

## Abstract

**Objective:** This study examined the effects of Parent Management Training, Oregon (PMTO) model on parenting effectiveness and caregiver functioning. **Methods:** Children in foster care with emotional and behavioral problems were randomized to PMTO ( $n=461$ ) or services as usual ( $n=457$ ) in a non-blinded study design. Using an intent-to-treat approach, analysis of covariance models tested the intervention's overall effect and time interactions for parenting and caregiver functioning. Additional analyses were conducted to identify significant predictors of improvements. **Results:** PMTO did not significantly affect parenting practices; however, positive effects were observed on caregiver functioning in mental health ( $OR=2.01$ ), substance use ( $OR=1.67$ ), social supports ( $OR=2.37$ ), and readiness for reunification ( $OR=1.64$ ). While no time interactions were detected, several child, parent, and case characteristics were associated with improvements in six-month outcomes. **Conclusion:** This study extends evidence on PMTO to biological families of children in foster care, including those with older youth.

More than 250,000 children enter foster care each year and, while the total number of children in foster care recently dropped from 524,000 to 397,000 (2002-2012), fewer than 40% of the children achieve family reunification within 12 months (U.S. Department of Health and Human Services, Administration on Children Youth and Families, & Children's Bureau, n.d.). To increase reunification rates and shorten the time to reunification, many public child welfare agencies are considering new strategies and innovations. Further, with the movement toward evidence-based practice (Wilson & Walsh, 2012), some states have looked to research-supported parenting interventions as one way to improve foster care outcomes. The use of parenting interventions aligns with the emerging science on the interrelationships between neurobiological factors, trauma, and health. In essence, these scholars suggest that children's safety, permanency, and well-being will be maximized by creating nurturing environments, which includes building and supporting parenting capabilities as a core component (Biglan, 2014; Biglan, Flay, Embry, & Sandler, 2012; Jones, LaLiberte, & Piescher, 2015; Shonkoff et al., 2012). While a multitude of strategies have been taken up by the child welfare system, behavioral parenting interventions in particular have been promoted because of a growing evidence-base on their positive effects for various high-risk populations (Barth, 2009; Horwitz, Chamberlain, Landsverk, & Mullican, 2010) and results that show the intervention effects extend to other domains beyond parenting. For example, researchers have demonstrated that parenting interventions have long-term cascading effects, including reductions in parent mental illness (especially maternal depression), parental substance abuse, and poverty (Barth, 2009; Patterson, Forgatch, & DeGarmo, 2010). Despite their potential for improving foster care outcomes, parenting interventions have been largely developed in the mental health field and lack testing in the unique setting of foster care. The purpose of this study was to examine the short-term parenting and caregiver functioning

outcomes of Parent Management Training Oregon model (PMTO) that was delivered to families of children in foster care with serious emotional and behavioral problems.

### **Study Background**

**The Permanency Innovations Initiative (PII).** In 2010, when findings from the federal Child and Family Services Reviews of the performance of state child welfare systems revealed challenges in achieving permanency for some populations of children in foster care, the U.S. Children's Bureau issued a request for proposals under the then titled "Initiative to Reduce Long-Term Foster Care." This initiative later came to be called the Permanency Innovation Initiative (PII) and allocated \$100 million to fund local demonstrations to reduce long term foster care.

The PII was distinguished by the PII Approach (PII-TTAP & PII-ET, 2013), which provided a systematic framework for implementation and evaluation. Under the PII Approach, grantees worked with technical assistance providers to select, implement, and test a local service strategy for improving child and family outcomes. This approach built on a results-oriented accountability framework (Testa & Poertner, 2010) and involved proceeding through implementation and evaluation in deliberate and thoughtful stages. Grantees moved progressively through each stage to include exploration (Authors 2012, 2014), usability testing (Authors, 2013), formative evaluation (Authors, 2014), and summative evaluation. Each stage was viewed as a tollgate; that is, grantees were required to satisfy designated criteria before passing the tollgate and proceeding to the next stage (PII-TAP & PII-ET, 2013). The present study describes the parent and family outcomes of the summative evaluation conducted by local evaluators in one of the six federally-funded projects.

**Target Population.** During the exploration stage, the Kansas Intensive Permanency Project identified children with serious emotional disturbance (SED) as the subpopulation of children in

foster care with the highest risk of long-term foster care. Analyses of statewide administrative data found that children's mental health status was the most robust predictor of long-term foster care and that children with SED were 360% more likely to experience long stays (three years or longer) (Authors, 2012). Compared to the non-SED population, children with SED experienced more placements in foster care, fewer and slower exits to permanency, and were more likely to age out of care without a permanent family (Authors, 2012). These findings were consistent with a sizable body of literature that has identified children's mental health problems as related to placement instability and poor permanency outcomes (e.g., Authors, 2011; Barth et al., 2007; Chamberlain et al., 2006; Connell, Katz, Saunders, & Tebes, 2006; Hurlburt, Chamberlain, DeGarmo, Zhang, & Price, 2010; Leathers, 2006; Park & Ryan, 2009). Based on this information, project leaders concluded that the greatest impact on long term foster care in this state would be achieved by targeting families of children in foster care with SED.

**Intervention Selection.** The exploration stage also comprised review of the current empirical evidence and selection of an intervention approach that would fit with the target population, reduce their stays in foster care, and improve their well-being outcomes. The research literature revealed growing evidence for treatments and strategies to address mental health problems among children in foster care (Landsverk, Burns, Stambaugh, & Reutz, 2009; Pecora, Jensen, Romanelli, Jackson, & Ortiz, 2009; Romanelli et al., 2009). After consultation with thought leaders and national experts on foster care, the project team narrowed its focus to behavioral parent training programs, which had been discussed in the recent literature as interventions that deserved further dissemination and evaluation in child welfare (Barth, 2009; Barth et al., 2005; Chaffin & Friedrich, 2004; Horwitz et al., 2010). Following a review of more than a dozen parent training programs, interviews with program developers, and assessment of

the state's implementation capacity and readiness, the project team selected to implement PMTO (Authors, 2014).

**PMTO.** PMTO is a behavioral parent training program developed over the past four decades by the Oregon Social Learning Center (OSLC) and disseminated by its affiliate, Implementation Sciences International, Incorporated. PMTO represents one of a family of interventions the OSLC created and researched to address child and adolescent antisocial behavior (Forgatch & Patterson, 2010). Other OSCL interventions that have been used with foster care populations include Multidimensional Treatment Foster Care (Chamberlain & Reid, 1991) and KEEP (Keeping Foster and Kinship Parents Trained and Supported) (Chamberlain et al., 2008). All of these programs are based on social interaction learning theory (SIL), which asserts that children's problematic behaviors can be mediated with parenting because parents are the agents of change for affecting improvements in their children's behaviors (Patterson, 1982).

PMTO has been tested in randomized studies with a variety of at-risk subpopulations including families of chronically offending youth (Bank, Marlowe, Reid, Patterson, & Weinrott, 1991), families with stepfathers and children with disruptive behaviors (Forgatch, DeGarmo, & Beldavs, 2005), Norwegian families of children with disruptive behaviors (Ogden & Hagen, 2008), and ethnic minority families in Norway with children with disruptive behaviors (Bjørknes, Kjøbli, Manger, & Jakobsen, 2012). The positive outcomes observed in these studies has earned PMTO a scientific rating of 1, *well-supported*, by the California Evidence Based Clearinghouse (California Evidence-Based Clearinghouse for Child Welfare, 2015) and the designation of "Near Top Tier" by the national Coalition for Evidence-Based Policy (<http://evidencebasedprograms.org>). Overall, PMTO has established evidence for reducing

negative parenting practices and improving positive parenting practices (Forgatch & Patterson, 2010).

### **Parent Training for Families of Children in Foster Care**

Several rigorous evaluations of parent training interventions in foster care have been conducted in recent years. However, most randomized studies examined interventions that targeted: (1) foster parents (Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008; Leve et al., 2012; Mersky, Topitzes, Grant-Savelle, Brondino, & McNeil, 2016; Price et al., 2008); (2) biological parents who were selected with various criteria but may or may not have had their children in foster care (e.g., confirmed physical abuse, involvement with Head Start and a history of child welfare reports) (Bernard et al., 2012; Chaffin, Funderburk, Bard, Valle, & Gurwitsch, 2011; Chaffin et al., 2004; Hurlburt, Nguyen, Reid, Webster-Stratton, & Zhang, 2013); or, (3) biological parents whose children had already reunified with them (DeGarmo, Reid, Fetrow, Fisher, & Antoine, 2013; Oxford, Marcenko, Fleming, Lohr, & Spieker, 2016). The research base for parenting interventions delivered to biological parents while their children were still in foster care is scarce (Linares, Montalto, Li, & Oza, 2006). Many of the studies with biological parents have used group-based parenting interventions (Webster-Stratton & Reid, 2010), which may offer benefits for peer support but could prohibit the involvement of some subgroups of parents such as those with transportation barriers and/or living in rural or frontier areas. Another characteristic of prior studies is centered on the age of the children. Although researchers have found that emotional and behavioral problems are most prevalent among older children and adolescents in foster care (Burns et al., 2004; Leslie, Hurlburt, Landsverk, Barth, & Slymen, 2004), rigorous evaluations of parent training interventions for biological parents of adolescents in foster care are rare.

PMTO, like many other parent training interventions, has accumulated a relatively extensive body of evidence for improving parenting practices and caregiver functioning; however, no randomized studies have yet to test PMTO with biological families of children in foster care. Most closely related are studies on two other OSLC parent training programs that were delivered to: (1) foster parents caring for children in foster care, and (2) biological parents and their children who have reunified (i.e., post-reunification). The study with foster parents investigated the KEEP training's effects on child behaviors and parenting practices with 700 families of children 5 to 12 years old. This KEEP study found that increases in parental effectiveness was related to decreases in children's problematic behaviors, particularly for foster parents that reported more than six behavior problems per day at baseline (Chamberlain et al., 2008). In the OSLC study with biological parents, known as the Pathways Home study, researchers examined in-home parent training with a sample of 103 families of children (5 to 12 years old) that had recently reunified. This study found that improvements in parenting practices were associated with reductions in child behavior problems over time (DeGarmo et al., 2013).

In sum, parent training interventions have emerged as a relevant and promising strategy for improving outcomes among children in foster care with SED. The research on PMTO specifically indicates that the intervention has positive effects on parenting strategies. Despite these promising results, more research is necessary to examine whether PMTO is effective with biological families of children, especially when the intervention is delivered while the children are still in foster care and to families with a broad age range of children. Thus, the present study examined whether individual, in-home PMTO would result in improved parenting practices and caregiver functioning at 6-months post-test among families of children and youth in foster care who had been identified as having an SED. Specifically, our primary research question was: Do

parents of children and youth (ages 3 to 16 years old) in foster care with SED and who receive in-home PMTO improve their parenting and family functioning more than parents of children and youth with SED who receive usual foster care services? In addition to testing the overall intervention effect on parenting and caregiver functioning, this study had a secondary aim to identify salient child, parent, and case characteristics that were themselves predictive of these outcomes or that may produce differential treatment effects.

## **Methods**

### **Design**

This study employed a post-randomization consent design also known as the Zelen design (1979). In this design, the entire sample of eligible participants, not just those who are willing to consent to randomization, are included in the sample. Given that non-compliance with service plans is a constant, the Zelen design offers an estimate of the total impact that can be expected when an intervention is introduced on a population basis (Adamson, Cockayne, Puffer, & Torgerson, 2006). One possible advantage of the Zelen design is optimizing external validity by providing a more representative sample due to the fact that all eligible participants are included in the study, not just participants that would agree to a randomized study.

The study was conducted over a two-year period (September 2012 – September 2014) in a Midwestern state. It was preregistered with the National Institute of Health's at [clinicaltrials.gov](http://clinicaltrials.gov). Human subjects' approval was obtained through the University of Kansas Institutional Review Board. The PMTO program developer, Implementation Science International Incorporated (ISII), provided implementation supports but did not participate in the design, conduct, analysis, or reporting of this study.



## Participants

This project targeted parents of children, ages 3 to 16, newly entering or re-entering foster care, and identified as having emotional and/or behavioral problems within six months of this removal episode. Trained caseworkers administered the Child and Adolescent Functioning Assessment Scale (CAFAS) and the Preschool and Early Childhood Functional Scale (PECFAS) (Hodges & Wong, 1996; Hodges, Xue, & Wotring, 2004) at the point of intake for all new referrals into foster care (new entries and re-entries). Children were identified as eligible when one of the following criteria were met: (1) for children 3-5 years old, a PECFAS total score of 50 or higher, or a score of 20 on one subscale; (2) for children 6-16 years old, a CAFAS score of 60 or higher, or a score of 30 on one subscale; or, (3) had been identified by a Community Mental Health Center as having a serious emotional disturbance; (4) had an Individual Education Plan for an emotional or behavioral disorder; (5) had a diagnosed mental disorder, and symptoms of that disorder were contributing to a lack of stability in out-of-home care placements; (6) had a diagnosed mental disorder, a history of outpatient or inpatient mental health treatment, and was currently prescribed psychotropic medications; or, (7) had been admitted for inpatient psychiatric care within the last year.

Study participants also met family-level criteria, including that at the time of study: 1) the child's case plan goal must be reunification; 2) parent must reside in the service area; 3) parent may not be incarcerated for longer than three months; and 4) parent cannot have a court-order of "no contact" with the child. Each case comprised the identified child and an identified parent which included birth parents, stepparents, adoptive parents, or other adults serving in a caregiving role. The identified parent was the caregiver with whom the child had a case plan goal of reunification at the time of study enrollment. Among the 918 child study participants, 102 had

more than one parent working toward reunification with them (e.g., divorced parents). For the present study, we selected the parent identified as the primary caregiver, which was defined as the parent who had spent the most time caring for the child on a daily basis. Both intervention and comparison families were offered foster care case management services without regard to study condition or study inclusion/exclusion status.

### **Procedures**

Data coordinators monitored foster care entries within the foster care agencies. These staff entered data on eligible children into a secure web-based system, the Research Electronic Data Capture (REDCap) system (Harris et al., 2009). In cases where two or more siblings met the criteria for SED, one child was randomly selected from the sibling group. Program supervisors contacted eligible parents to explain the study and ask for their consent to participate. As mentioned above, the supervisor and parent knew the group to which the child was randomly assigned at the time of consent. Parents agreed to participate by signing written informed consent statements and children assented to study participation. Parents and youth were provided with modest financial compensation for completing the assessments at each of three data collection waves (baseline, 6-months, 12-months). At these three points in time, the data collection comprised: (1) pre- and post-test questionnaires administered to parents, (2) assessments completed by caseworkers, and (3) video-recorded family interaction tasks (FITs) with the parent(s) and child. The present study includes parent and family measures, which were collected from caseworker assessments and the video recorded FITs. These videos and assessments were conducted at baseline, 6, and 12 months for both intervention and comparison families, including for intervention families that might have concluded PMTO earlier than 6 months. Finally, data coordinators entered all assessment data into REDCap.

**Randomization**

Randomization procedures were semi-automated in REDCap and implemented by a university research assistant (RA), who was in a separate unit from the evaluation team and did not interact with program-level staff or families. The RA used a form and file-based procedure with multiple checks to ensure fidelity to a preset randomization assignment schedule, which concealed allocation from all other research and program staff until after random assignment. The preset schedule used a blocked randomization approach stratified by region and a 1:1 allocation ratio. No blinding was used after random assignment. University research staff who were in a separate location from foster care agency staff allocated cases when foster care staff requested cases for a specific service region with an opening. Next, research staff selected the most recent cases for the intervention and comparison conditions, and made the case information available to the foster care staff in a separate REDCap project. Finally, trained foster care supervisors led participant recruitment and enrollment with oversight and monitoring by the principal investigator.

**Intervention**

PMTO was delivered statewide in-home to individual families, focusing on parents as the agents of change, and delivered for up six months. PMTO is an engaging, hands-on, active teach model that relies heavily on coaching through a strengths-orientation. Those delivering the service were master's level clinicians who were located in a PMTO-specific unit within the private foster care agencies. Each of six units was staffed by a full-time supervisor (also master's level clinician), five full-time clinicians, and one half-time administrative support person. Following the implementation science frameworks of the PII-TTAP and with input from ISII, the staff were hired with a structured, position-specific selection protocol. This protocol incorporated

behavioral interviewing and emphasized specific qualities and abilities for the PMTO model (e.g., strengths orientation, collaborative and supportive, creative, flexible, reflective, open to feedback, etc.). Once hired, practitioners were engaged in a comprehensive and rigorous training and coaching regimen that formed the foundation of the implementation infrastructure (Authors, 2014). Pre-service training comprised 8 days of in-person workshops. After beginning deliver of PMTO 10 additional days of training and 2 full days of in-person coaching were required over approximately 6-8 months. Beyond these coaching days, each practitioner received observation-based coaching twice per month in one of three formats: written feedback, live feedback via video-conference, and/or live feedback via group.

Fidelity monitoring was another key component of the PMTO implementation. Practitioners video recorded and uploaded all sessions a secure portal. These videos could then be selected for review by trainers, coaches, and/or fidelity raters. Using guidelines from ISII, sessions were selected for fidelity rating by a reliable PMTO fidelity team so that each practitioner was rated at least quarterly until they became certified in PMTO. Raters considered five domains of PMTO fidelity (knowledge, structure, active teach, process, and overall) on a 9-point scale where 1-3 represented “needs work,” 4-6 was “adequate work,” and 7-9 was “good work.” Fidelity scores were calculated as an average, ranging from 1 to 9. Additional coaching was targeted to practitioners whose scores were in the “needs work” range. After meeting training and coaching requirements, the certification process required practitioners to submit four session videos on two specific PMTO core parenting practices (i.e., skill encouragement and effective discipline). These videos were then scored by the fidelity team and, to achieve certification, required a mean total fidelity score of 6 or higher with no subscale scores lower than 3. On average, practitioners

took 22 months to become certified in PMTO. Following certification, practitioners submitted videos and were rated for fidelity annually.

The PMTO curriculum centered on teaching parents five core parenting practices: 1) positive involvement; 2) skill building; 3) supervision and monitoring; 4) problem-solving; and 5) appropriate discipline (Forgatch & Patterson, 2010) and was guided by a pre-defined and semi-structured session outline provided by ISII (Forgatch & Domenech Rodríguez, 2016). In this study, the curriculum was delivered in-home by master's level practitioners in weekly sessions. The PMTO model does not require a specific dosage (number of sessions) or timeline; instead, practitioners worked with families until they completed the curriculum. In this study, families had a maximum of six months to complete the curriculum as they were discharged from the PMTO program at the six-month point. Most commonly, practitioners met with families twice per week for approximately 60-90 minutes per session plus a mid-week check-in that lasted for 20-30 minutes. This weekly approach followed a three-step process. First, practitioners met with parents without children present. Second, parents were expected to practice new skills, and practitioners followed-up with a parent by phone or in-person to discuss the weekly 'homework.' Third, practitioners conducted a family session with the parents and children together, during which the parents tried newly learned skills with the practitioner acting as a live coach. The PMTO model emphasized an engaging, hands-on, active teach model that relied on the practitioner acting as a coach. Two key teaching strategies were role playing and problem-solving. Additional commonly used PMTO process skills were described by Forgatch & Domenech Rodriguez (2016).

In addition to PMTO fidelity, the site implementers established additional components of intervention fidelity which were based on findings from the project's exploration stage that

revealed important individual, family, and system level barriers to permanency (Authors, 2012, 2014). These included: (a) delivering PMTO within the first 6 months of the child's foster care episode; (b) delivering PMTO in-home; (c) emphasizing regular parent/child visits (at least one per week in addition to the PMTO family session); (d) maintaining small caseloads for practitioners to promote adequate intensity of services (4 per practitioner in rural areas and 6 per practitioner in urban areas); and, (e) providing practitioners with regular and clinical and group supervision.

### **Sample Size**

The study enrolled 918 children. To estimate the minimum sample size required for the study, we considered a 10% improvement in reunification rates as the desired effect size. With this desired effect size, the study required a minimum of 277 cases per group, a total sample of 554, with  $\alpha = .05$  and  $\beta = .20$ , and assuming a baseline reunification rate of 25% (Authors, 2014).

### **Outcomes**

This study's outcomes were described prospectively in a logic model that included proximal (child, parent, and family) and distal (permanency and re-entry) outcomes (Authors, 2013). A prior study has reported on the child outcomes (Author, in press), while the present study reports the proximal (6-month) parent and family outcomes.

**Dependent variables.** Below is information on each of the dependent variables used to measure parenting effectiveness and caregiver functioning.

***Effective parenting.*** Effective parenting was measured with the Family Interaction Task (FIT), which is an observation-based assessment that video-records the parent(s) and index child working together on several tasks for approximately 30 minutes. The tasks are grouped into three developmentally-appropriate sets for preschool age children, school-age children, and

adolescents. Videos were uploaded to a secure portal where they were observed and rated by coders. The coders were blind to the data collection wave and study condition, and were monitored by the study's principal investigator with regards to maintaining interrater reliability throughout the study. Coders rated behavioral items on their frequency according to these guidelines: never (0% of time), hardly ever (1-10% of time), sometimes (11-50% of time), often (51-75% of time), very often (76-90% of time), and always (91-100% of time). Example items included: good interactive body posture (e.g., faced other, eye contact, didn't skitter around); was critical to others' suggestions/ideas; used nagging or nattering to try to get compliance; used praise or other social reinforcers for positive behavior. Some tasks sought specific practices or behaviors and these were rated as: untrue (1), slightly true (2), fairly true (3), mostly true (4), and very true (5). For example, the problem solving task items included: problem was stated clearly, several different solutions were suggested, a plan was developed, etc. While tasks and items within the age groupings of the FIT were specific to the child's developmental stage, all were rated and scored on five subscales that correspond to the core parenting practices of PMTO: skill encouragement, positive involvement, problem-solving, communication/monitoring, and ineffective discipline. Subscales were reverse coded as needed (ineffective discipline) and averaged to provide an overall measure of effective parenting.

The FIT was developed by OSLC researchers and validated in passive and experimental longitudinal studies in which it was found to have convergent, discriminant and predictive validity, and sensitivity to change (Forgatch & DeGarmo, 1999; Patterson, Reid, & Dishion, 1992; Reid, Patterson, & Snyder, 2002). For the present study, Cronbach alpha estimates of internal reliability were .50 for Time 1 and .63 for Time 2.

**Caregiver functioning.** Four scales of the North Carolina Family Assessment Scale (NCFAS) were used to represent caregiver functioning: parent mental health, parent substance use, parent use of social supports, and readiness for reunification (Reed-Ashcraft, Kirk, & Fraser, 2001). The NCFAS was completed by foster care case managers. Scores were recorded with a six-point scale that ranged from “clear strength” (+2) to “serious problem” (-3) with anchoring definitions provided for three of the points (clear strength (+2), baseline/adequate (0), and serious problem (-3)). The NCFAS has received the Measurement Tools Rating of "A – Psychometrics Well-Demonstrated" from the California Evidence-Based Clearinghouse for Child Welfare. For this study, Cronbach alpha estimates of internal reliability were .66 for Time 1 and .83 for Time 2 on the NCFAS scales.

### **Covariates**

Covariates were selected based on review of the existing literature (Authors, 2011; 2012) and include child, parent, and case characteristics. These variables were collected from the state’s administrative data which are reported semi-annually to the federally-required Adoption and Foster Care Reporting System (AFCARS).

### **Data Analysis**

Intent-to-treat analyses were used to assess the effect of the intervention on the study’s outcomes. That is, all participants randomized and allocated to the intervention and comparison groups were compared on effective parenting and caregiver functioning. Where data were missing due to non-consented cases ( $n = 272$ ) and attrition, multiple imputation was applied using all three waves of data. Missing data at Time 2 were multiply imputed with 100 imputations using the principal component auxiliary variable technique (Howard, Rhemtulla, & Little, 2015). Tests of intervention effects were modeled via repeated measures analysis of



covariance (ANCOVA). The ANCOVA models were estimated with the R (R Core Team, 2014) and MPlus (Muthén & Muthén, 2012) software packages. Because the NCFAS data were ordinal, the ANCOVA models were implemented as *proportional odds logistic regression* models. These models were estimated with the *polr* function from the R **MASS** package (Venables & Ripley, 2002), and their results were pooled using Rubin's Rules (Rubin, 1987). The modeling process followed several steps for each outcome variable. First, we estimated an unconditional ANCOVA model in which the Time 2 score was predicted by its Time 1 counterpart and the study group variable (intervention = 1, comparison = 0). Second, we tested moderation in the autoregressive effect by including the interaction between the Time 1 score and the study group variable. Third, after the overall intervention effect was examined, we conducted a series of follow-up exploratory analyses to identify salient predictors of effective parenting and caregiver functioning using forward stepwise regression. When there was a significant time interaction (step 2), the stepwise procedure built off of the moderated unconditional model; otherwise, the stepwise regression model built off of the simple unconditional ANCOVA (step 1). After identifying significant covariates via the stepwise regression procedure, we produced a final fully specified model that included interactions between significant covariates and the study condition variable. The outcome variables were standardized before fitting the ANCOVA models, thus, the estimated intervention effects are interpretable on a Cohen's *d* metric, and the predictive effects in the conditional ANCOVA models are interpretable in units of the outcome's standard deviations. These standardized parameter estimates constitute effect sizes.

## Results

### Participant Flow

Figure 1 illustrates the participant flow. Over the two-year project period, 6,657 children were assessed to determine study eligibility. After applying eligibility criteria, 1,652 children were identified as eligible and randomly assigned to the intervention ( $n = 855$ ) or comparison ( $n = 797$ ) group. Among the randomized cases, 394 intervention and 340 comparison cases were not approached due to timing and location of service openings. In total, 918 children were allocated to the study (intervention = 461 and comparison = 457). Consent rates were 78.1% and 66.5% for the intervention and comparison groups, respectively. Attrition was specific to the measure. For the FIT, the intervention group's attrition rate was 29.3% at Time 1 and 47.7% at Time 2; and, the comparison group's attrition rate was 42.2% at Time 1 and 62.6% at Time 2. For the NCFAS, the intervention group's attrition rate was 21.0% at Time 1 and 25.2% at Time 2; and, the comparison group's attrition rate was 30.2% at Time 1 and 37.2% at Time 2. Using the ITT approach, the analytic sample was 918 children.

### Recruitment

Recruitment of participants into this summative evaluation followed usability testing of the intervention and data collection procedures (Authors, 2013) and a formative evaluation (Authors, 2014). Recruitment began September 1, 2012 and ended September 30, 2014. Data for the six-month post-test outcomes were completed by early June 2015.

### Intervention Fidelity

Multiple aspects of intervention fidelity were measured including adherence to the PMTO model, low caseloads, early intervention, treatment completion, service duration and intensity, in-home service, and parent-child contacts. All measures showed that adequate intervention

fidelity was obtained (Authors, in press). Additionally, reasons for intervention cases' non-completion were analyzed by Authors (in press).

### **Randomization**

To check randomization procedures, approached ( $N = 918$ ) and non-approached ( $N = 734$ ) children were compared on 15 baseline demographic and case characteristics, and children's functioning (CAFAS). Approached and non-approached children were similar on all but two variables. First, non-White children were more likely to be approached (65%) than White children (55%) but with a very small effect size ( $\chi^2 = 7.08$ ,  $df = 1$ ,  $p = .008$ ; Cramer's  $V = .07$ ). The approached group's higher proportion of non-White children is likely attributable to higher PMTO caseloads in urban areas where the foster care population was disproportionately Black. Second, child age was also significant. The approached group was younger ( $M = 11.4$  years,  $SD = 4.1$  years) than the non-approached group ( $M = 11.9$  years,  $SD = 4.0$  years); however, the effect size for this difference in age was very small (Cohen's  $d = -.12$ ).

### **Comparability**

Table 1 presents data for the intervention ( $n = 461$ ) and comparison groups ( $n = 457$ ) on 16 baseline variables, showing that they were similar on all variables. Moreover, the two groups were clinically similar with regards to baseline functioning measured by the CAFAS (Intervention,  $M = 84.2$ ,  $SD = 41.2$ ; Comparison,  $M = 87.5$ ,  $SD = 40.7$ ;  $F(1,916) = 1.45$ ,  $p = .23$ ).

### **Attrition**

Table 2 illustrates that differential attrition was observed between the intervention (completed = 52.3%) and comparison (completed = 37.4%) groups on the FIT ( $\chi^2(1, N = 918) = 20.5$ ,  $p < .001$ ) and the NCFAS (intervention completed 74.8%, comparison completed 62.8%;  $\chi^2(1, N = 918) = 15.5$ ,  $p < .001$ ). These differential attrition rates suggest a missing at random

(MAR) mechanism (i.e., the propensity to drop out depends on measured characteristics of the families; Enders, 2010). Given that data are MAR, simple missing data approaches, such as listwise deletion or last observation carried forward, will bias estimates of the intervention effect (Little & Rubin, 2014). Thus, we employed modern multiple imputation to avoid biased inferences that occur with MAR nonresponse (Rubin, 1987). Our multiple imputation approach adjusted for the statistically significant associations identified in the attrition analyses.

### **Intervention Effects**

Table 2 presents the means and standard deviations for the outcome variables and Tables 3, 4, 5, 6, and 7 show ANCOVA results for effective parenting and caregiver functioning.

**Effective parenting.** Unconditional ANCOVA did not suggest a significant intervention effect on effective parenting (Wald = -1.494,  $p = 0.135$ ). In addition, the moderated unconditional ANCOVA testing the time interaction was not significant. Stepwise regression indicated that the child's age at first removal and annual placement rate were each significant predictors of effective parenting such that the effective parenting decreased by 0.057 points for every year older the child was at first removal and by 0.021 points for every additional placement setting. In contrast, effective parenting was positively associated with physical abuse as a removal reason and a child having a disability. The moderated conditional ANCOVA model indicated no significant differences in the covariate interaction effects, and intervention effects remained non-significant in all models.

**Sub-scale analyses.** After observing a non-significant intervention effect on overall effective parenting, we conducted follow-up analyses of the five FIT subscales: encouragement, ineffective discipline, positive involvement, problem solving, and monitoring/communication. These additional analyses followed the same analytic approach as described above. Only the

positive involvement subscale demonstrated a significant intervention effect; however, it was not in the expected direction. The intervention group scored 0.248 points lower on the positive involvement subscale than the comparison group. The other subscales demonstrated covariate effects. Older child age at removal predicted worse scores on encouragement, positive involvement, problem solving, and discipline. A child having a diagnosed disability predicted better scores on positive involvement, problem solving, and discipline. Finally, placement instability predicted worse scores on positive involvement.

**Caregiver functioning.** PMTO was found to have significant effects on all four measures of caregiver functioning as shown in Tables 4, 5, 6 and 7. The intervention group was twice as likely as the comparison group to score higher on mental health (OR = 2.013, Wald = 5.658,  $p < .001$ ). Similarly, in relation to the comparison group the intervention group's odds for higher scores were 1.67 on substance abuse (OR = 1.67, Wald = 4.098,  $p < .001$ ), 2.37 on social support (OR = 2.37, Wald = 6.902,  $p < .001$ ), and 1.64 on readiness for reunification (OR = 1.638, Wald = 3.952,  $p < .001$ ). For all four scales the moderated unconditional ANCOVA models did not suggest any significant time interactions. Using the unconditional ANCOVA model as the baseline model, important covariates were added via forward stepwise regression. The intervention effects remained significant and several covariates were identified as significant predictors. For parent mental health, child's sex was a significant predictor such that girls were 1.32 times more likely than boys to have a caregiver score higher on mental health. For parent substance use, caregivers age at the child's first removal was a significant predictor. Older caregiver age lowered the odds of an improved substance use score by 0.99 times per year older. For social support, ethnicity was a significant predictor. Children who were non-Latino were 1.65 times more likely to have a higher social support score as compared to children who were

Latino. For readiness for reunification, IV-E eligibility decreased the odds of improvement by .62 and being non-Latino increased the odds of improvement by 1.47. For all four caregiver functioning measures, the moderated conditional ANCOVA models did not indicate any significant differences in the covariate effects between the intervention and comparison groups.

### **Discussion**

Using a randomized controlled trial, this study examined in-home PMTO versus usual care in a sample of families of children in foster care with SED. While the ITT analyses showed no significant effect on effective parenting practices, it indicated that PMTO was associated with significant improvements in four areas of caregiver functioning: mental health, substance use, social supports, and readiness for reunification. These results are important for two main reasons. First, despite the call for using research-supported parenting interventions with child welfare-involved families, very few rigorous studies have examined their application to biological parents while their children were still in foster care. Second, these findings illustrate some positive outcomes among a high-risk subpopulation of children and youth that were identified as experiencing the most serious barriers in foster care, including children and youth that ranged in age from 3 to 16 years. Most prior randomized studies of parenting interventions have not included adolescents; thus, the present study extends the evidence base on short-term caregiver outcomes to older youth.

The non-significant results for effective parenting practices were unexpected and surprising. Clearly, PMTO intends to reduce negative parenting practices and increase positive parenting practices; yet, this pattern was not observed. To our knowledge, no randomized studies of behavioral parenting interventions have been conducted with a sample similar to this study's and, therefore, comparators are rare. Most similar are prior studies with foster parents (Chamberlain et al., 2008) and already reunified biological parents (DeGarmo et al., 2013), both of which

demonstrated positive changes in parenting practices. However, both of these earlier PMTO studies relied on parents to self-report their daily use of specific parenting practices (e.g., positive reinforcement). In the present study, parenting was assessed with the use of video-recordings of approximately 30-35 minutes of structured interactions between parents and children. While observational methods are considered a gold standard in behavioral sciences, a recent meta-analysis of 33 studies cautioned their use with maltreating parents (Wilson, Rack, Shi, & Norris, 2008). These researchers found that observational tasks did not identify differences between maltreating and non-maltreating parents unless they were conducted for longer periods of time and in natural settings, such as the family's home. Interactions that were too short and undemanding did not detect aversive parental behavior. Additionally, Wilson and colleagues' meta-analysis indicated that parenting differences were harder to distinguish among older parents (>30), older children (>5), and with structured (versus unstructured) interaction tasks. Given that the current study comprised maltreating parents of whom the vast majority were older (80% were >30), was a sample of children and youth who were primarily above the age 5 (85% were >5), and used relatively short observations of structured tasks, it seems possible that the FIT did not detect differences in parenting behaviors that may have actually existed. Future research of parenting interventions should consider how measurement approaches may influence evaluation results.

In contrast to the non-significant results for effective parenting, this study found that PMTO positively affected all four measures of caregiver functioning. Case manager assessments were used to determine whether parents improved on mental health, substance use, social supports, and readiness for reunification. Unlike the FIT, the NCFAS has a long, stable history of use in child welfare, and has received a measurement tools rating of "A" from the California Evidence-

Based Clearinghouse for Child Welfare. Our findings are especially relevant because few studies of parenting interventions have demonstrated similar positive outcomes with biological parents. Given that parental mental health and substance use are formidable obstacles encountered by many parents of children in foster care (Authors, 2012), these results hold promise for complex and challenging family situations. Additional longitudinal analyses will be important for examining whether these gains are sustained and whether they are associated with the distal outcome of family reunification.

Our findings on salient predictors of effective parenting and caregiver functioning identified a significant predictor for each of the five outcomes but only one predictor (ethnicity) was related to more than one of the outcomes. Children's older age was associated with lower scores on the effective parenting measure; male children were less likely to have a parent show improvement in mental health; parents' older age was associated with a decreased likelihood of improvements in substance use; Latino children were less likely to have a parent make gains in use of social supports; and, children who were eligible for IV-E payments and children who were Latino were less likely to have a parent improve on readiness for reunification. With regards to the existing literature, these findings are new because prior research has not included biological parents with children still in foster care, youth over the age 12, and/or comparable caregiver functioning outcomes. Moreover, these findings are important because they may suggest areas in which parenting interventions may require adaptation or supplemental strategies.

This study's methodological strengths include its randomized design, an adequate sample size, multiple measures of intervention fidelity to verify that PMTO was implemented as intended, and ITT analyses which provide realistic estimates of the intervention's effectiveness at a population level. Despite these strengths, several study limitations should be considered.



First, this study occurred in a state that used private community-based organizations to deliver foster care services. It is unknown whether generalizability is influenced by these organizational arrangements. Second, our use of video-recorded parent-child interactions was accompanied by a sizable amount of attrition. This loss of data, combined with non-compliance that is inherent with a post-randomized consent design, required statistical adjustments to account for potential biases. Multiple imputation was the most appropriate response to this situation and, given the nature of services and evaluation in child welfare, may be necessary for many rigorous child welfare studies. Third, the observational measure used to assess parenting effectiveness (FIT) may have prohibited an accurate view of PMTO's influence on parenting. Future research could benefit from longer observations of unstructured parent-child interactions in natural settings. Fourth, although this study comprised a number of covariates, we cannot be certain that all relevant variables were included in the analyses.

In summary, this study contributes to the literature on parent training interventions by adding evidence for a subpopulation that is largely absent from existing studies. In contrast to most other parenting intervention studies, this study's intervention was delivered in-home to biological parents, including those with teenagers, while their child was still in foster care. Despite the study's non-significant findings on parenting practices, the overall findings indicate that behavioral parent training interventions hold promise for improving caregiver functioning among some of the foster care system's most challenging children and families. Our results suggest that in-home parent training may improve caregiver functioning in the domains of mental health, substance use, social supports, and readiness for reunification. In addition to offering encouragement for parenting interventions with biological parents of children in foster care, this study pinpoints some important methodological topics that must be addressed to

advance EBIs in child welfare settings. Finally, it will be necessary to track longer range outcomes to see if these short-term caregiver outcomes translate into stable permanency and sustained safety for children. Also needed are more randomized studies with biological parents of children in foster care to examine whether these findings are replicated in other jurisdictions.

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Table 1. Baseline Characteristics of Children and Parents by Study Condition

Characteristic	Total N (%)	Intervention Group n (%)	Comparison Group n (%)	<i>p</i>
Child gender is female, <i>n</i> (%)	427 (46.5)	204 (44.3)	223 (58.8)	.167
Child race is White, <i>n</i> (%)	709 (77.2)	350 (75.9)	359 (78.6)	.341
Child is Latino, <i>n</i> (%)	111 (12.3)	55 (11.9)	58 (12.7)	.351
Child age, <i>M</i> ( <i>SD</i> )	11.8 (4.2)	11.6 (4.1)	11.9 (4.3)	.248
Caretaker age at first removal, <i>M</i> ( <i>SD</i> )	38.4 (10.2)	38.2 (10.4)	38.7 (10.1)	.491
Child has diagnosed disability, <i>n</i> (%)	493 (53.8)	243 (52.9)	250 (54.7)	.592
Removal reason was physical abuse, <i>n</i> (%)	169 (18.4)	87 (18.9)	82 (17.9)	.717
Removal reason was sexual abuse, <i>n</i> (%)	57 (6.2)	27 (5.9)	30 (6.6)	.657
Removal reason was neglect, <i>n</i> (%)	340 (37.0)	170 (36.9)	170 (37.2)	.919
Removal reason was parent sub abuse, <i>n</i> (%)	196 (21.4)	102 (22.1)	94 (20.6)	.565
Parent was single mother, <i>n</i> (%)	479 (52.2)	255 (55.3)	224 (49.0)	.056
Parent was single father, <i>n</i> (%)	74 (8.1)	38 (8.2)	36 (7.9)	.839
Parents were married/unmarried couple, <i>n</i> (%)	365 (39.8)	168 (36.4)	197 (43.1)	.039
Child had prior removals, <i>n</i> (%)	197 (21.5)	107 (23.2)	90 (19.7)	.194
Child eligible for IV-E payment, <i>n</i> (%)	108 (11.8)	63 (13.7)	45 (9.8)	.073
Time in care at study start, <i>M</i> ( <i>SD</i> )	50.2 (81.0)	54.4 (102)	45.6 (50.8)	.102

Notes: Total sample, *N* = 918; Intervention group, *n* = 461; Comparison group, *n* = 457

Table 2. Completion Rates and Scale Scores at Baseline and 6-Months by Study Condition

	Intervention Group		Comparison Group	
	Baseline	6-Months	Baseline	6-Months
Completion Rates, <i>n</i> (%)				
Effective Parenting (FIT)	326 (70.7%)	241 (52.3%)	264 (57.8%)	171 (37.4%)
Caregiver Functioning (NCFAS)	364 (79.0%)	345 (69.8%)	319 (74.8%)	287 (62.8%)
Scores, <i>M</i> ( <i>SD</i> )				
Effective Parenting (FIT)	3.12 (0.54)	2.95 (0.85)	3.07 (0.56)	2.91 (0.84)
Skill encouragement	3.81 (1.25)	3.27 (2.43)	3.49 (1.25)	3.28 (2.64)
Ineffective discipline	1.76 (0.70)	2.35 (1.46)	1.80 (0.64)	2.12 (1.49)
Positive involvement	5.17 (0.73)	4.72 (1.18)	5.26 (0.58)	5.02 (1.15)
Problem solving	3.26 (1.14)	2.68 (2.38)	3.18 (1.05)	3.12 (2.02)
Monitoring	1.96 (1.26)	2.11 (1.78)	2.09 (1.20)	1.95 (1.84)
Parent Mental Health (NCFAS)	-0.56 (1.26)	-0.34 (1.54)	-0.45 (1.25)	-0.98 (1.56)
Parent Substance Use (NCFAS)	0.00 (1.48)	0.27 (1.59)	-0.03 (1.47)	-0.24 (1.69)
Parent Social Supports (NCFAS)	-0.32 (1.48)	-0.08 (1.74)	-0.39 (1.48)	-0.83 (1.77)
Readiness for Reunification (NCFAS)	-0.92 (1.72)	-0.30 (1.71)	-1.03 (1.68)	-0.81 (1.88)

Notes: Effective parenting ranges from 1-5; higher scores indicate higher levels of effective parenting. Skill encouragement ranges from 1-6; higher scores indicate higher levels of skill encouragement. Ineffective discipline ranges from 1-6; higher scores indicate higher levels of harsh discipline. Positive involvement ranges from 1-6; higher scores indicate higher levels of positive involvement. Problem solving ranges from 1-5; higher scores indicate higher levels of better outcomes. Monitoring ranges from 1-5; higher scores indicate higher levels of monitoring. The NCFAS subscales range from -3 to 2; higher scores indicate better caregiver functioning.

Table 3. ANCOVA Model of Effective Parenting (FIT)

Model	Estimate	SE	Wald	<i>p</i>	FMI
Unconditional ANCOVA					
Intercept	0.080	0.062	1.282	0.200	0.472
T1 FIT	0.170	0.141	1.204	0.229	0.949
Intervention	-0.159	0.107	-1.494	0.135	0.640
Unconditional Moderated ANCOVA					
Intercept	0.081	0.063	1.298	0.194	0.476
T1 FIT	0.208	0.149	1.398	0.162	0.909
Intervention	-0.160	0.107	-1.497	0.134	0.641
Intervention X T1 FIT	-0.074	0.125	-0.592	0.554	0.738
Conditional ANCOVA					
Intercept	0.625	0.184	3.402	0.001	0.677
T1 FIT	0.120	0.137	0.88	0.379	0.950
Intervention	-0.172	0.104	-1.651	0.099	0.667
Child age at first removal	-0.057	0.012	-4.619	<.001	0.635
Physical abuse, removal reason	0.187	0.086	2.171	0.030	0.170
Annual placement rate	-0.021	0.011	-1.991	0.047	0.375
Child disability	0.329	0.088	3.726	<.001	0.525
Moderated Conditional ANCOVA					
Intercept	0.539	0.219	2.462	0.014	0.595
T1 FIT	0.119	0.136	0.871	0.384	0.959
Intervention	0.014	0.234	0.059	0.953	0.299
Child age at first removal	-0.056	0.015	-3.652	<.001	0.533
Physical abuse, removal reason	0.215	0.122	1.762	0.078	0.158
Annual placement rate	-0.006	0.014	-0.402	0.688	0.330
Child disability	0.350	0.113	3.098	0.002	0.422
Intervention X Child age	-0.004	0.017	-0.224	0.822	0.209
Intervention X Physical abuse	-0.042	0.165	-0.254	0.799	0.103
Intervention X Placement rate	-0.030	0.019	-1.581	0.114	0.245
Intervention X Child disability	-0.045	0.132	-0.339	0.735	0.161

Notes: *N* = 918 children; *SE* = standard error; FMI = fraction of missing information, which represents the proportion of the total sampling variance that is due to missing data; ANCOVA = analysis of covariance.

Table 4. ANCOVA Model of Parent Mental Health (NCFAS)

Model	Estimate	Odds Ratio	SE	Wald	<i>p</i>	FMI
Unconditional ANCOVA						
T1 Mental Health	0.308	1.361	0.002	6.423	<.001	0.254
Intervention	0.700	2.013	0.015	5.658	<.001	0.083
Unconditional Moderated ANCOVA						
T1 Mental Health	0.325	1.384	0.005	4.803	<.001	0.225
Intervention	0.682	1.979	0.018	5.076	<.001	0.114
Intervention X T1 Mental Health	-0.032	0.969	0.009	-0.343	0.732	0.227
Conditional ANCOVA						
T1 Mental Health	0.307	1.360	0.002	6.399	<.001	0.254
Intervention	0.715	2.044	0.015	5.765	<.001	0.084
Child's Sex	0.275	1.317	0.015	2.233	0.026	0.084
Moderated Conditional ANCOVA						
T1 Mental Health	0.308	1.361	0.002	6.405	<.001	0.255
Intervention	0.753	2.123	0.029	4.390	<.001	0.093
Child's Sex	0.316	1.372	0.031	1.794	0.073	0.077
Intervention X Child's Sex	-0.080	0.923	0.061	-0.323	0.746	0.095

Notes: *N* = 918 children; *SE* = standard error; FMI = fraction of missing information, which represents the proportion of the total sampling variance that is due to missing data; ANCOVA = analysis of covariance.

Table 5. ANCOVA Model of Parent Substance Use (NCFAS)

Model	Estimate	Odds Ratio	SE	Wald	<i>p</i>	FMI
Unconditional ANCOVA						
T1 Substance Use	0.585	1.795	0.002	13.509	<.001	0.169
Intervention	0.512	1.668	0.016	4.098	<.001	0.071
Unconditional Moderated ANCOVA						
T1 Substance Use	0.591	1.805	0.004	9.935	<.001	0.173
Intervention	0.511	1.666	0.016	4.079	<.001	0.073
Intervention X T1 Substance Use	-0.011	0.989	0.006	-0.142	0.887	0.152
Conditional ANCOVA						
T1 Substance Use	0.606	1.832	0.002	13.614	<.001	0.168
Intervention	0.500	1.649	0.016	3.997	<.001	0.073
Caretaker age at first removal	-0.014	0.986	0.000	-2.206	0.027	0.114
Moderated Conditional ANCOVA						
T1 Substance Use	0.606	1.832	0.002	13.607	<.001	0.167
Intervention	0.469	1.599	0.237	0.965	0.335	0.093
Caretaker age at first removal	-0.014	0.986	0.000	-1.620	0.105	0.117
Intervention X Caretaker age	0.001	1.001	0.000	0.066	0.948	0.102

Notes: *N* = 918 children; *SE* = standard error; FMI = fraction of missing information, which represents the proportion of the total sampling variance that is due to missing data; ANCOVA = analysis of covariance.

Table 6. ANCOVA Model of Use of Social Supports (NCFAS)

Model	Estimate	Odds Ratio	SE	Wald	<i>p</i>	FMI
Unconditional ANCOVA						
T1 Social Supports	0.458	1.58	0.003	7.974	<.001	0.262
Intervention	0.862	2.369	0.016	6.902	<.001	0.089
Unconditional Moderated ANCOVA						
T1 Social Supports	0.367	1.444	0.006	4.776	<.001	0.224
Intervention	0.943	2.567	0.018	6.948	<.001	0.129
Intervention X T1 Social Supports	0.183	1.201	0.011	1.742	0.081	0.192
Conditional ANCOVA						
T1 Social Supports	0.463	1.589	0.003	8.048	<.001	0.264
Intervention	0.862	2.368	0.016	6.905	<.001	0.088
Not Hispanic	0.502	1.652	0.039	2.554	0.011	0.158
Moderated Conditional ANCOVA						
T1 Social Supports	0.463	1.589	0.003	8.05	<.001	0.264
Intervention	0.703	2.019	0.127	1.97	0.049	0.110
Not Hispanic	0.413	1.511	0.071	1.549	0.121	0.105
Intervention X Not Hispanic	0.182	1.199	0.145	0.477	0.633	0.113

Notes: *N* = 918 children; *SE* = standard error; FMI = fraction of missing information, which represents the proportion of the total sampling variance that is due to missing data; ANCOVA = analysis of covariance.

Table 7. ANCOVA Model of Readiness for Reunification (NCFAS)

Model	Estimate	Odds Ratio	SE	Wald	p	FMI
Unconditional ANCOVA						
T1 Readiness	0.307	1.359	0.002	6.712	<.001	0.199
Intervention	0.493	1.638	0.016	3.952	<.001	0.110
Unconditional Moderated ANCOVA						
T1 Readiness	0.259	1.296	0.004	3.908	<.001	0.264
Intervention	0.588	1.800	0.025	3.721	<.001	0.200
Intervention X T1 Substance Use	0.098	1.103	0.009	1.057	0.291	0.245
Conditional ANCOVA						
T1 Readiness	0.300	1.349	0.002	6.505	<.001	0.205
Intervention	0.513	1.670	0.016	4.094	<.001	0.110
IV-E Eligible	-0.478	0.620	0.040	-2.389	0.017	0.132
Not Hispanic	0.382	1.465	0.037	1.989	0.047	0.137
Moderated Conditional ANCOVA						
T1 Readiness	0.298	1.347	0.002	6.474	<.001	0.203
Intervention	0.292	1.339	0.131	0.807	0.42	0.133
IV-E Eligible	-0.294	0.746	0.097	-0.941	0.347	0.148
Not Hispanic	0.233	1.262	0.076	0.843	0.399	0.180
Intervention X IV-Eligible	-0.305	0.737	0.159	-0.765	0.444	0.113
Intervention X Not Hispanic	0.291	1.337	0.148	0.756	0.450	0.142

Notes:  $N = 918$  children;  $SE$  = standard error; FMI = fraction of missing information, which represents the proportion of the total sampling variance that is due to missing data; ANCOVA = analysis of covariance.

Figure 1. Flow Diagram of Children in Randomized Trial Comparing PMTO and Usual Care in the Context of Foster Care

