluation of the effects of INSIGHTS on the behavior of inner city primary school children. Journal of Primary Prevention. 2005; 26:567–584. [PubMed: 16237502]

Nock MK. Progress review of the psychosocial treatment of child conduct problems. Clinical Psychology Science and Practice. 2003; 10:1–28.

Patterson, GR. Coercive family process. Eugene, OR: Castalia Publishing Co.; 1982.

Patterson GR, DeGarmo DS, Forgatch MS. Systematic changes in families following prevention trials. Journal of Abnormal Child Psychology. 2004; 32:621–633. [PubMed: 15648529]

Patterson, GR.; Forgatch, MS. Parents and adolescents: I Living together. Eugene, OR: Castalia Publishing; 1987.

Peer Technical Assistance Network. Learning from colleagues: Family/professional partnerships moving forward together. Washington, DC: Center for the Study of Social Policy; 1998.

Reid JB, Eddy JM, Fetrow RA, Stoolmiller M. Description and immediate impacts of a preventive intervention for conduct problems. American Journal of Community Psychology. 1999; 27:483–517. [PubMed: 10573832]

Reid MJ, Webster-Stratton C, Baydar N. Halting the development of conduct problems in Head Start Children, the effects of parent training. Journal of Clinical Child and Adolescent Psychology. 2004; 33:279–291. [PubMed: 15136193]

Sobel, ME. Asymptotic confidence intervals for indirect effects in structural equation models. In: Leinhart, S., editor. Sociological methodology. San Francisco: Jossey-Bass; 1982. p. 290-312.

Stone AA, Broderick JE, Kaell AT, DelesPaul PAEG, Porter LE. Does the peak-end phenomenon observed in laboratory pain studies apply to real-world pain in rheumatoid arthritics? Journal of Pain. 2000; 1:212–217. [PubMed: 14622620]

Webster-Stratton C, Reid MJ, Hammond M. Preventing conduct problems, promoting social competence: A parent and teacher training partnership in Head Start. Journal of Clinical Child Psychology and Psychiatry. 2001; 42:943–952.

Weinrott, MR.; Bauske, B.; Patterson, GR. Systematic replication of a social learning approach. In: Sjöden, PO.; Bates, S.; Dockens, WS., III, editors. Trends in behavior therapy. New York: Academic Press; 1979. p. 331-352.

Wodarski JS, Kurtz PD, Gaudin JM, Howing PT. Maltreatment and the school-age child: Major academic, socioemotional, and adaptive outcomes. Social Work. 1990; 35:506–513. [PubMed: 2284600]

Wulczyn, F.; Barth, RP.; Yuan, YYT.; Jones Harden, B.; Landsverk, J. Evidence for child welfare policy reform. New York: Transcation De Gruyter; 2005.

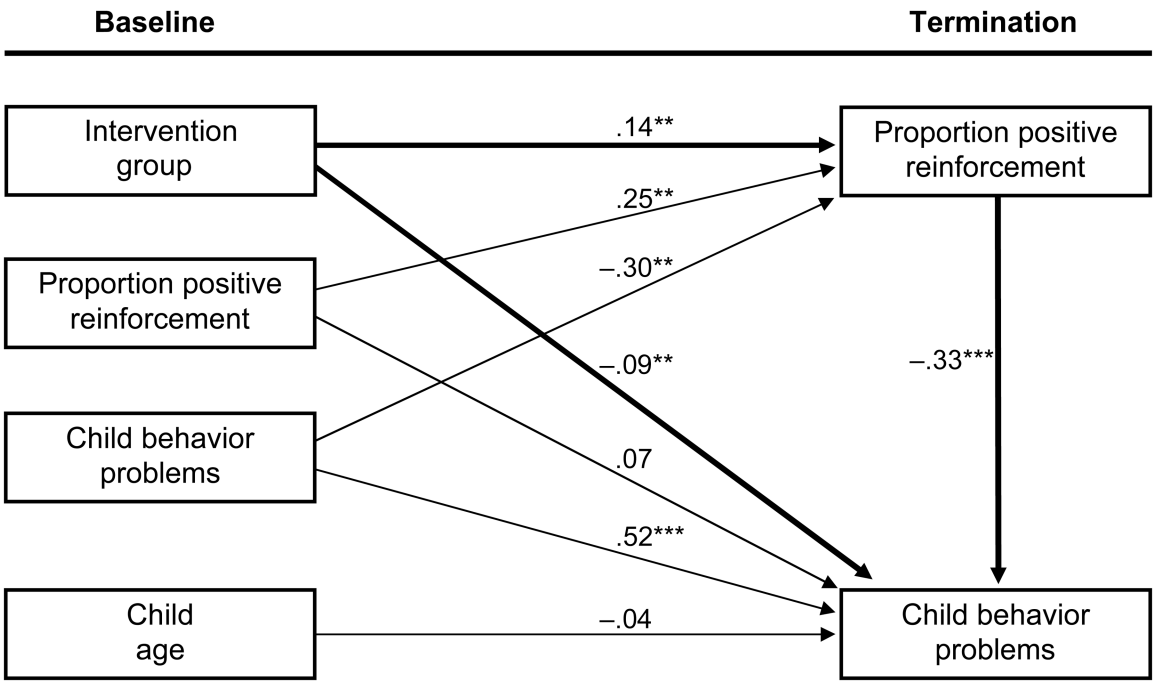

Figure 1.

Intervention path model for the full sample testing the direct effect of the intervention on the proportion positive reinforcement and child behavior problems and the indirect effect of the intervention on child behavior problems as mediated through proportion positive reinforcement. *Note.* Standardized path coefficients are presented with the mediational paths in bold. The direct path from intervention group to termination child behavior problems in the absence of the positive reinforcement mediator (not shown) was −.14 ($p < .001$). **$p < .01$. ***$p < .001$.

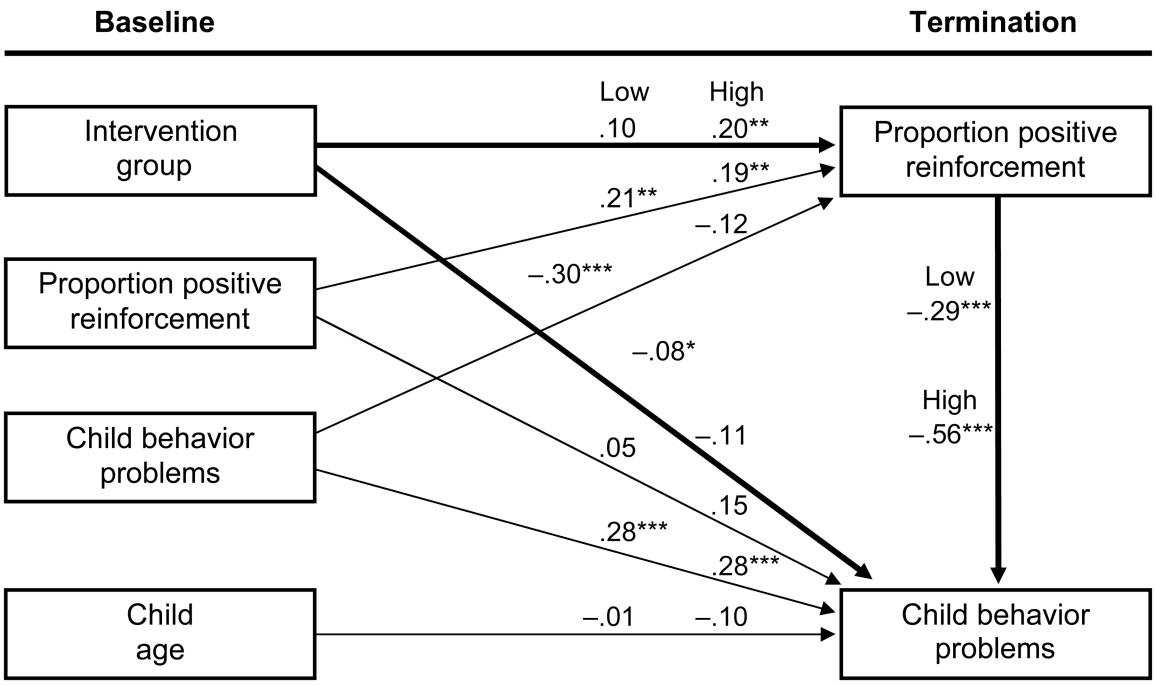

Figure 2.

Intervention path model for low-risk and high-risk group testing the direct effect of the intervention on the proportion positive reinforcement and child behavior problems and the indirect effects of the intervention on child behavior problems as mediated through proportion positive reinforcement. *Note.* "Low" represents path coefficients for the low-risk group (≤ 6 child behavior problems), and "High" represents path coefficients for the high-risk group (> 6 child behavior problems). Standardized path coefficients are presented with the mediational paths in bold. The direct path from intervention group to termination child behavior problems in the absence of the positive reinforcement mediator (not shown) was −.11 ($p < .01$) for the low-risk group and −.22 ($p < .01$) for the high-risk group. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 1
Demographic Information for Foster Parents and Children

	Foster parent		Child	
	Intervention (*n* = 359)	**Control (*n* = 341)**	**Intervention (*n* = 359)**	**Control (*n* = 341)**
Age at baseline	49.86 (11.8)	47.29 (11.7)	8.88 (2.2)	8.72 (2.3)
Kin	32%	36%		
Non-kin	68%	64%		
Gender				
Female	94%	93%	50%	54%
Male	6%	7%	50%	46%
Ethnicity				
African American	27%	24%	23%	19%
Asian/Pacific Islander	4%	2%	1%	1%
Caucasian	21%	34%	20%	25%
Latino	41%	33%	35%	30%
Native American	1%	1%	1%	1%
Multi-Ethnic	6%	6%	20%	24%
Language Spoken				
English	55%	65%	66%	79%*
Spanish/English & Spanish	45%	35%	34%	21%
Number of prior placements			2.95	2.80

* $p < .05$

Table 2

Daily Rates of Positive Reinforcement, Discipline, and Proportion Positive Reinforcement and Effect Sizes

	Full sample		Intervention group		Control group	
	M	***SD***	***M***	***SD***	***M***	***SD***
Baseline						
Positive reinforcement	0.96	0.55	1.01	0.57	0.91	0.53
Discipline	1.27	1.18	1.31	1.24	1.22	1.13
Proportion positive reinforcement	0.53	0.27	0.53	0.27	0.52	0.27
Mean number of child problem behaviors/day	5.85	4.10	5.92	4.26	5.77	3.93
Termination						
Positive reinforcement	0.98	0.57	1.06	0.60	0.88	0.53
Discipline	1.14	1.12	1.06	1.13	1.24	1.20
Proportion positive reinforcement[a]	0.56	0.28	0.60	0.28	0.52	0.28
Mean number of child problem behaviors/day[b]	4.87	4.06	4.37	3.91	5.44	4.15

[a] Cohen's d = .29;

[b] Cohen's d = .26.