Routledge
Taylor & Francis Group

Preventing Child Behavior Problems and Substance Use: The Pathways Home Foster Care Reunification Intervention

DAVID S. DeGARMO, JOHN B. REID, BECKY A. FETROW,
PHILIP A. FISHER, and KARLA D. ANTOINE

Oregon Social Learning Center, Eugene, OR, USA

This study evaluated the Pathways Home manualized selective preventive intervention that was designed to prevent reunification failures once children are returned home to their biological parent(s) after first-time stays in foster care (N = 101). The theoretically-based intervention focused on support and parent management practices designed to prevent the development of child behavior problems, including internalizing and externalizing problems and also substance use. Intent-to-treat analyses employed probability growth curve approaches for repeated telephone assessments over 16 weeks of intervention. Findings showed that relative to "services as usual" reunification families, the Pathways Home families demonstrated better parenting strategies that were, in turn, associated with reductions in problem behaviors over time. Growth in problem behaviors predicted foster care reentry. Maternal substance use cravings were a risk factor for growth in problem behaviors; this risk was buffered by participation in the Pathways Home intervention.

KEYWORDS foster care, parenting, prevention, reunification, substance use

INTRODUCTION

Maternal substance abuse is associated with greater likelihood of the mothers' children's own substance use when becoming an adult (Widom & Hiller-Sturmhöfel, 2001). Maternal substance use is also associated with compromised parenting practices, including harsh parenting, child maltreatment, and neglect (Walsh, MacMillan, & Jamieson, 2003), which in turn is the leading cause of children's removal from the home (Boles, Young, Moore, & DiPirro-Beard, 2007; Mokuau, 2002). For both environmental and genetic reasons, compromised parenting is a contributing factor to the development of child behavior problems and substance use (DeGarmo, Eddy, Reid, & Fetrow, 2009). Life course models have demonstrated an association between prenatal substance use, greater maternal postnatal use, and greater paternal substance use, and have also demonstrated a direct association between prenatal substance use and poor long-term child emotional and behavior problems in both foster care and community samples (Fisher et al., 2011; Smith, Johnson, Pears, Fisher, & DeGarmo, 2007). Recent evidence also suggests that subclinical alcohol use, which can be more prevalent than clinical drinking problems, may have a more pervasive impact on children's developmental adjustment than alcohol dependence (Keller, Cummings, & Davies, 2005).

The present study focuses on the successful reunification and prevention of reentry into foster care for children who are at high risk for the development of substance use. Children in the sample had been removed from the home prior to the onset of the study, and more than 90% of their mothers were substance abusers. Very few theory-based or evidence-based intervention programs focusing on successful reunification exist for families, and even fewer exist focusing on reunification in cases where substance abuse is a factor. This report focuses on an initial efficacy evaluation of the "Pathways Home" intervention. Given the links among maternal substance use, placement in foster care, and the development of later child substance use problems, maternal substance use history and current cravings were evaluated as main effect risk factors for reunification failure and potential moderators of the Pathways Home intervention.

Children who have been removed from their biological families and placed in foster homes are at extreme risk for a wide range of disorders and adjustment problems over the life course (e.g., substance abuse, educational failure, mental disorders, externalizing problems, health-risking sexual behavior, and delinquency; Cicchetti & Rogosch, 1994; Pears, Kim, & Fisher, 2008; Shonk & Cicchetti, 2001). Although the majority of children exit foster care through family reunification, reunification takes longer relative to the time to exit for adoption outcomes (Wulczyn, 2004), and for the majority that return home, there remains a risk for reunification failure, additional stays in the child welfare system (CWS), and the development of emotional and behavioral problems associated with disruptions in caretakers. National studies have estimated that 15% to 30% of children who are reunified with their

biological parents reenter foster care (Berrick, Needell, Barth, & Jonson-Reid, 1998; Curtis, Dale, & Kendall, 1999; Wulczyn, 2004).

It is often presumed that reunification with biological parents is the preferred outcome because a continuous caretaking relation is important for the child's well-being and the separation and lack of stability inherent in a temporary placement may psychologically harm the child. However, first reunification failures involve the largest group of children—those who exit foster care too quickly after placement and are returned home to families that often receive inadequate support services to remedy the problems that may have precipitated the initial placement (Ahart, Bruer, Rutsch, Schmidt, & Zaro, 1992). Estimates indicate that for the majority of children who are reunified within the first 12 months, the risk of reentry into foster care is 40% (Barth, 1997; Wells & Guo, 1999). Few services are typically available to children and their biological families following reunification; and currently there is a lack of evidence-based programs designed to help prevent reentry into foster care. The extant services targeting parent and family issues are often underdeveloped and are not designed to meet the known targets of parenting deficiencies, including parental substance abuse.

Both child and parental risk factors contribute to reunification failures. In addition to parental substance use, key contributing risks for foster care reentry and for the development of child substance use problems include parental criminality (Berrick et al., 1998; Rzepnicki, Schuerman, & Johnson, 1997; Terling, 1999; Wulczyn, 2000) and poor parenting and behavior management skills (Festinger, 1994, 1996; Frame, Berrick, & Brodowski, 2000). Therefore, parent management skills are a key focus of the theory-based Pathways Home intervention evaluated here. For children, behavior problems can further increase the risk of reunification failure and foster care placement disruptions (Newton, Litrownik, & Landsverk, 2000). These behavior problems are often associated with disrupted attachments with primary caregivers and foster care providers. For example, one large study of foster care families (i.e., Keeping Foster Parents Trained and Supported [KEEP]) demonstrated that baseline child behavior problems predicted subsequent placement disruption from foster homes (Chamberlain et al., 2006). Specifically, six or more child behavior problems reported by the foster parent during brief daily telephone interviews significantly amplified the likelihood of subsequent negative placement disruptions. A subsequent effectiveness analysis showed that KEEP significantly reduced the daily rates of child behavior problems for intervention families compared with control families. Furthermore, effective parenting, and specifically, the use of positive encouragement, mediated the association between the intervention and reductions in child behavior problems (Chamberlain et al., 2008). The general parent management strategies and principals are based on social interactional and social learning approaches focusing on positive reinforcement and encouragement of desired prosocial behaviors in children (Reid, Patterson, & Snyder, 2002).

Child gender can also influence developmental outcomes of child welfare involvement as well as intervention. Leve, Fisher, and DeGarmo (2007) found that girls in the foster care system were more vulnerable than girls in a community comparison sample on measures of teacher-rated and self-reported social competence and peer problems. In a randomized trial comparing foster care with case management with standard foster care services, Clark and colleagues (1998) found that boys and older children demonstrated differential improvement relative to girls for externalizing behaviors and placement stability.

Pathways Home

Based on the lack of evidence-based services available for children and parents reunifying following foster care placement, the goal of the Pathways Home study was to develop, implement, and evaluate the efficacy of an intervention designed to improve long-term outcomes for reunifying children and families using a randomized controlled trial (RCT). The goal was to prevent reunification failures once children are returned home to their biological parent(s) in hopes of reducing more distal outcomes such as later childhood substance use and behavioral problems. Because participants are selected for the study due to their membership in a group that has been identified as being at high risk for conduct and substance use problems, the proposed program is considered a selective preventive intervention (Offord, 2000). When using the *selective prevention* approach, problems can be addressed early on before they become accompanied by more severe behavioral or psychological impairments.

Pathways Home focused on supporting parents and making the reunification transition as smooth as possible and building a foundation of continued success in parenting. The goal was to create a safe and nurturing environment for the children and to meet the demands of parenting and daily household management, including managing stress, staying healthy, and getting appropriate support. The intervention was developed upon systematic translational research and prior evidence-based programs involving parent management approaches for biological parents and foster parent caregivers. Key foundational programs underpinning Pathways Home were Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003) and Project KEEP. MTFC involves multiple levels of intervention and wraparound services, including individualized treatment for children. MTFC emphasizes the importance of parental or other caregiver role in providing children with consistent close supervision, effective limit setting, and emotional involvement and support (Chamberlain & Reid, 1998). Project KEEP is a group-delivered foster parent intervention, designed to provide training, supervision, and support in behavior management strategies and managing caregiver stress.

Intent-to-Treat Hypotheses for the Prevention of Child Problem Behaviors

Three main goals were evaluated with intent-to-treat (ITT) analyses focusing on a theoretical model of preventing child problem behaviors and reunification failure. The hypothesized tests were (1) to examine whether the Pathways Home intervention obtained benefits demonstrating improvements in parenting behaviors and whether these improvements were related to significant reductions in children's problem behaviors after reunification; (2) to test whether the intervention benefited families most at risk; and (3) to test whether benefits were associated with long-term reductions in reentry. All analyses controlled for main effect risk factors.

Hypothesis 1. Intervention families were expected to exhibit increased use of encouragement-based parenting strategies over time relative to control group families.

Hypothesis 2. Intervention families were expected to exhibit decreases in child problem behaviors over time relative to control group families. Increases in encouragement were expected to be associated with reductions in problem behaviors.

Hypothesis 3. Intervention families were expected to exhibit a lower likelihood of reentry into the child welfare system, with increases in problem behaviors associated with risk of reentry.

Risk factor by intervention interactions for potential moderators of intervention effectiveness also were examined.

METHOD

Sample Participants

The Pathways Home study was conducted in collaboration with the local Child Welfare Services department. Eligible families for the study included a child that was between the ages of 5 and 12 years old, was returning home to live with at least one biological parent, was living within 25 miles of the research center, and was reunifying for the first time with the parent(s) after foster care placement. Staff from the Child Welfare Branch referred children who were in foster care and about to be reunified with their families to the study. Referrals were screened for eligibility. The design involved random assignment to the Pathways Home intervention or to services typically offered in the community for families involved in child welfare services. One-half of the eligible families were randomly assigned to the intervention condition. Screening and random assignment procedures excluded the study's intervention staff; they only received information about cases once

a family had been assigned to the intervention group and the appropriate consents had been obtained.

All of the procedures were reviewed and accepted by collaborating partners in the local Child Welfare Branch and by the centers' institutional review board (IRB) for the protection of human participants. Informed consents were obtained from both the participating biological parent(s) and the caseworker (as the legal guardian of the child). Prospective participants received a written invitation to participate in the study and a copy of the project description and consent form(s). Senior trained project staff then contacted prospective participants, either by phone or in person, to further explain the study, orally reviewing all of the information on the project description and consent form, and answering any questions.

A total of 103 families were randomly assigned, resulting in 53 assigned to services-as-usual control families and 50 to Pathways Home intervention families. There were no differences on baseline sociodemographics or problem behaviors. The sample included 52 boys and 51 girls. Children's ages ranged from 5.36 to 11.74 years ($M = 8.28$), mothers ranged in age from 22.81 to 49.12 years ($M = 31.86$), and fathers ranged in age from 20.10 to 49.32 years ($M = 36.62$). Fifty-four percent of the families were headed by single parents, including two single fathers. Seventy-four percent of mothers self-identified as European-American, 5% African-American, 17% Hispanic, and 4% multiracial. Children were identified as 53% European-American, 3% Native American, 35% Hispanic, and 9% multiracial. Of the fathers providing demographic data, 82% identified as European-American, 4% African-American, 11% Hispanic, and 3% multiracial (reporting fathers were 27% of sample, which was also 59% of two-parent families). At time of enrollment, 92% of biological mothers had a history of drug or alcohol abuse, 55% had been arrested, and 47% had a history of family violence. All children had experienced multiple parental figure transitions and had experienced an average of five family structure, placement, or parental transitions. Forty-one percent were below expected grade-level performance. Because the present report focused on maternal substance use history and drug and alcohol craving, the two single fathers were removed from analyses.

Data were gathered from families through in-person interviews, questionnaires, teacher questionnaires, and records searches. The initial assessment (baseline) took place shortly before the child left his or her foster care placement. The second assessment occurred shortly after the 16-week parent management intervention and the final assessment 6 months after that. Thus, the assessment schedule corresponded to roughly a baseline, 6-, and 12-month timeline.

Intervention Curriculum

The structured and manualized curriculum included strategies to enhance parenting skills, encourage cooperation, teach new behaviors, set effective

limits, keep track of children's behavior and whereabouts, and help children to succeed at school. Pathways Home was delivered in two main phases during individual sessions with a trained professional family consultant. Phase 1 began just prior to reunification and included 16 weeks of parent management training and healthy self-care strategies. Curriculum sessions included the following:

- getting started,
- daily schedules,
- encouragement and cooperation,
- tracking cooperation/requests and directions,
- teaching new behaviors,
- behavior contracts,
- limit setting,
- balance between encouragement and discipline,
- promoting school success,
- promoting positive peer and sibling relationships,
- anticipation and pre-teaching,
- avoiding power struggles,
- problem solving,
- stress and coping,
- social support, and
- parenting plans.

Stress and coping focused on ongoing substance use issues for parents. Each weekly session included review, home practice assignments, and role-plays. After an eight-week break, Phase 2 continued for an additional eight weeks and included booster session fine-tuning of parent management skills, assessed level of risk for future harm to family members, and developed a family protection plan to address those risks. Regarding intent to treat, the mean and median percentage of coverage of the Phase 1 16-week intervention was 80% for the intervention families, meaning half of the families received less than 80% and half of the families received 80% or more of Phase 1.

Measures

Pathways Home intervention was coded 1 for random assignment to intervention condition and 0 for controls. A sensitivity analysis was also conducted, computing *dosage* as percentage of sessions attended and completed by families.

The focal proximal outcome measures for children's problem behaviors and parent management strategies were collected biweekly during the 16-week Phase 1 intervention for a total of 32 repeated calls using the Parent Daily Report Checklist (PDR; Chamberlain & Reid, 1987). The PDR was

designed to avoid the potential bias of aggregate recall of frequency estimates (Stone, Broderick, Kaell, DelesPaul, & Porter, 2000). It has been used in previous outcome studies (e.g., Chamberlain et al., 2008; Kazdin & Wassell, 1999; McClowry, Snow, Tamis-Lemonda, 2005) and has demonstrated convergent validity with observed behaviors in the home (Weinrott, Bauske, & Patterson, 1979).

Child behavior problems collected from the PDR included 40 behavior problem items that were computed as a total summative index ranging from 0 to 40. Trained interviewers were blind to random assignment and asked the parent, "Thinking about [child's name], during the past 24 hours did any of the following behaviors occur?" (e.g., arguing, defiance, fighting, lying, school problems, stealing, etc.). Behaviors on the PDR include known risk factors for youth substance abuse.

Encouragement strategies were also collected during the PDR calls. After reporting their children's behaviors, parents were then asked, "What did you do?" (e.g., ignore, discuss problem, warn or threaten punishment, time-out, restrict privileges, etc.). Responses were then scored as binary scores indicating 0 ("did not use") and 1 ("used appropriate limit setting and intervention-based encouragement") based on a set of specific items (e.g., increase privileges, give praise, talk, acknowledgment; giving incentive points; hugs/kisses; etc.).

Foster care reentry was a focal distal outcome collected from CWS records at 12 months, coded 1 for reentry and 0 for child remaining in the home.

Baseline risk factors were collected from questionnaire and records data. Three risk variables were included in the present analyses: (1) a summative *risk index* ranging from 0 to 14 (mother or father has been arrested, has a history of drug abuse, mental illness, poverty, etc.), (2) the total number of children's parental and residential transitions, and (3) parental alcohol and drug craving using a measure adapted from the Penn Alcohol Craving Scale (Flannery, Volpicelli, & Pettinati, 1999). Drug and alcohol use was a clinically sensitive measure to collect for families involved in child protective services in that positive reports of use would trigger mandated reporting to the CWS. Therefore, a decision was made to collect craving reports as risk factor rather than to collect data on the frequency of use. The Pathways Home alcohol and drug craving measure included 10 items rated on a 0 to 6 Likert-type rating scale that assessed thoughts, cravings, craving intensity, and self-rated resistance for use of alcohol and repeated questions for drug use. Sample items included the following: "During the past week … how often have you thought about drinking or about how good a drink would make you feel?"; "At its most severe point, how strong was your craving during the past week?"; "How much time have you spent thinking about drinking or about how good a drink would make you feel?"; "How difficult would it have been to resist taking a drink, etc.?" Cronbach's alpha was .93 for mothers.

    Control variables included child age measured in years, child gender
coded 1 for girl and 0 for boy, and single-parent status.

Analytic Strategy

For the main ITT evaluation we employed hierarchical generalized linear
modeling (HGLM), a special case of hierarchical linear modeling (HLM;
Raudenbush, Bryk, Cheong, & Congdon, 2004) appropriate for binary
dichotomous outcomes and count variables. HLM is a multilevel regression
framework also known as mixed modeling. The present modeling was hier-
archical (e.g., multilevel) because Level 1 growth rate outcomes were time-
varying repeated measures nested or clustered within individual families at
Level 2. Time-invariant variables such as child gender, Time 1 risk factors,
and assignment to intervention condition are Level 2 predictors of time-vary-
ing growth rates at Level 1. More specifically, as opposed to continuous vari-
ables with assumptions of normally distributed residuals, probability models
in HGLM specify a link function that transforms the dependent variable so
that the predicted values are constrained to be within a specific interval. Log-
itistic growth models were estimated for repeated binary parent encourage-
ment variable using Bernoulli estimation and Poisson growth models were
estimated for behavior problem counts. As an initial step in the analyses,
missing data were evaluated over time. Little's test of missing data patterns
revealed the data were missing completely at random (MCAR; $\chi^2(6) = 7.68$,
$p = .26$). We then employed multiple imputation of missing data (Schafer &
Graham, 2002) using 10 Bayesian imputations.

RESULTS

The hypothesized tests for the prevention of child problem behaviors are
presented in three main ITT analyses. The first focused on parenting as the
proximal target of the intervention followed by ITT models of youth risk fac-
tors for substance use, including child problem behaviors and reunification
failures. Each explored effects of baseline risk factors as moderators of the
main prevention model.

Parent Encouragement

Hypothesis 1 stated that intervention families would exhibit increased use
of encouragement-based parenting strategies over time relative to control
group families. The observed proportion of families using encouragement-
based parenting strategies is plotted over time by group condition in Figure
1 using the 32 repeated telephone call assessments. The observed propor-
tions show relatively similar rates of use in the first month of the interven-
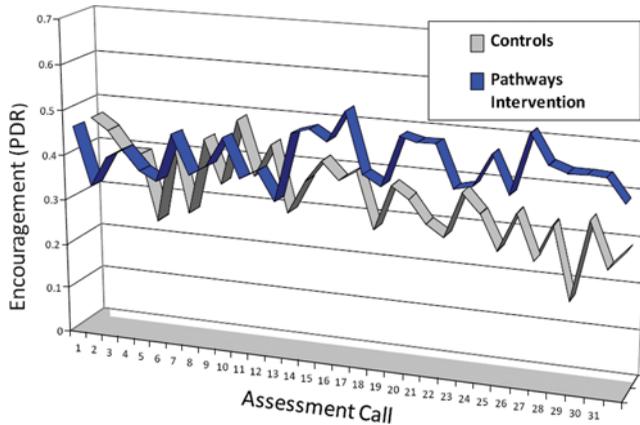tion phase, with higher variability among the control group families. By

FIGURE 1 Observed proportion of sample using encouragement-based parenting strategies over time by group condition. Time period covers the Phase 1 16-week intervention period using two weekly phone calls for collecting the Parent Daily Report (PDR) (color figure available online).

the third and fourth months of intervention, the intervention group showed relatively higher use of encouragement. To formally test Hypothesis 1, we specified an HGLM growth model entering the group condition contrast between Pathways Home and services as usual controlling for time from baseline assessment to reunification, child age, gender, single-parent status, drug and alcohol craving, child transitions, and the summative risk index. As opposed to modeling time as equidistant phone calls from 1 to 32 as shown in Figure 1, an advantage of HLM was the ability to model the individual families on their specific unique timelines using dates of PDR calls. Time was specified on a scale of "weeks" as a continuous timeline from Week 1 of the intervention to Week 16 (e.g., calls were weighted 0 for initial status, and a sample timeline was 0, .14, .81, 1.14, 2.00, 2.71, 3.00, etc.).

Hypothesis 1 was supported. Results for growth in parenting encouragement are presented in Table 1 in the form of unstandardized logit parameters and their corresponding odds ratios. Controlling for risk factors, families in the Pathways Home intervention had higher growth rates and were more likely to use encouragement as a strategy over time relative to the control condition ($\gamma = .024$, $p = .01$). None of the risk factors were associated with parent use of encouragement strategies over time. A subsequent model (not shown) examined baseline risk and child characteristics by intervention interactions. No intervention moderators were observed.

Problem Behaviors

We next evaluated child problem behavior count scores over time. The observed count means are presented in Figure 2 by group condition. Both

TABLE 1 Bernoulli Logit Growth Model for Predictors of Use of Encouragement

	Use of Encouragement Growth Rate		
Model 1	Estimand	Odds Ratio	Confidence Interval
Time to reunification	−.000	.999	.999–1.000
Pathways intervention	.024**	1.024**	1.005–1.045**
Child age	−.000	.999	.990–1.016
Girl	−.016	.983	.964–1.005
Single parent	−.001	.998	.978–1.020
Drug and alcohol craving	.017	1.015	.997–1.037
Child transitions	−.008	.991	.973–1.011
Risk index	−.003	.997	.975–1.018

**$p < .01$.

group conditions show elevated counts of problem behaviors in the first weeks following reunification. The overall mean trajectories were nonlinear, showing rapid improvements after one month, followed by a steadier decline in the remaining three months. We next tested Hypothesis 2 formally by specifying the same set of variables predicting growth in PDR problem behavior counts as the dependent variable, followed by entry of growth in parent use of encouragement as a time-varying covariate. Results for Hypothesis 2 are shown in Table 2 using three regression models with blocked entry. Hypothesis 2, stating that intervention families would exhibit greater decreases in problem behaviors over time relative to the control group, was not supported in Model 1. There was no main effect of the intervention. However, upon entering group by risk factor potential interactions in Model 2, one significant interaction was obtained. The main effect of the intervention was conditioned by maternal substance
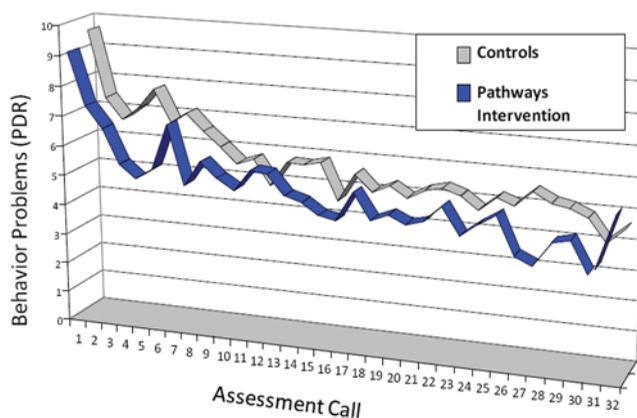

FIGURE 2 Observed counts of total problem behaviors over time by group condition. Time period covers the Phase 1 16-week intervention period using two weekly phone calls for collecting the Parent Daily Report (PDR) (color figure available online).

TABLE 2 Poisson Growth Model Estimands for Predictors of Problem Behavior Count Score

	Problem Behavior Growth Rate		
Model 1	Estimand	Event Rate Ratio	Confidence Interval
Time to reunification	−.000	.999	1.000–1.000
Pathways intervention	−.003	.997	.994–1.001
Child age	−.004***	.999***	.996–.996***
Girl	−.010***	.989***	.986–.993***
Single parent	−.009***	.990***	.986–.992***
Drug and alcohol craving	.011***	1.011***	1.007–1.013***
Child transitions	.005**	1.005**	1.002–1.007**
Risk index	.005**	1.003**	1.002–1.009**
Model 2			
Intervention × craving	−.005***	.995***	.992–.998**
Model 3			
Time-varying encouragement	−.122***	.883***	.855–.918***

**$p < .01$. *** $p < .001$.

use cravings such that the intervention was more beneficial for mothers with higher drug and alcohol cravings relative to mothers with low drug and alcohol cravings (Pathways Home × Cravings $\gamma = -.01$, $p = .001$), suggesting that the intervention was most successful for those families where the child was exposed to the greatest risk for substance use. Upon entering use of encouragement as a time-varying covariate, Model 3 supported the hypothesis that use of encouragement would be associated with decreases in problem behaviors ($\gamma = -.12$, $p < .001$). Although a main effect of the intervention was not present, this finding suggested an indirect effect of the intervention on reductions in problem behaviors through increased use of encouragement.

Among the risk factors, drug and alcohol cravings ($\gamma = .01$, $p < .001$) and the number of child transitions were associated with growth in problem behaviors ($\gamma = .01$, $p < .001$). Girls who were reunified showed greater reductions in problem behaviors relative to boys who were reunified ($\gamma = -.01$, $p < .001$) and single parents showed greater reductions relative to two-parent families ($\gamma = -.01$, $p < .001$).

Dosage Analysis on Problem Behaviors

We also evaluated a sensitivity analysis based on the number of intervention sessions attended and completed by the intervention group. Within the intervention condition, the average number of session completed was 80% of the intervention curriculum. The median was also 80%. Although the ITT assignment did not show a main effect on growth in problem behaviors, the dosage variable did show a significant effect. Using the same predictors in Table 2, the level of dosage was associated with a 1% greater reduction per
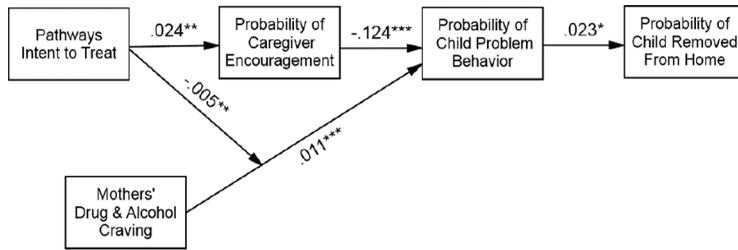
FIGURE 3 Summary of final findings controlling for risk factors in the HGLM and logistic regression models. *$p < .05$. **$p < .01$. ***$p < .001$.

week relative to families receiving no intervention ($\gamma = -.010$, $p = .006$, event ratio $= .99$, CI $= .98 - .99$).

Foster Care Reentry

In the final step of the analyses, we employed Child Welfare Branch records after roughly 1 year to test Hypothesis 3, expecting lower rates of reentry for the intervention group relative to the controls. Nearly twice the percentage of families in the control condition ($N = 8$, 15%), experienced reentry into the foster care system relative to the Pathways Home intervention condition ($N = 4$, 8%). Although the proportion of families was larger in the control groups, as expected, this was not a statistically significant difference using nonparametric tests ($\chi^2 (1) = 1.26$, $p = .26$). We then evaluated risk factors using a multivariate logistic regression model. For the prediction model we computed within family time-centered growth slopes for growth in encouragement and growth in problem behaviors to conduct the single-level logistic regression. Given the small portion of families that reentered, we specified the logistic regression model by first entering the group condition contrast followed by stepwise entry of the risk factors and growth slopes. Only one variable met criteria for significant entry. Supporting the hypotheses, growth in problem behaviors was associated with increased reentry risk ($\beta = .023$, $p = .03$, OR $= 1.023$).

A summary of the final findings controlling for risk factors in the HGLM and logistic regression models is provided in Figure 3. The findings suggest that the Pathways Home intervention benefited permanency and stability after reunification through the indirect pathway of increased use of encouragement parenting strategies (a 2.4% increase in likelihood of use), which were in turn associated with reductions in growth rates of problem behavior counts (a 12.4% reduction in risk). Growth in problem behaviors was associated with increased risk of reunification failure (a 2.3% increase in risk). Maternal drug and alcohol cravings were associated with increased risk of growth in problem behaviors; however, this risk was buffered for mothers participating in the Pathways Home intervention.

DISCUSSION

The present report focused on the prevention of behavior problems in children who are at high risk for the development of substance use. Children had previously been removed from the home and more than 90% of their mothers had substance use problems—a leading factor contributing to the neglect and maltreatment precipitating removal from the home. The theoretically-based intervention was designed to promote the successful reunification of children with their families by supporting parents with effective parent management skills, reducing stress, and addressing substance use issues. Although this was not an intergenerational research design, the present study represents a life course model of substance abuse in parents as a key risk factor to be addressed in preventing the development of substance abuse in their children. The familial contextual events of neglect, child removal, and reunification are intervention contexts that are relatively poorly understood. Reunification is a process for children and parents, not an event (Wulczyn, 2004). Although it is the most frequent result, reunification for children who exit foster care too quickly after placement are returned home to families that often receive inadequate support services, thereby increasing risk for reentry into foster care due to factors that include parental relapse, child behavior problems, or both. To address the lack of evidence-based reunification services, the present study evaluated a program designed to support parents during this process. The goal was to create a safe and nurturing environment for the children and to teach parents how to meet demands of daily household management, including parenting, managing stress, staying sober and healthy, and maintaining appropriate support. Although not directly tested here, these proximal goals are thought to reduce the risk of later adolescent substance use.

In testing these goals, the ITT analyses showed that relative to services-as-usual reunification families, the Pathways Home families demonstrated more appropriate limit setting and intervention-based encouragement of their child in response to the child's behavior problems, which in turn was associated with reductions in problem behaviors over time. Maternal substance use cravings were a risk factor for increases in problem behaviors that were buffered by participation in the Pathways Home intervention. This suggests that the intervention program might mitigate the link between parental substance abuse and the future onset of children's substance use. Finally, foster care reentry was predicted by growth in problem behaviors over time. Foster care reentry and problem behaviors are both predictors of future substance abuse.

In the first weeks following reunification, the observed mean counts of problem behaviors were elevated for both the intervention and control conditions. Mean trajectories then showed rapid then stable improvements in the numbers of problem behaviors for both groups. These mean patterns

for both groups strongly suggest that early engagement with services in the reunification process is important. These mean trajectories, however, do not convey the individual variation in trajectories over time, an advantage of employing HGLM in the present analyses where individual differences in trajectories were the focus of the analyses. A recent study by Hurlburt and colleagues (2010), employing growth mixture modeling, examined variation in trajectory profiles for PDR counts for children living with foster caregivers. These author(s) argued that early identification of escalating problem behaviors or episodic event-related spikes could be related to more effective individualized treatment and prevention at the family level, or more adaptive intervention designs at a more systematic level. Similar intervention strategies recommended for foster parents could be applied to reunification families.

Among child characteristics, the number of prior transitions was associated with increased risk of problem behaviors and girls exhibited greater reductions in problem behaviors relative to boys; however, no gender by intervention effects were obtained that differentially benefited either boys or girls (Clark et al., 1998). Further analyses might focus on more gender-specified outcomes of internalizing symptoms versus externalizing symptoms, or more long-term gender-specified outcomes such as substance use, health-risking sexual behaviors, and their timing.

Although there were promising results of the intervention, limitations to the present study included the sample size. The foster care reunification rates in the local catchment area were less frequent and took longer than had been anticipated by pilot data. Although the reunification failure and reentry rates were nearly double for the control group relative to the intervention, this difference was not statistically significant. The beneficial impact was likely underpowered given the sample size and rate of reentry in the present sample. Given the low base rate of reentry events, longer-term follow-up may also increase the power for testing the prevention of reunification failures.

Another limitation was the sensitivity of measuring substance use as cravings as opposed to actual use, frequency, or dependence. However, the vast majority of mothers had a substance use history and mothers in both intervention and control conditions were equally monitored and under equal pressures to remain clean and sober. These circumstances limited the extent to which we could ask direct questions about substance use without legal reporting requirements that might affect placement changes. Given this measurement limitation, adequate variance and predictive validity was obtained in the sample. The measures of parenting and child problem behaviors were also assessed with parent reports. However, the discrete nature of the behaviors collected in repeated short-term intervals provides more validity and reliability than do global ratings, and as previously noted, this measure has been validated in multiple outcome studies and converges with behaviors observed in the home.

Practice Implications for Parenting and Substance Use

The present study was based on teaching principals of positive parenting strategies, effective limit setting, and adequate supervision to promote and reinforce the desired prosocial behaviors of children and to prevent the development and escalation of detrimental behaviors. For families involved in children's protective services this involves even more attention to issues related to substance use, stress management, and parenting supports than would typically be delivered to more normative populations who might receive basic parent management training.

The Pathways Home intervention moderated the effect of maternal substance use cravings. For mothers, substance use is not only a potential cause of child maltreatment and neglect, but can also be a consequence of a mother's own childhood maltreatment and trauma. Beyond child welfare populations, health-related intervention efforts need to more adequately target and treat abused and neglected females both as adolescent girls and adults to reduce their risk of adult alcohol problems. Because alcohol use as a coping mechanism is identified as a mediator between childhood maltreatment and subsequent use, such interventions could focus on helping those women develop more positive coping mechanisms (Widom & Hiller-Sturmhöfel, 2001).

The Pathways Home intervention demonstrated evidence of effectiveness in preventing problem behaviors and preventing reentry into foster care. The manualized curriculum based on MTFC and Project KEEP is consistent with practice implications recommended by the Children's Bureau (Dougherty, 2004). These include family engagement prior to reunification as a critical component of successful change during the reunification process, regular and individualized needs assessments that include clear, mutually established goals critical to case planning, and services that are skills-focused and multisystemic, if possible.

Regarding engagement, the dosage sensitivity analysis indicated that if families attended and completed the program curriculum, there was a greater rate in the reduction of problem behaviors relative to families not completing and relative to families with no intervention. This suggests that early engagement into services is critical to improved outcomes, as well as retention of families in services.

The present study focused on substance use for mothers and outcomes for their children and was limited in its ability to assess the role and impact of the father. We note that services and research also need to better understand the role of fathers, who have been generally peripheral to services and research in the child welfare system (O'Donnell, Johnson, D'Aunno, & Thorton, 2005). In addition, research on alcohol and drug abuse with men has largely neglected the role of fathering and parenting roles (McMahon & Rounsaville, 2002; Parke, 2002). As a consequence, inadequate attention to the role of fathers could have problematic implications for the prevention of child maltreatment (Lee, Bellamy, & Guterman, 2009).

Finally, it should be noted that the present study was limited in its ability to understand culturally specified factors related to substance use and reunification. It should be recognized that successful interventions for treating child maltreatment and substance use might require culturally sensitive adaptations in order to meet the needs of diverse populations (Mokuau, 2002).

REFERENCES

Ahart, A., Bruer, R., Rutsch, C., Schmidt, R., & Zaro, S. (1992). *Final report: Intensive foster care reunification programs*. Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services (Contract No. HHS-100-91-0016). Calverton, MD: Macro International.

Barth, R. (1997). Family reunification. In J. D. Berrick, R. Barth, & N. Gilbert (Eds.), *Child welfare research review* (vol. 2, pp. 219–228). New York, NY: Columbia University Press.

Berrick, J. D., Needell, B., Barth, R. P., & Jonson-Reid, M. (1998). *The tender years: Toward developmentally sensitive child welfare services for very young children*. New York, NY: Oxford University Press.

Boles, S. M., Young, N. K., Moore, T., & DiPirro-Beard, S. (2007). The Sacramento Dependency Drug Court: Development and outcomes. *Child Maltreatment*, *12*(2), 161–171. doi: 10.1177/1077559507300643

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

Chamberlain, P., Price, J., Leve, L. D., Laurent, H., Landsverk, J., & Reid, J. B. (2008). Prevention of behavior problems for children in foster care: Outcomes and mediation effects. *Prevention Science*, *9*, 17–27. doi: 10.1007/s11121-007-0080-7

Chamberlain, P., Price, J. M., Reid, J. B., Landsverk, J., Fisher, P. A., & Stoolmiller, M. (2006). Who disrupts from placement in foster and kinship care? *Child Abuse & Neglect*, *30*, 409–424. doi: 10.1016/j.chiabu.2005.11.004

Chamberlain, P., & Reid, J. B. (1987). Parent observation and report of child symptoms. *Behavioral Assessment*, *9*, 97–109.

Chamberlain, P., & Reid, J. (1998). Comparison of two community alternatives to incarceration for chronic juvenile offenders. *Journal of Consulting and Clinical Psychology*, *6*, 624–633. doi: 10.1037/0022-006X.66.4.624

Cicchetti, D., & Rogosch, F. A. (1994). The toll of child maltreatment on the developing child. *Child Abuse*, *3*, 759–776.

Clark, H. B., Lee, B., Prange, M. E., Stewart, E. S., McDonald, B. B., & Boyd, L. A. (1998). An individualized wraparound process for children in foster care with emotional/behavioral disturbances: Findings and implications from a controlled study. In M. Epstein, K. Kutash, & A. Duchnowski (Eds.), *Outcomes for children and youth with emotional and behavioral disorders and their families: Programs and evaluation best practices* (pp. 513–542). Dallas, TX: PRO-ED.

Curtis, P. A., Dale, G., & Kendall, J. C. (1999). *The foster care crisis: Translating research into policy and practice*. Lincoln, NE: University of Nebraska Press.

DeGarmo, D. S., Eddy, J. M., Reid, J. B., & Fetrow, R. A. (2009). Evaluating mediators of the impact of the Linking the Interests of Families and Teachers (LIFT)

multimodal preventive intervention on substance use initiation and growth across adolescence. *Prevention Science*, *10*, 208–220.

Dougherty, S. (2004). *Promising practices in reunification*. Washington, DC: The Children's Bureau, The National Center for Foster Care & Permanency Planning, Hunter College School of Social Work. Retrieved from http://www.hunter.cuny.edu/socwork/nrcfcpp/downloads/promising-practices-in-reunification.pdf

Festinger, T. (1994). *Returning to care: Discharge and reentry in foster care*. Washington, DC: Child Welfare League of America.

Festinger, T. (1996). Going home and returning to foster care. *Children and Youth Services Review*, *18*, 383–402. doi: 10.1016/0190-7409(96)00011-4

Fisher, P. A., Lester, B. M., DeGarmo, D. S., LaGasse, L. L., Lin, H., Shankaran, S., … Higgins, R. (2011). The combined effects of prenatal drug exposure and early adversity on neurobehavioral disinhibition in childhood and adolescence. *Development and Psychopathology*, *23*, 777–788. doi: 10.1017/S0954579411000290

Flannery, B. A., Volpicelli, J. R., & Pettinati, H. M. (1999). Psychometric properties of the Penn Alcohol Craving Scale. *Alcoholism: Clinical and Experimental Research*, *23*, 1289–1295. doi: 10.1097/00000374-199908000-00001

Frame, L., Berrick, J. D., & Brodowski, M. L. (2000). Understanding reentry to out-of-home care for reunified infants. *Child Welfare*, *79*, 339–369.

Hurlburt, M. S., Chamberlain, P., DeGarmo, D. S., Zhang, J., & Price, J. (2010). Advancing prediction of foster placement disruption using brief behavioral screening. *Child Abuse & Neglect*, *34*, 917–926. doi: 10.1016/j.chiabu.2010.07.003

Kazdin, A. E., & Wassell, G. (1999). Barriers to treatment participation and therapeutic change among children referred for conduct disorder. *Journal of Clinical Child Psychology*, *28*, 160–172. doi: 10.1207/s15374424jccp2802_4

Keller, P. S., Cummings, E. M., & Davies, P. T. (2005). The role of marital discord and parenting in relations between parental problem drinking and child adjustment. *Journal of Child Psychology and Psychiatry*, *46*, 943–951. doi: 10.1111/j.1469-7610.2004.00399.x

Lee, S. J., Bellamy, J., & Guterman, N. B. (2009). Fathers, physical child abuse, and neglect: Advancing the knowledge base. *Child Maltreatment*, *14*, 227–231. doi: 10.1177/1077559509339388

Leve, L. D., Fisher, P. A., & DeGarmo, D. S. (2007). Peer relations at school entry: Sex differences in the outcomes of foster care. *Merrill Palmer Quarterly*, *4*, 557–577. doi: 10.1353/mpq.2008.0003

McClowry, S. G., Snow, D. L., & Tamis-LeMonda, C. S. (2005). An evaluation of the effects of INSIGHTS on the behavior of inner city primary school children. *Journal of Primary Prevention*, *26*, 567–584. doi: 10.1007/s10935-005-0015-7

McMahon, T. J., & Rounsaville, B. J. (2002). Substance abuse and fathering: Adding Poppa to the research agenda. *Addiction*, *97*, 1109–1115. doi: 10.1046/j.1360-0443.2002.00159.x

Mokuau, N. (2002). Culturally based interventions for substance use and child abuse among Native Hawaiians. *Public Health Reports*, *117*(Suppl. 1), S82–S87.

Newton, R. R., Litrownik, A. J., & Landsverk, J. A. (2000). Children and youth in foster care: Disentangling the relationship between problem behaviors and number of placements. *Child Abuse and Neglect*, *24*, 1363–1374. doi: 10.1016/S0145-2134(00)00189-7

O'Donnell, J. M., Johnson, W. E., Jr., D'Aunno, L. E., & Thorton, H. L. (2005). Fathers in child welfare: Caseworkers' perspectives. *Child Welfare*, *84*, 387–414.

Offord, D. R. (2000). Selection of levels of prevention. *Addictive Behaviors*, *25*, 833–842. doi: 10.1016/S0306-4603(00)00132-5

Parke, R. D. (2002). Substance-abusing fathers: Descriptive, process and methodological perspectives. *Addiction*, *97*, 1118–1119. doi: 10.1046/j.1360-0443.2002.00234.x

Pears, K. C., Kim, H. K., & Fisher, P. A. (2008). Psychosocial and cognitive functioning of children with specific profiles of maltreatment. *Child Abuse & Neglect*, *32*, 958–971. doi: 10.1016/j.chiabu.2007.12.009

Raudenbush, S., Bryk, A., Cheong, Y. F., & Congdon, R. (2004). *HLM6: Hierarchical linear and nonlinear modeling*. Lincolnwood, IL: Scientific Software International.

Reid, J. B., Patterson, G. R., & Snyder, J. (Eds.). (2002). *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention*. Washington, DC: American Psychological Association.

Rzepnicki, T. L., Schuerman, J. R., & Johnson, P. (1997). Facing uncertainty: Reuniting high-risk families. In J. D. Berrick, R. P. Barth, & N. Gilbert (Eds.), *Child welfare research review* (vol. 2, pp. 229–251). New York, NY: Columbia University Press.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177. doi: 10.1037/1082-989X.7.2.147

Shonk, S. M., & Cicchetti, D. (2001). Maltreatment, competency deficits, and risk for academic and behavioral maladjustment. *Developmental Psychology*, *37*, 3–17. doi: 10.1037/0012-1649.37.1.3

Smith, D. K., Johnson, A. B., Pears, K. C., Fisher, P. A., & DeGarmo, D. S. (2007). Child maltreatment and foster care: Postnatal parental substance use. *Child Maltreatment*, *12*, 150–160. doi: 10.1177/1077559507300129

Stone, A. A., Broderick, J. E., Kaell, A. T., DelesPaul, P. A., & Porter, L. E. (2000). Does the peak-end phenomenon observed in laboratory pain studies apply to real-world pain in rheumatoid arthritics? *Journal of Pain*, *1*, 212–217. doi: 10.1054/jpai.2000.7568

Terling, T. (1999). The efficacy of family reunification practices: Reentry rates and correlates of reentry for abused and neglected children reunited with their families. *Child Abuse & Neglect*, *23*, 1359–1370. doi: 10.1016/s0145-2134(99)00103-9

Walsh, C., MacMillan, H. L., & Jamieson, E. (2003). The relationship between parental substance abuse and child maltreatment: Findings from the Ontario Health Supplement. *Child Abuse & Neglect*, *27*(2), 1409–1425. doi: 10.1016/j.chiabu.2003.07.002

Weinrott, M. R., Bauske, B., & Patterson, G. R. (1979). Systematic replication of a social learning approach. In P. O. Sjödén, S. Bates, & W. S. Dockens III (Eds.), *Trends in behavior therapy* (pp. 331–352). New York, NY: Academic Press.

Wells, K., & Guo, S. (1999). Reunification and reentry of foster children. *Children and Youth Services Review*, *21*, 273–294. doi: 10.1016/s0190-7409(99)00021-3

Widom, C. S., & Hiller-Sturmhöfel, S. (2001). Alcohol abuse as a risk factor for and consequence of child abuse. *Alcohol Research & Health*, *25*(1), 52–57.

Wulczyn, F. (2000). *Foster care dynamics 1983–1998 (Alabama, California, Illinois, Iowa, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Wisconsin)*. Chicago, IL: Chapin Hall Center for Children, University of Chicago.

Wulczyn, F. (2004). Family reunification. *The Future of Children: Children, Families, and Foster Care*, *1*, 95–113. doi: 10.2307/1602756