

# Risk, Reinforcement, Retention in Treatment, and Reoffending for Boys and Girls in Multidimensional Treatment Foster Care

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A SUBSTANTIAL RESEARCH BASE EXISTS on risk factors in the development of antisocial behavior in youths (see Smith, Sprengelmeyer, & Moore, in press), and researchers have identified a predictable developmental course for antisocial behavior (Patterson, Reid, & Dishion, 1992). These studies have the potential to guide prevention and treatment interventions such that youths with higher levels of risk receive services that are more intensive and youths with the highest levels of risk are referred to more restrictive treatment facilities. Although information on risk factors can assist in identifying youths who appear to be at highest risk for further problems, it is unclear to what extent levels of risk can assist in identifying youths who will benefit from a particular treatment intervention. In addition, more information is needed on whether specific treatment components may be beneficial for treating youths with high levels of risk.

Limited resources are allocated for the prevention and treatment of problem behaviors in youths, and intensive prevention efforts and restrictive treatment settings are typically very expensive (Aos,

In this study, the author examined the impact of youth and family preplacement risk factors on multidimensional treatment foster care (MTFC) parent–youth interactions, youth treatment completion, and outcomes for boy and girl adolescents who have problems with chronic delinquency. In particular, she looked at (a) how levels of preplacement youth and family risk factors for chronically delinquent boys and girls who were treated with MTFC affect parent–youth interactions during treatment, (b) how these interactions and preplacement youth and family risk factors relate to treatment completion for boys and girls, and (c) how treatment completion for girls and boys affects reoffending behavior during the 12 months postplacement. As hypothesized, results indicated higher levels of preplacement youth and family risk for girls compared with boys; however, contrary to the author's hypothesis, levels of preplacement youth and family risk were not found to have a significant impact on MTFC parent–youth interactions. As expected, MTFC parent–youth interactions were significantly related to treatment completion, and treatment completion was significantly related to lower rates of reoffending behavior for both boys and girls. Treatment components specific to MTFC are reviewed and directions for future research are suggested.

Phipps, Barnoski, & Leib, 1999). It therefore would be advantageous for agencies and treatment professionals to identify, before treatment, those youths who might benefit most from a specific treatment intervention or from specific treatment components, as well as those youths who are at highest risk for treatment failure. Although some steps have been taken to identify the contribution that specific treatment components have on outcomes for delinquent youths (e.g., Eddy & Chamberlain, 2000), this research is still in its infancy, and very little is known

about how and why specific treatment interventions are effective and how levels of risk may affect treatment efficacy.

Multidimensional treatment foster care (MTFC; Chamberlain, 1994; Chamberlain, 2003; Chamberlain & Reid, 1998; Eddy & Chamberlain, 2000) is one of several evidence-based approaches that have received recent attention for producing positive outcomes for high-risk youths and for being viable and cost-effective alternatives to group care for the treatment of delinquent male and female adolescents (see Elliott, 1998). The MTFC model is

based on social learning theory and more than 20 years of longitudinal research on the development of antisocial behavior and coercive family processes. According to social learning theory, individuals' behaviors, attitudes, and emotions are thought to be highly responsive to influences in the contexts of their environments. In this light, the MTFC model was designed to take advantage of the powerful socializing role of the family (i.e., the MTFC home) by using trained MTFC parents to provide a set of carefully coordinated consequences to teach and reinforce prosocial behaviors across multiple settings (i.e., home, school, community). MTFC parents are responsible for delivering treatment on a moment-by-moment basis using a daily behavior management system (i.e., the point-and-level system) that requires frequent and consistent use of reinforcement (earned points) and sanctions (lost points) to "shape" youth behavior (Rimm & Masters, 1974). Given the "in-vivo" nature of MTFC and the extensive contact that MTFC parents have with the youths in treatment, the MTFC parents (who receive daily training and guidance from the MTFC program supervisor) are seen as the cornerstone of the treatment intervention.

Several studies have documented the relationship between inconsistent discipline and youth conduct problems—in terms not only of the development of conduct problem behavior but also of its maintenance (McCord, McCord, & Zola, 1959; Patterson, 1976; Rutter, Shaffer, & Sturge, 1975). In addition, numerous studies have also shown that changing the day-to-day interactions with and reactions to youth conduct problem behavior by teaching the parent to systematically provide contingent responses (e.g., positive reinforcement, contingent discipline) for negative behaviors can effectively alter negative behavioral patterns (Miller & Prinz, 1990; Patterson, Chamberlain, & Reid, 1982; Taplin & Reid, 1977; Webster-Stratton, Kolpacoff, & Hollinsworth, 1988). The daily MTFC point-and-level system operates on this premise and serves to provide a structure in which coercive parent–youth interactions can be

successfully avoided. The giving and taking of points translates the overall discipline practice into a nonreactive interaction that prevents the youth's negative behavior from escalating while providing the parent with a method to avoid engaging with the youth in negative verbal or behavioral exchanges. Over time, the structured interactional process of the point-and-level system results in the youth learning that negative behaviors (e.g., arguing, defiance) are no longer effective in producing short-term rewards (e.g., getting his or her way) and that compliance and prosocial behaviors are. It also helps the parent to rely on the consistent and predictable use of consequences to result in positive behavior change in the youth.

The function of the point-and-level system is, therefore, to provide a clear and consistent system for administering reinforcement (i.e., point gains) and disciplining consequences (i.e., point losses). The MTFC parent uses this system on a moment-by-moment basis to provide the youth with contingent responses to his or her behavior and attitude during the day, as well as to measure the progress that the youth is making in the program (e.g., less negative behavior results in less point loss). In this regard, the total daily points a youth earns on the point-and-level system is seen as a measure of the level of positive behavior observed from the youth and the level of reinforcement provided by the MTFC parent, as well as an indicator of the interaction between parent-issued reinforcement and resulting youth behavior.

Previous studies have examined the role that discipline practices play in determining youth outcomes. In particular, four key treatment components of the MTFC model have been identified as mediators of the effect of treatment: supervision, discipline, positive adult–youth relationship, and decreased association with delinquent peers (Eddy & Chamberlain, 2000). Although these four components appear to make MTFC work as it was intended, we know little about how these mediators actually work. Three of the four key mediators of treatment in MTFC are parenting practices (supervision, disci-

pline, and positive adult–youth relationship), which highlight the interactive nature of the treatment intervention (i.e., the MTFC parent provides positive and negative consequences for youth behavior, which in turn alters the youth's behavior). However, the functional intricacies of these interactions are not well-known. In particular, very little is known about the impact of MTFC parent–youth interactions (e.g., levels of reinforcement and resulting behavior) on treatment effectiveness.

In this article, I examine the relationship between MTFC parent–youth interactions as they are measured by the point-and-level system used in MTFC and treatment completion and outcome. I also explore the impact of youth and family preplacement risk factors on MTFC parent–youth interactions and youth treatment completion and outcome. Specifically, in this study, I examined

1. how levels of preplacement youth and family risk factors for chronically delinquent boys and girls who were treated with MTFC affect MTFC parent–youth interactions during treatment,
2. how these interactions and preplacement youth and family risk factors relate to treatment completion for boys and girls, and
3. how treatment completion for girls and boys influences reoffending behavior during the 12 months post-placement.

Based on existing research (Brown, Henggeler, Brondino, & Pickrel, 1999; Henggeler, Edwards, & Borduin, 1987; Lewin, Davis, & Hops, 1999), I hypothesized that girls would have higher levels of youth and family risk at the onset of treatment and that higher levels of risk would result in less positive MTFC parent–youth interactions. I also hypothesized that high levels of risk and less positive MTFC parent–youth interactions would result in lower rates of treatment completion, which, in turn, would result in higher risk for reoffending behavior for both boys and girls during the 12 months post-treatment.

## METHOD

### Participants

The study participants were 62 delinquent youths (34 boys and 28 girls) who were referred by the state juvenile justice system after being court-mandated to out-of-home care. All youths in the present study were participants in two randomized studies that examined the efficacy of using MTFC to treat chronically delinquent youths (*Mediators of Male Delinquency: A Clinical Trial*, Chamberlain, 1990; *Female Delinquency: Treatment Processes and Outcomes*, Chamberlain, 1997). Youths in these studies were randomly assigned to experimental (i.e., MTFC) and control (i.e., group care) conditions. In the present study, only those youths who were assigned to the experimental condition (MTFC) were included in order to examine the impact of treatment components of

interest that were specific to MTFC (i.e., the point-and-level system).

Inclusion criteria for placement in the studies were (a) history of arrest, (b) court-mandated out-of-home placement, and (c) age 12 to 18 years. At the time of placement, the average age of participants was 15.01 (boys:  $M = 14.62$ , girls:  $M = 15.48$ ). Eighty-one percent of participants were White, 5% African American, 5% Hispanic, 4% American Indian, and 5% Other.

### Overview of Treatment

The MTFC model has two major aims: (a) to create opportunities for youths to live successfully in foster families in their communities while they are provided with intensive supervision, support, and skill development and (b) to simultaneously prepare their parents (or other aftercare re-

source) to provide effective parenting that will increase the chance for positive reintegration into the family following placement. The overarching goal is to implement an intensive, well-coordinated set of interventions (e.g., family and individual therapy, skill training, academic support, case management, psychiatric consultation for medication management) across multiple settings (e.g., home, school, peer group, community). Four key treatment elements are targeted during placement and aftercare:

1. providing a consistent reinforcing environment where youths are mentored and encouraged to perform specific behaviors or tasks designed to increase their skill base,
2. providing daily structure with clear expectations and limits and well-specified consequences delivered in a teaching-oriented manner,
3. providing close supervision of youths' whereabouts, and
4. avoiding deviant peer associations while providing support and assistance in establishing prosocial peer contacts.

Court-mandated placements in MTFC last between 6 and 9 months. Treatment completion in MTFC is based on attaining specific family- and youth-related treatment goals (e.g., youth's behavior deemed safe for community placement, parent(s)' ability to utilize effective family management strategies) specified by the MTFC clinical team and the juvenile justice department.

### Point-and-Level System

Daily behavior management of youth was provided through foster parents implementing a point-and-level system (see Figure 1). The daily point-and-level system in MTFC is a basic tool used to provide positive reinforcement, structure, and clear behavioral expectations across all settings in which a youth is involved. This system is used to provide ongoing feedback to youths on their behavior in regards to a variety of daily expectations (e.g., getting up on time, attending school, dis-

LEVEL I		
Name:		
Date:		
BEHAVIOR	DESCRIPTION	POINTS
UP ON TIME	Out of bed	10
READY IN MORNING	Shower, teeth brushed, hair combed, wear clean clothes, eat breakfast	10
MORNING CLEAN-UP	Bed made, dirty clothes put away, room neat, bath towel and wash rag put away, dishes placed in sink	10
GO TO SCHOOL	Be on time for the bus and attend each class with, no tardiness	5
CARRY SCHOOL CARD	Carry school card to each class and have teacher sign it	2/Class
BEHAVIOR IN CLASS	Pay attention to tasks in class, cooperate with the teacher, and hand homework in on time	5/Class
READ AND STUDY	50 minutes reading/writing each day (not including letter writing)	20
SCHOOL CARD BONUS	All signatures, no overdue homework, no tardies, and good behavior	10
CHORE	To be explained each day	10
ATTITUDE/MATURITY	Being helpful, taking criticism well, being pleasant, not pushing limits, not being moody, accepting NO!	15 a.m. 15 p.m.
VOLUNTEERING	Volunteering to do extra tasks (parent will decide on points).	2-10
EXTRA CHORE	Optional (must be approved by parent)	5-30
BED ON TIME	If you CAN buy BASICS (minimum of 50 points) 9:30	10
	If you CAN'T buy BASICS 8:30	

FIGURE 1. Daily point-and-level system used with boys and girls in MTFC.

playing positive behavior in class, displaying maturity, and having a positive attitude). MTFC foster parents are trained and supervised to use the point-and-level system as a tool to positively “shape” a youth’s behavior; youths are reinforced (i.e., given points) for positive behaviors and are provided with negative consequences (i.e., lost points) for negative or undesirable behaviors. MTFC parents are supervised on their use of the point-and-level system during weekly meetings with the program supervisor in which the daily giving and taking of points, the balance of reinforcement and sanctions, and interactions between MTFC parents and youths via the point-and-level system are addressed.

The point-and-level system is relatively standard for all youths; however, specific target behaviors are occasionally added to assist MTFC parents in focusing on and improving particularly problematic behaviors. For example, “accurate reporting” may be added to the system of a youth who has a particular problem with lying. The youth would then be reinforced for truth-telling behavior and would lose points for reporting inaccurate information. Although the general procedures for using the point-and-level system are standard (i.e., standard point values are assigned for basic daily behaviors, such as getting up on time and completing homework), targeted reinforcement is used to improve individualized specific behaviors. MTFC foster parents are taught to provide extra reinforcement for targeted behaviors by assigning bonus points for positive and adaptive behaviors in those areas. For example, youths who have particular difficulty behaving appropriately in school may receive higher levels of reinforcement (i.e., bonus points) for positive behavior at school.

In addition to serving as a method for MTFC foster parents to praise and reinforce specific behaviors, the point-and-level system is also used to determine the type and number of privileges earned by each youth. A standard list of privileges and corresponding point “costs” are provided to each youth at the time of placement. Youths are encouraged to earn as many points and “purchase” as many priv-

ileges as possible. For example, youths need at least 100 points per day to receive basic privileges such as a later bedtime (i.e., 9:30 p.m. versus 8:30 p.m.) and a radio in their bedroom. Points above 100 can be used to purchase additional privileges, such as television time, computer or video game time, telephone use, and participation in planned activities with prosocial peers. The number of points given and earned each day is a reflection of both the foster parent’s level of reinforcement and the youth’s level of appropriate, positive behavior.

## Measures

**Preplacement Risk.** To assess preplacement risk for boys and girls, the following six variables were examined: (a) drug/alcohol abuse, (b) history of suicide attempts, (c) academic level, (d) mental health (*Brief Symptom Inventory* score; Derogatis, 1993), (e) chronic truancy, and (f) early offending behavior (i.e., first arrest before age 13). The *Brief Symptom Inventory* is a 53-item standardized questionnaire used to assess mental health, including somatization, obsessive compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. To assess preplacement family criminality, three variables were examined: (a) mother convicted of a crime, (b) father convicted of a crime, and (c) sibling institutionalized. To assess preplacement family stress, five variables were used: (a) single parent status, (b) income below \$10,000, (c) documented physical abuse, (d) family violence, and (e) run away child. Data on these variables were obtained through interviews with participants and their caretakers at the onset of placement. Official offense data (i.e., age at first offense and reoffending behavior during the 12 months postplacement) were collected from juvenile court records. All family- and youth-related risk variables and offense data were coded to be dichotomous (coded 1 = yes; 0 = no).

**MTFC Parent–Youth Interaction.** The mean total number of daily points earned on the daily point-and-level sys-

tem was calculated daily for each youth during the first 2 weeks of treatment (see Note 1). This was used as a measure of the level of reinforcement (provided by the MTFC parent) and positive behavior (observed from the youth) at the onset of treatment; higher points equal more reinforcement and more positive behavior.

**Treatment Completion.** Based on the average length of treatment for youths in MTFC (i.e., 6–9 months), a dichotomous variable was created to describe treatment completion. Youths who remained in MTFC for at least 6 months were considered to have completed treatment (coded 1), and youths who left MTFC prior to 6 months were considered not to have completed treatment (coded 0).

**Reoffending Behavior.** The primary outcome examined was whether youths were arrested during the 12 months after leaving their MTFC placements. Youths who had at least one offense during the 12 months following their MTFC placement were considered to have reoffended (coded 1), and youths who had no offenses during the 12 months following their MTFC placement were considered to have not reoffended (coded 0).

## Procedure

After referral and consent, all youths who were randomly assigned to MTFC were placed with MTFC parents who were recruited, trained, and supervised by clinicians at the Oregon Social Learning Center (OSLC). Foster parents participated in a 20-hour preservice training conducted by staff and experienced MTFC foster parents. Training followed a social learning and behavioral model in which foster parents were taught to provide youths with frequent reinforcement and clear and consistent limits using the point-and-level system. Treatment foster parents were taught to turn problem situations into teaching opportunities, to provide daily feedback by giving and taking points, and to respond to various forms of aggression in nonreactive ways. MTFC parents received ongoing support and supervision in the form of weekly foster parent meetings

and daily telephone contacts with a case manager. Detailed information on the MTFC program model and procedures are described elsewhere (e.g., Chamberlain, 1994; Chamberlain & Smith, 2003).

The average number of total points earned each day during the first 2 weeks of treatment was calculated for each case and was used as a measure of MTFC parent–youth interaction (i.e., the level of reinforcement and resulting positive behavior) at the onset of treatment. The average total daily points earned during the first 2 weeks of treatment was 128, *SD* = 16 (boys: *M* = 129.4, girls: *M* = 127.1).

The total number of days in treatment was calculated for each youth in MTFC in order to identify those youths who completed at least 6 months of treatment. Youths who spent at least 180 days in treatment were considered to have completed MTFC. Nineteen of 62 youths (30.6%, 10 boys and 9 girls) left MTFC before completing at least 6 months of treatment.

Gender differences were examined for each demographic variable using independent sample *t* tests or chi-square tests, as appropriate; results are presented in Table 1. As can be seen in Table 1, all risk factors, except Single Parent Family and Income Below \$10,000, were more common for girls than boys.

Alphas for the three risk constructs were .78 for Youth Risk, .65 for Family Stress, and .62 for Family Criminality. Correlation coefficients among the three constructs ranged from .53 to .61, indicating that all three constructs are related. However, all correlation coefficients were < .70, indicating that each construct taps somewhat different but related aspects of youth and family risk.

Three logistic regression models were conducted to examine treatment completion (treatment completion was regressed on gender, the mean daily total points earned during the first 2 weeks of treatment, and preplacement risk variables); reoffending behavior during the 12 months

postplacement (offenses were regressed on treatment completion, gender, and preplacement risk variables); and an interaction between gender and reoffending behavior (see Note 2). Logistic regression analyses were used to examine treatment completion and reoffending behavior for two reasons: (a) The variance for the dichotomous variable (completed treatment/did not complete treatment; postplacement reoffense/no postplacement reoffense) is not constant, and (b) the error term does not vary across levels, violating assumptions of homoscedasticity.

## RESULTS

### Preplacement Risk

Independent samples *t* tests were conducted to examine gender differences for the three preplacement risk factor constructs (i.e., family criminality, family stress, youth risk). Significant differences were found for all three constructs for boys and girls, with girls showing significantly greater family criminality (girls: *M* = .49, *SD* = .37; boys: *M* = .11, *SD* = .18), family stress (girls: *M* = .71, *SD* = .23; boys: *M* = .31, *SD* = .20), and youth emotional/behavioral risk (girls: *M* = .70, *SD* = .22; boys: *M* = .18, *SD* = .15).

### MTFC Parent–Youth Interaction

Correlation analyses examining the relationship between the mean daily total points for the first 2 weeks of treatment and preplacement risk constructs (i.e., family criminality, family stress, youth risk) indicated that there were no significant relationships between levels of preplacement risk and the mean daily total points earned during the first 2 weeks of treatment for boys or girls.

### Treatment Completion

Using logistic regression, treatment completion was regressed on the mean daily total points measured at the onset of treatment, gender, and preplacement risk constructs. Because of the small sample size, *t* tests were used to interpret regression

TABLE 1  
Preplacement Risk Scores for Boys and Girls

Variable	Boys	Girls	<i>t</i>	<i>df</i>
Mom convicted of a crime	.03	.48***	−4.4	31
Dad convicted of a crime	.18	.64***	−4.1	51
Sibling institutionalized	.12	.36*	−2.2	45.6
Single parent family at present	.56	.74	−1.5	58.2
Current family income < \$10,000	.22	.33	−.98	57
Documented physical abuse	.03	.79***	−8.9	34.9
Family violence	.03	.75***	−8.1	34.1
Child run away	.68	.93**	−2.6	53.7
Drug/alcohol abuse	.03	.79***	−8.9	34.9
Documented suicide attempt	.00	.68***	−7.6	27
Academically below grade level	.36	.93***	−5.7	50.5
BSI—clinical cutoff for total score	.03	.65***	−5.9	25.7
Chronic truancy	.61	.89**	−2.7	54.9
First arrest before age 13	.56	.54	.18	60

Note. Scores are reported in percentages: e.g., .03 = 3%; BSI = Brief Symptom Inventory (Derogatis, 1993).

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

coefficients instead of the Wald statistic (Norusis, 1990); one-tailed tests were conducted for variables where a priori hypotheses of directionality were specified. The results are presented in Table 2.

In Model 1, the effects of the mean daily total points for the first 2 weeks of treatment, gender, and preplacement risk constructs (i.e., family criminality, family stress, youth risk) on the likelihood of completing treatment were estimated. The model estimated ( $-2L_1$  minus  $-2L_0 = 12.22$ ) was significant at the  $p = .03$  level. According to Model 1, the mean daily total points ( $b = .06, p < .01$ ) earned during the first 2 weeks of treatment and youth risk ( $b = -4.17, p < .05$ ) were significant predictors of completing treatment. There was no additive effect of gender, family criminality, or family stress on treatment completion.

### Predicted Probability of Treatment Completion

In logistic regression, an estimated model can be used to calculate the probability of an event occurring (i.e., treatment completion). Using coefficients from Model 1, the predicted probability of treatment completion was calculated. According to this model, an increase of one daily point decreases the probability of leaving MTFC before completing treatment by 1%. Because the units were so small, the predicted probability of treatment completion was also calculated according to standard deviation, indicating that an increase of 32 daily points (approximately 2 SD) decreases the probability of leaving MTFC before completing treatment by 32%. These analyses suggest that the mean total daily points for the first 2 weeks of treatment is a stronger predictor of leaving MTFC prior to completing treatment than youth risk, and that gender, family criminality, and family stress do not play a significant role in predicting leaving MTFC prior to completing treatment.

### Offense Analyses

Using logistic regression, postplacement offenses were regressed on treatment com-

pletion, gender, and preplacement risk constructs. Results are presented in Table 3. In Model 2, the effects of treatment completion, gender, and preplacement risk constructs (i.e., family criminality, family stress, youth risk) on the likelihood of reoffending during the 12 months post-

placement were estimated. Two of the preplacement risk constructs (youth risk and family stress) did not contribute to the fit of the first model estimated ( $b = .96, p = .28; b = .51, p = .37$ , respectively), so a reduced form model that excluded these two variables was estimated. The model ( $-2L_1$

TABLE 2  
Logistic Regression Models Predicting Youth Who Completed Treatment

Variable	Model 1	
	b	SE
Gender	1.19	1.35
Total points	.06**	.02
Youth risk	-4.17*	2.04
Family criminality	1.00	1.32
Family stress	1.60	1.83
Constant	-6.16	2.97
-2 Log likelihood <sub>0</sub>	60.36	
df	5	
-2 Log likelihood <sub>1</sub>	72.58	
Model significance	.03	

\* $p < .05$ . \*\* $p < .01$ .

TABLE 3  
Logistic Regression Models Predicting Youth Who Reoffend 12 Months Posttreatment

Variable	Model 2	
	b	SE
Gender	-1.39*	.75
At least 6 months in TFC	-1.40**	.60
Family criminality	1.26	1.08
Constant	.86	.57
-2 Log likelihood <sub>0</sub>	74.39	
df	3	
-2 Log likelihood <sub>1</sub>	84.33	
Model significance	.03	

\* $p < .05$ . \*\* $p < .01$ .

minus  $-2L_0 = 9.94$ ) was significant at the  $p = .03$  level. According to Model 2, program completion ( $b = -1.40, p < .01$ ) and gender (i.e., being male;  $b = -1.39, p < .05$ ) were significant predictors of reoffending during the 12 months postplacement. There was no additive effect of family criminality on postplacement offending, and youth risk and family stress did not significantly contribute to the model.

A third model was then estimated with postplacement offenses regressed on gender-treatment completion variables (i.e., boys who completed treatment, boys who did not complete treatment, girls who completed treatment, girls who did not complete treatment). Results for Model 3 are presented in Table 4. According to this model, girls who completed treatment were significantly less likely to reoffend during the 12 months postplacement than were boys who did not complete treatment ( $b = 2.17, p < .01$ ) and girls who did not complete treatment ( $b = 1.54, p < .05$ ). Girls who completed treatment were also less likely to reoffend during the 12 months postplacement than were boys who completed treatment; however, this difference was not significant ( $b = 1.44, p = .08$ ). The rank-order of treatment com-

pletion and reoffending behavior for boys and girls is presented in Figure 2. As can be seen there, the likelihood of reoffending for boys and girls is as follows: girls who complete treatment are the least likely to reoffend, followed by boys who complete treatment, girls who do not complete treatment, and finally, boys who do not complete treatment, who are at the highest risk for reoffending during the 12 months postplacement.

### Predicted Probability of Reoffending

Using coefficients from Model 3, the predicted probability of reoffending was calculated for boys and girls who completed treatment versus those who did not. According to Model 3, boys who left MTFC prior to completing treatment were at the highest risk for reoffending and had a 68.9% probability of being arrested during the 12 months postplacement. Boys who left MTFC prior to completing treatment were 24% more likely to reoffend during the 12 months postplacement than were boys who completed treatment, and were 48% more likely to reoffend than were girls who completed treatment. Girls who left MTFC prior to completing treat-

ment were 37% more likely to reoffend than were girls who completed at least 6 months of treatment. Using coefficients from Model 2, the predicted probability of reoffending for boys and girls together was calculated. According to this model, completing treatment (i.e., remaining in MTFC for at least 6 months) decreased the probability of reoffending for both boys and girls by 19.8%.

## DISCUSSION

As expected, results of this study indicated higher levels of preplacement youth and family risk (youth emotional and behavioral risk, family criminality, family stress) for girls compared with boys. This finding is commensurate with previous research on delinquent girls (e.g., Calhoun, Jurgens, & Chen, 1993; Chamberlain & Reid, 1994; Eme, 1992; Henggeler et al., 1987; Lewis et al., 1991). In this study, higher levels of preplacement risk were hypothesized to have a negative impact on MTFC parent-youth interactions during treatment; however, results indicated that this was not the case. Levels of preplacement youth risk and family risk were not found to have a significant impact on the number of points earned on the daily point-and-level system (i.e., level of reinforcement provided by the MTFC parent and the level of positive behavior observed from the youth) during the first 2 weeks of treatment. It was also hypothesized that higher levels of preplacement youth and family risk and less positive MTFC parent-youth interactions would be significantly related to failing to complete treatment for boys and girls. Results, however, were only partially in line with our expected findings. As expected, MTFC parent-youth interactions were significantly related to treatment completion; higher levels of points (i.e., higher levels of reinforcement provided by the MTFC parent and more positive behavior observed from the youth) were significantly predictive of completing treatment for both boys and girls. Unexpectedly, levels of family risk (family criminality and family stress) were not significantly related to treatment completion for boys and girls.

TABLE 4  
Logistic Regression Models Predicting Boys and Girls Who Reoffend  
12 Months Posttreatment

Variable	Model 3	
	<i>b</i>	<i>SE</i>
Boy did not complete treatment	2.17**	.89
Girl did not complete treatment	1.54*	.87
Boy completed treatment <sup>a</sup>	.99 <sup>+</sup>	.70
Constant	-1.32	.56
-2 Log likelihood <sub>0</sub>	76.74	
<i>df</i>	3	
-2 Log likelihood <sub>1</sub>	84.33	
Model significance	.05	

<sup>+</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

<sup>a</sup>Girls who completed treatment were omitted as the reference category.

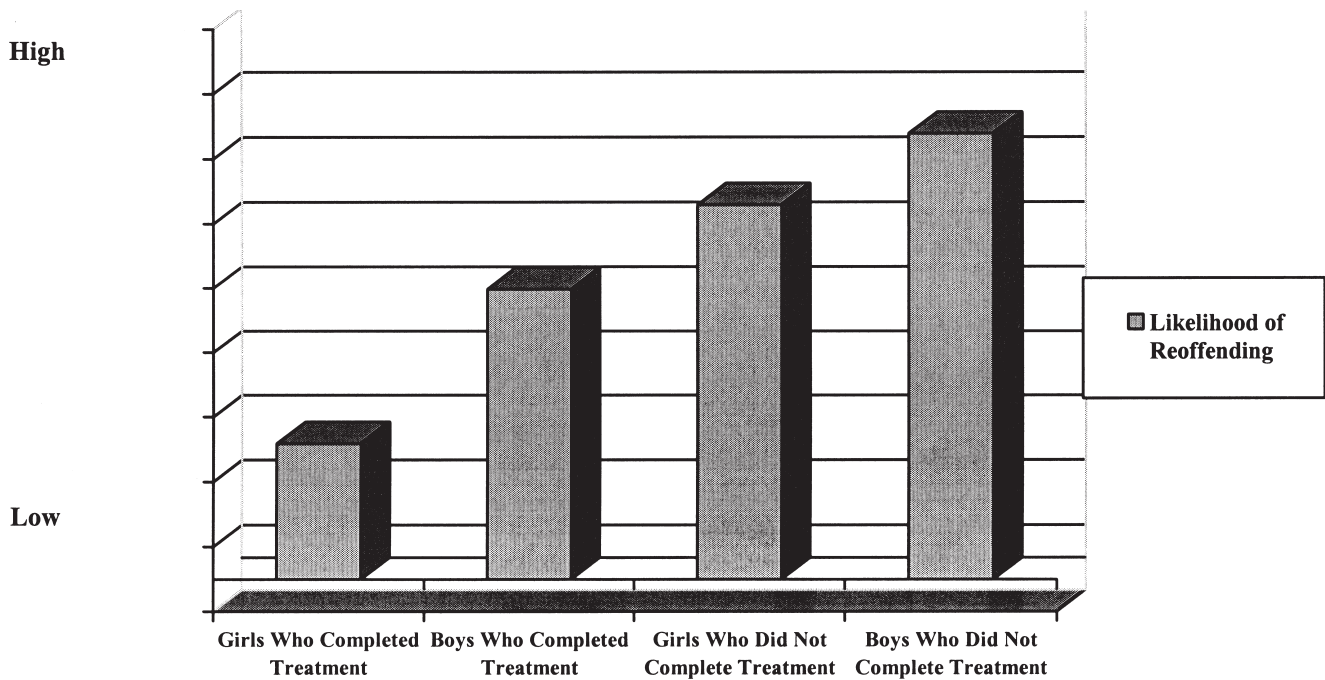


FIGURE 2. Likelihood of reoffending for boys and girls placed in MTFC.

Levels of preplacement youth risk were significantly related to treatment completion (higher levels of youth risk were predictive of failing to complete treatment); however, the strongest predictor of treatment completion was the MTFC parent–youth relationship. Finally, as expected, results showed that treatment completion was significantly related to lower rates of reoffending for both boys and girls during the 12 months postplacement, with girls showing significantly less reoffending than boys, overall.

Previous research has suggested that antisocial girls are difficult to treat (Warren & Rosenbaum, 1987; Zoccolillo & Rogers, 1991) and that adolescent girls are at the highest risk (compared with adolescent boys and younger children) for disruption from treatment foster care placements (Smith, Stormshak, Chamberlain, & Bridges Whaley, 2001). Despite having significantly higher levels of youth and family risk compared with boys, girls in this study did not show significantly higher rates of treatment failure than boys nor did girls' higher levels of preplacement risk have a negative impact on MTFC parent–youth interactions during treatment.

These results are promising, especially in light of reported difficulties in reducing behavior problems and later offending with female adolescent samples (e.g., Warren & Rosenbaum, 1987; Zoccolillo & Rogers, 1991). In this study, girls who completed treatment were at the lowest risk for reoffending during the 12 months postplacement. These results suggest that if delinquent girls are able to remain in a stable treatment environment (i.e., MTFC) for at least 6 months, their risk for reengaging in delinquent behavior can be significantly reduced, despite significantly higher initial levels of preplacement youth and family risk. Although, overall, boys reoffended at a higher rate than girls, boys who remained in MTFC for a minimum of 6 months showed significantly lower rates of reoffense during the 12 months postplacement compared with boys who did not complete treatment. Taken together, these results suggest that MTFC may be effective at reducing later reoffending behavior for both chronically delinquent boys and girls if youths remain in their MTFC placements for at least 6 months of treatment.

Although low rates of reoffending for boys and girls who complete treatment

with MTFC is promising, perhaps what is most promising are the possible reasons for such a finding. In this study, the most significant predictor of reoffending behavior was remaining in MTFC for at least 6 months. The most significant predictor of remaining in MTFC for at least 6 months was higher levels of points earned during the first 2 weeks of placement (i.e., level of reinforcement provided by the MTFC parent and the level of positive behavior observed from the youth). One possible reason for this finding is that youths who demonstrate more positive behaviors are less likely to experience a disruption from treatment—the more positive a youth's behavior is, the less likely he or she will run from treatment or be detained or expelled. The second and perhaps more plausible possibility is that MTFC foster parents who give more points on the daily point-and-level system focus more on positive behaviors than on problematic behaviors, resulting in a more positive and reinforcing environment for the youths in their care. Foster parents who focus more on positive behaviors than negative behaviors are likely to feel and show encouragement for positive changes, however small they may be, as they shape the

youth's behavior in a positive manner. In addition, youths who reside in foster homes where the focus is on positive rather than negative behavior are likely to experience more frequent reinforcement for appropriate behaviors and to receive more encouragement during treatment, and they may ultimately be more open to MTFC foster parents and staff "teaching" appropriate behaviors (e.g., social skill development, adaptive coping skills, problem-solving skills). Over time, this may assist youths in making continued emotional and behavioral progress during treatment.

Also encouraging is the finding that youth and family preplacement risk alone were not significantly predictive of reoffending behavior. Previous research has suggested that family dysfunction, early childhood maltreatment, childhood behavior problems, and school difficulties are strongly associated not only with the development of antisocial behavior but also with its persistence (Rutter & Madge, 1976). This finding suggests that if youths can be maintained in MTFC until treatment is complete, negative life trajectories may be altered for youths with histories of early offending and severe chaos, abuse, and trauma. In addition, these results demonstrate the power of positive reinforcement. Regardless of whether a youth's positive behavior affects his or her environment in a positive manner or whether a positive environment affects a youth's behavior in a positive manner, reinforcement appears to be the key. This is especially promising in the treatment of youths where the high level of youth and family risk typically found with chronically delinquent youths is often impervious to change (i.e., past abuse and neglect, parent in prison). If positive reinforcement can effectively "overpower" negative youth and family risk, it may be that intervention programs could be tailored to fit the level of reinforcement needed to override specific levels of risk. According to such a premise, no youth could be termed "too delinquent" for treatment. These data, in conjunction with previous research on the effectiveness of MTFC (e.g., Chamberlain & Reid, 1998; Eddy & Chamberlain, 2000), suggest that the negative trajec-

ries of even severely and chronically delinquent youths who have high levels of preplacement youth and family risk can be altered through changes made to a youth's environment (i.e., the family setting).

Regardless of why lower daily points and higher levels of youth risk were related to failing to complete treatment, it appears that these variables may be used to identify youths who are at particularly high risk for failing to complete treatment and later offending behavior. Because behavioral and youth risk measures were collected at the onset of treatment (i.e., preplacement risk was calculated at the time of placement, and points earned during the first 2 weeks of treatment were used as the measure of reinforcement and positive behavior), it may be possible to identify youths who are at highest risk for treatment failure at the onset of treatment and design interventions to prevent such failures.

### Limitations

There are several limitations to the present study. First, the lack of a control group eliminates any conclusions that can be drawn regarding treatment effectiveness and limits the ability to generalize the current findings across programs or populations. In addition, because youths in the present study were all participants in two randomized clinical trials (*Mediators of Male Delinquency: A Clinical Trial*, Chamberlain, 1990; *Female Delinquency: Treatment Processes and Outcomes*, Chamberlain, 1997), gender comparisons for the present study were limited to measures that were identical for both male and female youths in those clinical trials. Finally, although the strongest predictor of treatment completion was the MTFC parent-youth interaction (i.e., mean total number of daily points earned during the first 2 weeks of treatment), the exact nature of this relationship (e.g., the specific impact that levels of reinforcement provided by the MTFC parent have on levels of positive behavior observed from the youth) could not be determined. In this regard, the results of this study would be strengthened using multiple measures and multiple respondents of problem behav-

ior, levels of reinforcement, and levels of risk, as well as measures of behavior gathered from additional settings (e.g., behavioral reports from biological parents, youths).

### Future Directions

Despite its limitations, this study provides important preliminary information on the treatment of male and female delinquent behavior, as well as implications for future research. Surprisingly few gender differences were found in analyses of treatment completion for the delinquent youths in this study, suggesting that treating severely delinquent girls with MTFC may be as successful as treating severely delinquent boys with MTFC. However, additional studies comparing the long-term treatment of delinquent boys and girls are needed to substantiate and augment these findings. In addition, these findings highlight the possible role that reinforcement plays in determining treatment success for chronically delinquent youths. Clearly, more research is needed to examine these and other areas of treatment intervention. Future research should examine specific treatment interventions that may enhance treatment effectiveness—in particular, matching higher levels of reinforcement to youths with higher levels of preplacement risk. In addition, future studies should examine additional methods for improving placement stability and treatment completion for delinquent male and female youths.

Although conclusions regarding treatment effectiveness cannot be drawn from a single study, results do indicate that severely delinquent male and female youths who are typically considered for residential treatment were maintained in a community setting (i.e., foster family) at a rate that was slightly superior to those reported in previous studies with treatment foster care populations (38%–70%; Berrick, Needell, Barth, & Jonson-Reid, 1998; Palmer, 1996; Staff & Fein, 1995; Stone & Stone, 1983). Results also indicate that youths who completed treatment with MTFC had significantly lower rates of reoffending behavior during the 12 months postplacement compared with youths who

did not. Given recent reports of an increase in female delinquency (U.S. Department of Justice, 2000), it is promising that treatment for female antisocial populations may be able to take place in a less restrictive setting (i.e., MTFC) for a fraction of the cost of residential treatment (Aos et al., 1999).

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## Notes

1. Frequencies were examined for the total daily points for the second 2 weeks of treatment, as well as for Months 2 through 6, in an effort to explore the possibility that the total points for the first 2 weeks of treatment were artificially higher than points earned during the remainder of treatment as a consequence of youths being on their "best behavior" at the onset of placement. No significant differences were found for total daily points for the various time points examined.
2. Three dummy variables (coded 0 or 1) were created for three gender/treatment completion groups (girls who completed treatment were omitted as the reference category) to examine the interaction between gender, treatment completion, and reoffending behavior.

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