

A Randomized Clinical Trial of Multisystemic Therapy With Juvenile Sexual Offenders: Effects on Youth Social Ecology and Criminal Activity

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A randomized clinical trial evaluated the efficacy of multisystemic therapy (MST) versus usual community services (UCS) for 48 juvenile sexual offenders at high risk of committing additional serious crimes. Results from multiagent assessment batteries conducted before and after treatment showed that MST was more effective than UCS in improving key family, peer, and academic correlates of juvenile sexual offending and in ameliorating adjustment problems in individual family members. Moreover, results from an 8.9-year follow-up of rearrest and incarceration data (obtained when participants were on average 22.9 years of age) showed that MST participants had lower recidivism rates than did UCS participants for sexual (8% vs. 46%, respectively) and nonsexual (29% vs. 58%, respectively) crimes. In addition, MST participants had 70% fewer arrests for all crimes and spent 80% fewer days confined in detention facilities than did their counterparts who received UCS. The clinical and policy implications of these findings are discussed.

Keywords: juvenile sexual offender, multisystemic therapy, MST, cognitive-behavioral therapy, randomized clinical trial

Public concern about sex crimes is very high and has led to state and federal mandates for harsher sentences and other sanctions such as mandatory notification policies and sexual offender registries. Although arrests for sexual offenses are relatively rare, accounting for less than 1% of all arrests (U.S. Department of Justice, 2006), these crimes are among the most devastating to victims (Chapman, Dube, & Anda, 2007; Letourneau, Resnick, Kilpatrick, Saunders, & Best, 1996). Moreover, the societal costs of sexual offending are substantial. Indeed, in the United States, the estimated total annual cost to the public treasury for sexual assaults, including costs for the treatment of victims, is over \$1 billion (M. A. Cohen, Miller, & Rossman, 1994; Post, Mezey, Maxwell, & Wibert, 2002).

Youths under the age of 18 years account for approximately 20% of all arrests for sexual crimes, not including prostitution

(Pastore & Maguire, 2007; U.S. Department of Justice, 2006). This arrest statistic is especially disturbing when one considers that the ratio of self-reported to adjudicated sexual crimes by juveniles is approximately 25:1 (Elliott, 1995). There is also evidence that about one half of all adult sexual offenders commit their first sexual offense during adolescence (Zolondek, Abel, Northey, & Jordan, 2001) and that juvenile sexual offenders are more likely than juvenile nonsexual offenders and nonoffending adolescents to sexually reoffend as adults (Hagan, Gust-Brey, Cho, & Dow, 2001). Accordingly, juvenile sexual offenders are important to target for interventions, given the potential public welfare benefits of preventing recidivism for sexual crimes among these youths during both adolescence and adulthood.

Unfortunately, although juvenile sexual offenders consume much of the resources of the criminal justice, educational, and mental health systems (Melton, Lyons, & Spaulding, 1998), few if any empirically supported interventions exist to treat these youths. Indeed, a decade ago, Brown and Kolko (1998) noted that the treatment outcome literature on juvenile sexual offenders contained “little information regarding successful approaches” (p. 362) in spite of a proliferation of untested specialized programs. More recently, reviewers (e.g., R. K. Hanson et al., 2002; Reitzel & Carbonell, 2006) have highlighted the relative absence of randomized clinical trials in this area of research and have noted the continuing need for empirical knowledge about effective treatments. Clearly, the development of effective interventions with sexually offending youths has been neglected and deserves increased attention from researchers.

Research suggests that juvenile sexual offenders have more in common with other delinquents than is generally assumed and, like

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other offenders, experience problems in multiple domains, including family, peer, and school contexts (see Ronis & Borduin, 2007; Van Wijk et al., 2005). In addition, approximately 92% of juvenile sexual offenders also commit nonsexual crimes (Butler & Seto, 2002; Elliott, 1995). Such findings suggest that effective treatments for juvenile nonsexual offending, particularly those that are comprehensive, hold promise in treating juvenile sexual offenders. One promising approach is multisystemic therapy (MST; Henggeler & Borduin 1990; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998), an intensive family- and home-based treatment that addresses multiple determinants of serious antisocial behavior in youths. MST has received extensive empirical support as an effective treatment for violent and chronic criminal behavior in youths (see Curtis, Ronan, & Borduin, 2004; U.S. Public Health Service, 2001, for reviews).

The present study is the second in a series of three randomized clinical trials designed to evaluate the efficacy and effectiveness of MST with juvenile sexual offenders.¹ The first trial (Borduin, Henggeler, Blaske, & Stein, 1990), though modest in scope and size ($N = 16$), established the feasibility of using MST with this population. Recidivism rates for sexual offenses at a 3-year follow-up were considerably lower (12.5% vs. 75%) for youths who received MST than for counterparts who received individual therapy, and the average number of rearrests for both sexual (0.12 vs. 1.62) and nonsexual (0.62 vs. 2.25) offenses also was lower in the MST condition. The present trial with a different sample contains several important methodological improvements over the earlier trial, including (a) a larger and more heterogeneous sample of juvenile sexual offenders, (b) a comparison treatment condition that is more typical of the types of services provided to juvenile sexual offenders in community settings (McGrath, Cumming, & Burchard, 2003), (c) psychosocial outcome measures that reflect key social-ecological domains, and (d) a longer follow-up period for the measurement of criminal recidivism.

Method

Design

A pretest–posttest control group design (with random assignment to conditions and an average 8.9-year follow-up for arrest and incarceration measures) was used to compare the efficacy of MST versus usual community services (UCS). We selected a follow-up period that was long enough to allow for adult arrest data on every youth.

Participants

Youths and their families were referred to the study by juvenile court personnel in a judicial circuit serving two counties with approximately 200,000 people in the midwestern United States; the circuit includes approximately equal numbers of urban and rural residents. Referrals were made consecutively and included all families in which the youth (a) had been arrested for a serious sexual offense (i.e., rape/sexual assault or molestation of younger children) with a subsequent order for outpatient sexual offender counseling, (b) was currently living with at least one parent figure, and (c) showed no evidence of psychosis or serious mental retardation. Figure 1 depicts the study flow from referral through data

analyses. As can be seen, 51 eligible youths and families were referred to and recruited for the study. Of the 48 families that consented to participate (94%), equal numbers of families were randomized (using a random-number table) to the MST ($n = 24$) and UCS ($n = 24$) conditions. Recruitment was conducted from July 1990 through November 1993, with follow-up continuing through October 2001.

The arrest histories of the youths attest to their serious criminal involvement: The youths averaged 4.33 previous arrests ($SD = 4.81$) for sexual ($M = 1.62$) and nonsexual ($M = 2.71$) felonies. The mean age of the youths was 14.0 years ($SD = 1.9$); 95.8% were boys; 72.9% were White and 27.1% were Black, and among all youths 2.1% indicated Hispanic ethnicity; and 31.3% lived with only one parental figure (always a biological parent). The primary caretaker of the youth included biological mothers (91.7%), biological fathers (6.3%), or stepmothers (2.1%). Families averaged 3.3 children ($SD = 1.3$), and 54.8% of the families were of lower socioeconomic status (SES; Class IV or V of Hollingshead, 1975). Analyses of variance (ANOVAs) and chi-square tests showed no differences in pretreatment criminal histories or demographic characteristics of MST and UCS participants.

Pre- and posttreatment assessment batteries were completed by 100% of the families in the MST condition ($n = 24$) and 91.7% of the families in the UCS condition ($n = 22$). Research participation at postassessment was attenuated by the out-of-home placement of 2 youths from the UCS condition in Department of Youth Services residential facilities. These youths were classified as dropouts but were included in analyses of criminal activity and incarceration at follow-up (i.e., intent to treat).

Treatment Conditions

Families were randomly assigned to treatment conditions. The mean length of treatment/services was 30.8 weeks ($SD = 12.3$; range = 14.3 to 63.7 weeks) for the MST participants and 30.1 ($SD = 18.0$; range = 17.0 to 89.9 weeks) for the UCS participants; these means were not significantly different, $F(1, 47) = 0.02$, $p > .05$. Variability in treatment lengths reflected the individualized nature of the interventions provided in each condition as well as varying degrees of success in meeting treatment goals.

Multisystemic Therapy

MST interventions for youth antisocial behavior have been specified in a clinical volume (Henggeler & Borduin, 1990) and a treatment manual (Henggeler et al., 1998). The treatment emphases of MST fit closely with findings from studies of the correlates of serious antisocial behavior, including juvenile sexual offending (e.g., Becker, 1998; Ronis & Borduin, 2007). MST targets a comprehensive set of identified risk factors (e.g., across individual, family, peer, school, and neighborhood domains) through individualized interventions. These interventions integrate empirically

¹ Although all of the clinical trials were conducted in community settings, the first and second (i.e., present) trials involved graduate students as MST therapists and thus should probably be classified as “efficacy” (rather than “effectiveness”) studies (see Bickman & Noser, 1999). The third trial (Letourneau et al., 2008) evaluates effectiveness with community-based treatment providers.

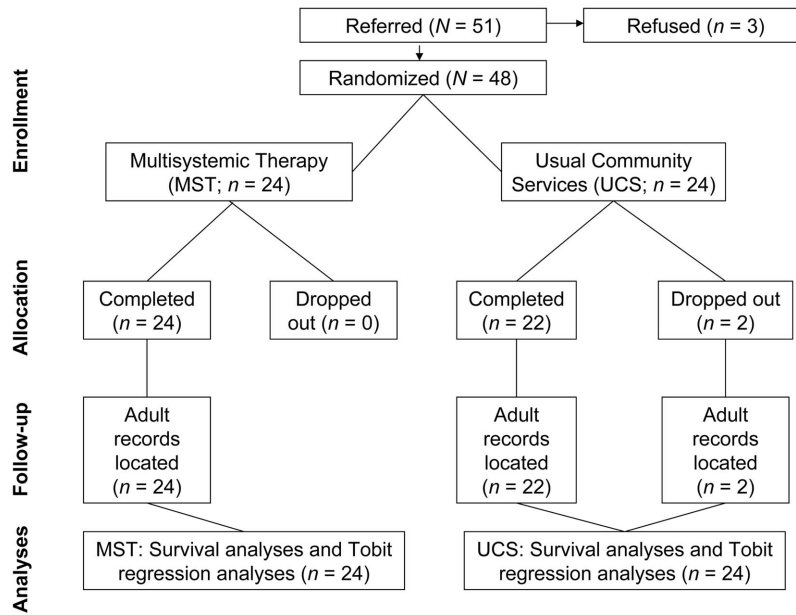


Figure 1. Flow diagram of participants from randomization to follow-up. UCS = usual community services.

based clinical techniques (e.g., from behavioral and cognitive-behavioral therapies and structural family therapy), which have historically focused on a limited aspect of a youth's social ecology (e.g., individual youth, family), into a broad-based ecological framework.

The MST approach for juvenile sexual offenders is described in detail elsewhere (Borduin, Letourneau, Henggeler, & Swenson, 2003). The approach is guided by the same principles and uses many of the same evidence-based techniques as in MST for nonsexual offenders but focuses on aspects of a youth's ecology that are functionally related to the problem sexual behavior. At the family level, MST interventions often aim to (a) reduce parent and youth denial about the sexual offenses and their sequelae, (b) remove barriers to effective parenting, (c) enhance parenting knowledge, and (d) promote affection and communication among family members. Moreover, conjoint work with family members and other appropriate persons in the youth's social ecology (e.g., teachers, extended family) is essential in the development of plans for risk reduction, relapse prevention, and victim safety. At the peer level, interventions often target youth social skill and problem-solving deficits to promote the development of friendships and age-appropriate sexual experiences. Peer relations interventions are conducted by the youth's parents, with the guidance of the therapist, and often consist of active support and encouragement of relationship skills and associations with nonproblem peers, as well as substantive discouragement of associations with deviant peers (e.g., applying significant sanctions). Likewise, under the guidance of the therapist, the parents often develop strategies to monitor and promote the youth's school performance; interventions in this domain typically focus on establishing improved communication between parents and teachers and on restructuring after-school hours to promote academic efforts. Finally, in some cases, individual interventions are used with the youth or parent to modify the individual's social perspective-taking skills, belief system, or attitudes that contributed to sexual offending.

As with MST for nonsexual offenders, clinical services in the present study were provided in home, school, and/or neighborhood settings at times convenient to the family. Youths and their families received multiple contacts each week (about 3 hr of intervention per week across family, school, peer, and individual systems). Therapists were available to respond to clinical problems 24 hr a day, 7 days a week.

Usual Community Services

All of the offenders in this condition received cognitive-behavioral group and individual treatment through the local juvenile court. The therapy provided in this condition represented the usual community (i.e., outpatient) treatment for juvenile sexual offenders in our judicial district and in many other judicial districts as well.² Youths attended group treatment for 90 min twice a week and individual treatment for 60–90 min once a week. Group treatment (with 4–6 youths) focused on having each youth (a) accept personal responsibility for his or her sexual offense(s), (b) eliminate deviant cognitions, (c) learn new social skills (including anger management), (d) develop victim awareness and empathy, and (e) engage in behaviors and thoughts that prevent relapse. Individual treatment was provided by a different therapist from the group leader and was designed to address barriers and reinforce progress in meeting group treatment goals. Youths also kept personal journals to review during their individual therapy meetings to better understand the connection between their thoughts and behaviors. The interventions were not manual driven; the thera-

² In a nationwide survey of community-based programs for adolescent sexual offenders, McGrath et al. (2003) reported that 91% of the programs ($N = 418$) used a cognitive-behavioral model of intervention with an emphasis on relapse prevention.

pists had discretion in the selection of material and in deciding when youths had completed treatment.

Therapists

MST was provided by two female and four male graduate students (ages 23–30 years, $M = 26$) in clinical psychology. All of the therapists were White, and one had Hispanic ethnicity. Each had approximately 1.5 years of direct clinical experience with children or adolescents. The six therapists served in the study for an average of 21 months and had caseloads that included both juvenile sexual offenders (participants in the present study) and nonsexual offenders.

Interventions in the UCS group were provided by one female and four male therapists (ages 26–36 years, $M = 31$) employed by the treatment services branch of the juvenile court. All of the therapists were White. Each therapist had a master's degree in counseling psychology, clinical psychology, or social work and had approximately 6 years of direct clinical experience with adolescents. The five therapists served in the study for an average of 17 months.

Treatment Fidelity

To sustain the fidelity of MST, therapists received training in the MST model and ongoing quality assurance. Included were an initial orientation, 3-hr weekly group supervision, and individual supervision as needed. Therapist supervision was provided by Charles M. Borduin throughout the course of the investigation. Group supervision was task oriented and focused on reviewing the goals and progress of each case and designing plans to overcome any barriers to obtaining strong treatment adherence and favorable outcomes. The therapists and supervisor also observed and discussed selected videotaped therapy sessions each week to promote intervention skills and adherence to MST treatment principles. Completion of treatment occurred when the therapist and family agreed that goals had been met and that ecological supports to sustain clinical gains were in place.

The therapists in the UCS condition had been certified as juvenile sexual offender counselors through a university-based training program. To monitor the integrity of interventions and promote adherence to treatment plans, the therapists attended weekly case reviews with the treatment coordinator from the juvenile court. The therapists were also required to provide weekly reports summarizing the nature of therapeutic contacts, who was present at the contacts, and youth progress in meeting treatment goals. Youths completed treatment when the therapists and treatment coordinator judged that treatment goals had been met.

At the time of the study, a standard measure of therapist adherence to MST was not yet developed. However, the therapists in the MST condition completed a summary for each of their cases to indicate the systems directly addressed during the course of treatment (i.e., individual, marital, family, peer, school) and the general issues addressed in each identified system. These summaries revealed that all of the MST cases had received interventions in three (most often family, school, and peer) or more systems. In the UCS condition, therapist and supervisor reports indicated that services remained office based (with little or no community outreach) and focused on the individual youth rather than on the systems in which the youth was embedded.

Research Procedures

All families who were referred to the project were initially contacted by phone or a home visit by a research assistant (uninformed as to treatment condition). Families were informed that 2-hr research assessments would be conducted shortly before treatment began and shortly after treatment had ended. It was emphasized that the family's participation in the research was voluntary and that refusal to participate (or exercising the right to discontinue participation at any time) would not jeopardize the receipt of treatment services or result in any sanctions from the court. The youths remained under the jurisdiction of the court regardless of their families' decisions about participating in the research assessments or in randomization to treatment conditions. Family members provided written consent or assent to the research procedures. All procedures were approved by the Institutional Review Board of the University of Missouri.

Research assistants were trained to standardize the assessment procedures and to recognize and attenuate circumstances (e.g., fatigue, reading problems) that threatened the validity of the assessments. The pretreatment assessment session was scheduled at the family's convenience either in their home or in a meeting room at the juvenile office; the vast majority (94%) of the families in the MST and UCS groups completed the assessment in their homes. Self-report instruments and behavior-rating inventories were administered in a random order to the parent(s) and youth. Following completion of the battery, a sealed envelope was opened, and the family was informed of the treatment condition to which they were assigned.

The posttreatment assessment was conducted at the same location and with the same measures as the pretreatment assessment within 1 week of the completion of treatment. One of the youth's teachers also completed a paper-and-pencil instrument before and after treatment. The teacher was randomly selected and told that the youth was a participant in a study of teen socialization. Follow-up assessments using police and court records of juvenile and adult criminal activity were conducted an average of 8.9 years after treatment had been completed.

Participants' juvenile and adult criminal records were obtained within the state of Missouri.³ It was necessary to determine whether each participant had continued to live in Missouri since the time of release from treatment and, thus, whether he or she was available to have an arrest record in the state after that time. For those individuals whose names did not appear in local juvenile office or state criminal records, we conducted a search of Missouri driver's license records. For several remaining individuals for whom there were no arrest records or driver's license records, we confirmed Missouri residency by contacting their parents (using original phone numbers and addresses). Overall, 100% ($N = 48$) of the sample was located and determined to have lived in the state during the follow-up period.

³ A broader search of criminal records in other states was not possible because fingerprints would have been required to conduct a national criminal records check, and these were not obtained at the time of consent to participate.

Outcome Measures

A multiagent assessment battery was used to obtain outcome measures related to the instrumental and ultimate goals of MST. Instrumental goals, which are theory driven, included improved individual adjustment of the youth and parent(s), improved family relations, improved relations between the youth and his or her peers, and improved grades in school for the youth. Ultimate goals, common to all treatments of juvenile sexual offenders, included decreases in rates of posttreatment criminal activity (i.e., sexual and nonsexual offending) and incarceration.

Individual Adjustment

Psychiatric symptoms. Symptoms in mothers, fathers (when present), and youths were assessed by the Global Severity Index (GSI) of the Brief Symptom Inventory (BSI; Derogatis, 1993). The GSI is considered the best single index of respondent emotional distress and is formed by summing scores across items and dividing by the total number of items. The 53 self-report items of the BSI are rated on a scale ranging from 0 (*not bothered in the previous week by the symptom*) to 4 (*extremely bothered by that symptom*).

Youth behavior problems. Behavior problems in youths were assessed through mother and father reports (total score) on the 89-item Revised Behavior Problem Checklist (RBPC; Quay & Peterson, 1987). The measure discriminates between violent and nonviolent juvenile offenders (Blaske, Borduin, Henggeler, & Mann, 1989) and predicts serious offense history in delinquent youths (C. L. Hanson, Henggeler, Haefele, & Rodick, 1984). Item scores range from 0 (*no problem*) to 2 (*severe problem*). In two-parent families, the mother's and father's individual ratings scores were averaged together.

Family Relations

Mother, father (when present), and youth perceptions of family relations were evaluated with the 30-item Family Adaptability and Cohesion Evaluation Scales II (FACES-II; Olson, Portner, & Bell, 1982), which assesses the constructs of *cohesion* and *adaptability*. The Likert-type items are rated on a scale from 1 (*almost never*) to 5 (*almost always*). Parent and youth ratings were highly correlated (mean intraclass correlations = .92 for adaptability and .95 for cohesion) and thus were averaged together to form composites.

Peer Relations

Parent, youth, and teacher perceptions of the youth's peer relations were evaluated with the 13-item Missouri Peer Relations Inventory (MPRI; Borduin, Blaske, Cone, Mann, & Hazelrigg, 1989). The MPRI measures three factor-analytically derived dimensions of peer relations: *emotional bonding*, *aggression*, and *social maturity*; the construct validity of these dimensions has been supported in studies of serious juvenile offenders (e.g., Blaske et al., 1989). Item scores range from 1 (*rarely*) to 5 (*often*). Given high intercorrelations between parent and teacher ratings on these dimensions (mean intraclass correlation = .69), their scores were averaged together to form composites; youth ratings had low correlations with parent and teacher ratings and thus were evaluated separately.

School Grades

Parent and teacher reports of youth grades were obtained across five content areas (English, math, social studies, science, and other) using 5-point Likert scales ranging from 0 (*grade of F*) to 4 (*grade of A*). Grades were averaged across content areas. Parent and teacher ratings were highly correlated (mean intraclass correlation = .76) and thus were averaged to form a composite.

Criminal Activity and Incarceration

Self-report of delinquent behavior. Youth reports on the Self-Report Delinquency Scale (SRD; Elliott, Ageton, Huizinga, Knowles, & Canter, 1983) were used to assess criminal activity during the previous 3 months. The 40-item SRD, used in the National Youth Survey, is one of the best validated measures of delinquent behavior and includes a summary measure of the number of person-related crimes (e.g., assault, armed robbery) and property-related crimes (e.g., vandalism, stealing a car) committed by the youth. Elliott et al. (1983) reported that test-retest reliabilities for SRD subscales range from .80 to .99, and the discriminant validity and predictive validity have been supported with chronic and serious offenders (Dunford & Elliott, 1984).

Arrests. Youths' criminal arrest data were obtained yearly from juvenile office records by research assistants who were uninformed as to each participant's treatment condition. Adult criminal arrest data were obtained from a computerized database by a state police employee (also uninformed as to treatment condition) who conducted a search by participant name. Dates of all juvenile and adult arrests were recorded to ensure that arrest information was not duplicated. For both juvenile and adult arrest records, only substantiated arrests for index offenses were included (i.e., charges that were dismissed at trial were excluded). The average length of the follow-up period was 8.9 years ($SD = 1.02$; range = 7.31 to 10.64 years).

Each arrest was coded as having taken place during the follow-up period if it occurred after the date of the posttreatment assessment (or, if a posttreatment assessment was not completed, then after the date of termination from treatment). In addition, each arrest was classified as either a sexual (e.g., rape, child molestation) or a nonsexual offense (e.g., breaking and entering, physical assault, distribution of cocaine); these categories were mutually exclusive. Juvenile and adult arrest data were combined in analyses to provide a complete record of all arrests (i.e., number and type) during the follow-up period.

Incarceration. Information about punitive sentencing also was obtained for each juvenile and adult offense. Juvenile incarceration was measured as the number of days that a youth was placed by the Department of Youth Services in a residential facility. Adult incarceration was measured as the number of days that a participant was sentenced to serve in an adult correctional facility.⁴ Because adult sentencing was done prospectively, the length of some participants' sentences exceeded the length of their follow-up period. Juvenile and

⁴ Participants may have served fewer days in adult correctional facilities than actually sentenced, given that most convicted persons do not serve the entire length of their original sentences (Hughes, James-Wilson, & Beck, 2001).

adult incarceration data were combined to provide a composite index of confinement during follow-up.

Results

Pretreatment Comparability of Treatment Groups

Analyses were completed to examine whether subjects assigned to MST ($n = 24$) and those assigned to UCS ($n = 24$) differed at pretreatment on measures of individual adjustment, family relations, peer relations, or youth self-reports of delinquent behavior (as noted previously, these groups did not differ on pretreatment arrest histories or demographic characteristics). Averaged caregiver reports indicated that MST youths had more behavior problems ($M = 48.32$) than did UCS youths ($M = 31.88$), $F(1, 45) = 7.56$, $p < .01$, $\eta^2 = .11$. No other between-groups differences were observed.

Treatment Outcomes

Instrumental Outcomes

ANOVAs were used to evaluate whether significant changes over the course of treatment were experienced by the 24 MST youths/families or 22 UCS youths/families who completed pre- and posttreatment assessments. Table 1 presents the means and standard deviations for the measures of instrumental outcomes at pre- and posttreatment assessments. The results of the ANOVAs for the effect of time and for the interaction between treatment group and time are shown in Table 1. To control for the family-wise (Type I) error rate, we used Bonferroni-corrected alpha levels for $p < .05$ when there were multiple constructs within a given domain of functioning (i.e., family or peer relations). Effect sizes (η^2) for tests of instrumental outcomes ranged from .05 to .53 ($M = .30$), suggesting small to moderate effects (J. Cohen, 1977) for the Treatment Group \times Time interactions overall. The following discussion addresses the results of the ANOVAs that showed a significant interaction effect, with within-group t tests used to evaluate change over time for each group.

Individual adjustment. As shown in Table 1, significant Group \times Time interaction effects were found for mothers', fathers', and youths' reports of psychiatric symptoms (BSI-GSI); participants in the MST group showed decreases in their symptoms from pre- to posttreatment, whereas their counterparts in the UCS group showed increases in their symptoms. In addition, a significant interaction effect emerged for parents' reports of youth behavior problems (RBPC); parents in the MST group reported a decrease in youth behavior problems from pre- to posttreatment, whereas parents of UCS youths reported an increase in behavior problems.

Family relations. Significant interaction effects were observed for both measures of perceived family functioning (FACES-II). Families receiving MST reported increases in cohesion and adaptability at posttreatment, whereas reported cohesion and adaptability decreased in the UCS condition.

Peer relations. Significant interaction effects were observed for measures of youth emotional bonding to peers and social maturity with peers (MPRI). Parents and teachers (composite measure) and youths reported increases in emotional bonding

and social maturity from pre- to posttreatment for youths in the MST condition, whereas peer bonding and social maturity decreased over time for youths in the UCS condition. Parents and teachers (composite measure) of youths receiving MST also reported decreases in youth aggression toward peers at posttreatment, whereas parents and teachers of UCS youths reported increases.

School grades. Significant interaction effects also were observed for parent and teacher reports (composite measure) of youths' grades. Parents and teachers of youths in the MST condition reported increases in youths' grades at posttreatment, whereas parents and teachers of UCS youths reported decreases in grades.

Ultimate Outcomes

Measures of ultimate outcome were based on youths' reports on the SRD (pre- to posttreatment changes) and on arrest data that were collected during follow-up. Effect sizes for tests of ultimate outcomes ranged from .04 to .39 ($M = .21$), suggesting small to moderate effects. Differences in the lengths of follow-up periods were controlled for in all analyses of arrests and incarceration.

Self-report of delinquent behavior. Repeated measures ANOVAs were used to evaluate whether significant pre to post changes on the SRD were experienced by the 24 MST youths or the 22 UCS youths who completed pre- and posttreatment assessments. As shown in Table 2, youths receiving MST reported decreases in person and property crimes from pre- to posttreatment, whereas youths receiving UCS reported increases.

Arrests and incarceration. We evaluated whether the MST and UCS groups differed on the number of arrests for sexual and nonsexual crimes at follow-up and the number of days incarcerated. Because these recidivism variables are continuous and non-normal, they can be considered censored-dependent variables (Greene, 1993), containing both a qualitative (i.e., arrested vs. not arrested) and a quantitative (i.e., number of arrests among recidivists) component. Accordingly, Tobit regression analyses (based on the STATA 9.0 statistical package; StataCorp, 2005), which used maximum-likelihood estimation procedures and a corresponding chi-square test statistic, were used to estimate differences between groups on these measures.⁵

As shown in Table 2, MST participants had 83% fewer arrests for sexual crimes and 70% fewer arrests for other crimes than did their UCS counterparts. MST participants also spent 80% fewer days in detention facilities than did UCS participants.

Survival functions. Survival analysis (SPSS Version 14 for Windows) was used to obtain the cumulative survival functions (or survival curves) for participants who received either MST or UCS, whose average follow-up periods were 3,254.67 and 3,279.58 days, respectively. The cumulative survival function

⁵ The use of ordinary least squares regression is inappropriate for censored-dependent variables because the relationship between an independent variable and a censored-dependent variable is inherently nonlinear (Greene, 1993; Tobin, 1958). Common data transformation techniques also are inappropriate with such variables. To avoid these transformation problems, researchers have applied Tobit regression to many types of nonnormal variables, including measures of substance abuse (e.g., Frone, Cooper, & Russell, 1994) and health status (e.g., Grootendorst, 2000).

Table 1
Means, Standard Deviations, and Significance Tests for MST and UCS Treatment Conditions on Measures of Instrumental Outcomes

Measure	MST		UCS		Repeated ANOVA <i>F</i>		
	Pre	Post	Pre	Post	Time	Group × Time	η^2
Individual adjustment							
BSI-GSI							
Mother							
<i>M</i>	0.75	0.38 ^a	0.53	0.89 ^b	0.01	20.24 ^{***}	.348
<i>SD</i>	0.64	0.63	0.36	0.71			
Father							
<i>M</i>	0.58	0.27 ^a	0.68	1.24 ^b	0.00	5.31 [*]	.306
<i>SD</i>	0.48	0.19	0.61	1.39			
Youth							
<i>M</i>	0.82	0.40 ^a	0.56	0.82 ^b	0.06	18.04 ^{***}	.303
<i>SD</i>	0.68	0.41	0.49	0.51			
RBPC: Parent report							
<i>M</i>	45.40	21.11 ^a	31.66	42.21 ^b	0.00	35.11 [*]	.461
<i>SD</i>	14.88	17.19	23.95	26.17			
Family relations							
FACES-II: Parent and youth reports (mean)							
Cohesion							
<i>M</i>	45.74	53.58 ^b	50.91	47.42 ^a	0.05	28.64 ^{***}	.410
<i>SD</i>	12.62	10.63	12.67	14.88			
Adaptability							
<i>M</i>	33.11	41.47 ^b	40.10	35.91 ^a	0.02	34.05 ^{***}	.450
<i>SD</i>	13.83	12.36	12.96	13.45			
Peer relations							
MPRI: Parent and teacher reports (mean)							
Emotional bonding							
<i>M</i>	12.28	15.19 ^b	12.79	10.95 ^a	0.13	11.56 ^{**}	.220
<i>SD</i>	3.99	3.02	2.91	3.02			
Aggression							
<i>M</i>	12.92	9.12 ^a	12.08	14.21 ^b	0.29	9.25 ^{**}	.184
<i>SD</i>	2.50	3.23	3.72	3.63			
Social maturity							
<i>M</i>	8.65	10.80 ^b	9.78	8.10 ^a	1.20	24.12 ^{***}	.370
<i>SD</i>	2.54	2.32	1.91	2.23			
MPRI: Youth report							
Emotional bonding							
<i>M</i>	12.83	14.05 ^b	13.10	12.27 ^a	0.12	9.90 ^{**}	.176
<i>SD</i>	2.05	1.61	2.48	2.44			
Aggression							
<i>M</i>	11.23	10.89	11.96	12.84	0.00	1.99	.050
<i>SD</i>	2.26	2.14	2.27	2.12			
Social maturity							
<i>M</i>	11.04	12.30 ^b	10.62	9.81 ^a	0.05	7.09 ^{**}	.141
<i>SD</i>	2.34	1.77	2.46	2.27			
School grades							
Parent and teacher reports (mean)							
<i>M</i>	1.67	2.49 ^b	1.85	1.22 ^a	0.94	18.83 ^{***}	.326
<i>SD</i>	0.77	0.99	1.06	1.06			

Note. Raw score means are reported for all measures. The univariate *d*'s for each measure are as follows: mother BSI (1, 39); father BSI (1, 19); youth BSI (1, 38); FACES-II subscales (1, 44); RBPC and youth MPRI subscales (1, 42); parent and teacher MPRI subscales and grades (1, 41). The Bonferroni-corrected alpha levels for $p < .05$ were as follows: FACES-II subscales, $p = .025$; MPRI subscales across respondents and subscales, $p = .008$. Thus, for these measures, only the *F* values with a double or triple asterisk met the adjusted level. Average effect size (η^2) for all tests of instrumental outcomes was .30; average achieved power was .81. MST = multisystemic therapy; USC = usual community services; ANOVA = analysis of variance; Pre = pretreatment; Post = posttreatment; BSI-GSI = Brief Symptom Inventory-Global Severity Index; RBPC = Revised Behavior Problem Checklist; FACES-II = Family Adaptability and Cohesion Evaluation Scales II; MPRI = Missouri Peer Relations Inventory.

^a Significant decrease from pretreatment to posttreatment. ^b Significant increase from pretreatment to posttreatment.

* $p < .05$. ** $p < .008$. *** $p < .001$.

Table 2

Means, Standard Deviations, and Tests of Significance for MST and UCS Treatment Conditions on Measures of Ultimate Outcomes

Measure	MST			UCS			Analyses		
	Pre	Post	Follow-up	Pre	Post	Follow-up	Group \times Time F	χ^2	η^2
Criminal activity									
Person									
<i>M</i>	4.86	1.38 ^a		4.55	7.98 ^b		24.59 ^{***}		.387
<i>SD</i>	5.53	1.83		7.50	9.35				
Property									
<i>M</i>	13.62	2.90 ^a		20.27	30.85 ^b		23.71 ^{***}		.378
<i>SD</i>	17.20	3.28		38.59	46.09				
Arrests									
Sexual crimes									
<i>M</i>			0.13			0.79		17.36 ^{***}	.155
<i>SD</i>			0.34			1.02			
Other crimes									
<i>M</i>			1.46			4.88		13.13 ^{***}	.037
<i>SD</i>			3.27			8.24			
Incarceration									
<i>M</i>			393.42			1,942.50		11.17 ^{**}	.086
<i>SD</i>			1,221.11			3,121.04			

Note. Criminal activity and arrest variables are reported as numbers of offenses; incarceration is reported as number of days. Criminal activity is measured on the Self-Report Delinquency Scale (SRD); the univariate *dfs* for the SRD subscales are 1, 39. Chi-square values for arrest and incarceration data are based on Tobit regression analyses ($df = 2$). Average effect size (η^2) for all tests was .21; average achieved power was .99. MST = multisystemic therapy; UCS = usual community services; Pre = pretreatment; Post = posttreatment.

^a Significant decrease from pretreatment to posttreatment. ^b Significant increase from pretreatment to posttreatment.

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

represents the proportion of participants who survived any type of arrest (i.e., were not arrested) in each group by the length of time (in days) from the release from treatment. A log-rank test

(using the Kaplan–Meier estimator) revealed that the survival functions for the two groups were significantly different, $\chi^2(1, N = 48) = 8.17, p < .01$. As depicted in Figure 2, MST

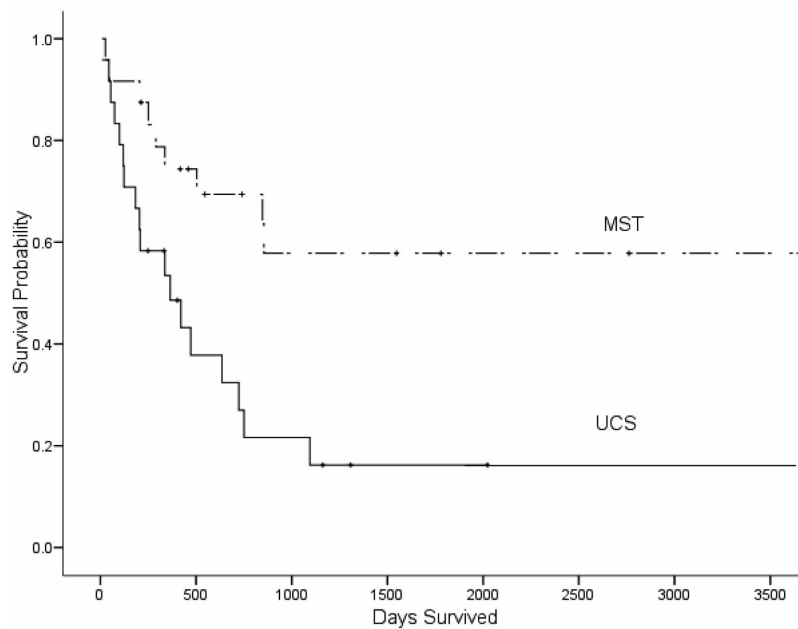


Figure 2. Survival functions for multisystemic therapy (MST) and usual community services (UCS) groups for any offense. The survival probability represents the proportion of participants who were not arrested for any type of offense in each group by the length of time (in days) from the end of treatment.

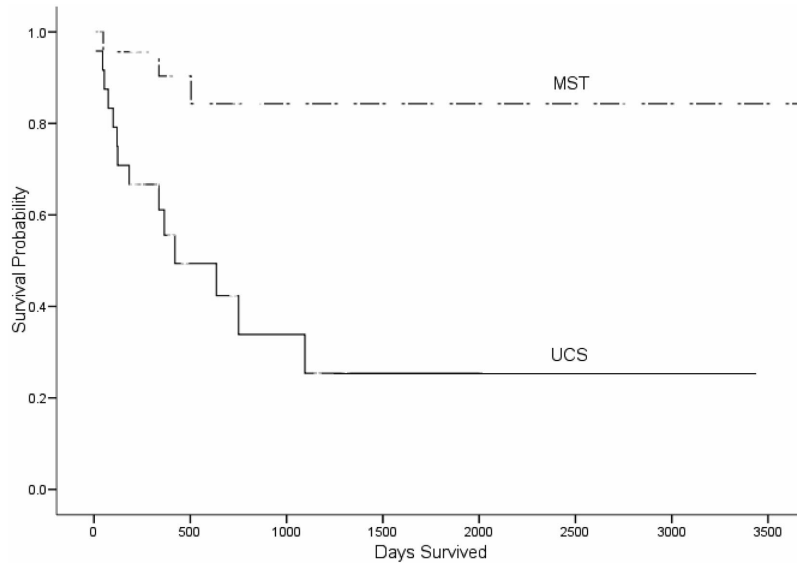


Figure 3. Survival functions for multisystemic therapy (MST) and usual community services (UCS) groups for a sexual offense. The survival probability represents the proportion of participants who were not arrested for a sexual offense in each group by the length of time (in days) from the end of treatment.

participants were at lower risk of rearrest (i.e., more likely to “survive”) during the follow-up than were UCS participants. By the end of 8.9 years (3,267.13 days), 75.0% of participants in the UCS group had been arrested at least once, compared with 29.2% of MST participants. To determine an effect size for this survival function, we performed a Cox proportional hazards

regression. The hazards ratio (β) for treatment condition was .325 ($p = .007$), suggesting a medium effect size for MST.

Survival analyses also were conducted to examine between-groups differences on time to first arrest for various types of offenses. As depicted in Figures 3 and 4, respectively, MST participants were at lower risk for sexual offenses, $\chi^2(1, N =$

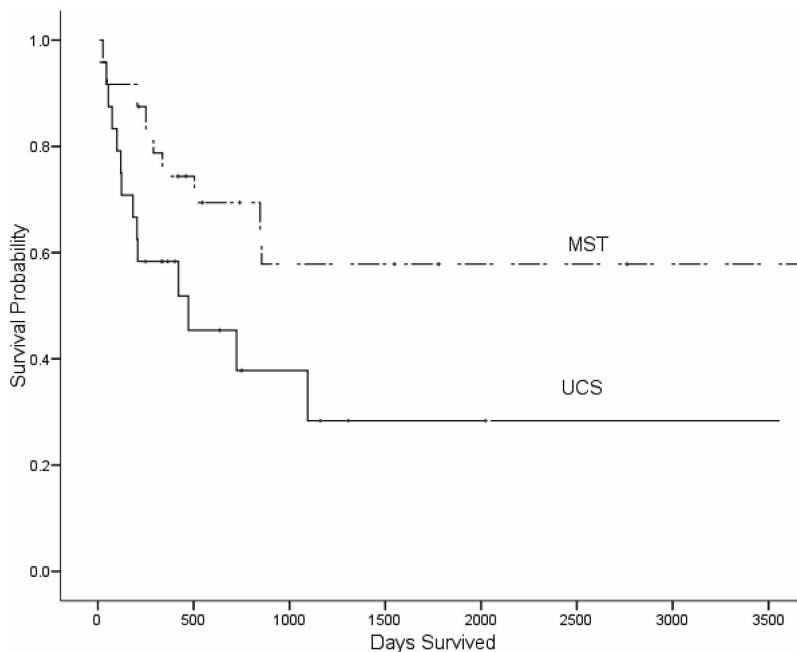


Figure 4. Survival functions for multisystemic therapy (MST) and usual community services (UCS) groups for a nonsexual offense. The survival probability represents the proportion of participants who were not arrested for a nonsexual offense in each group by the length of time (in days) from the end of treatment.

48) = 11.80, $p < .001$, and nonsexual offenses, $\chi^2(1, N = 48) = 3.94$, $p < .05$, during follow-up. By the end of 8.9 years, 45.8% of UCS participants had been arrested at least once for a sexual crime and 58.3% had been arrested for a nonsexual crime, compared with 8.3% and 29.2%, respectively, of MST participants. Cox proportional hazards tests showed small to medium effect sizes for MST versus UCS (sexual offenses, $\beta = .124$, $p = .007$; nonsexual offenses, $\beta = .433$, $p = .050$).

Discussion

The current study clearly demonstrates the impact of MST on key social–ecological correlates of juvenile sexual offending and on individual adjustment in family members. At posttest, MST had favorable effects on family relations (increased cohesion and adaptability), peer relations (increased emotional bonding and social maturity, decreased aggression), and academic performance (improved grades). Moreover, MST resulted in decreased symptoms in parents and youths (self-reports) and decreased behavior problems in youths (parent reports). Most importantly, MST produced both short- and long-term changes in youths' criminal behaviors and incarceration. Youths treated with MST reported decreases in person and property crimes at posttest and were less likely to be rearrested for sexual and nonsexual crimes within the 8.9-year follow-up period than were youths who received UCS. In addition, MST participants spent 80% fewer days incarcerated than did their UCS counterparts.

The findings replicate and extend those of a smaller randomized clinical trial of MST with a different sample of juvenile sexual offenders. In that study, 12.5% of MST participants had been rearrested for a sexual crime and 25% had been rearrested for a nonsexual crime within 3 years after treatment termination (Borduin et al., 1990). The current clinical trial used a longer follow-up period (by 5.9 years) yet found that MST participants had recidivism rates (8.3% for sexual crimes, 29.2% for nonsexual crimes) that were similar to those in the previous trial. Viewed together, the results of these studies are encouraging and suggest that the effects of MST on sexual and nonsexual offending may persist into early adulthood.

The relative efficacy of MST in reducing criminal activity in juvenile sexual offenders has important implications regarding the design of treatment programs for such youths. Indeed, the results of MST may be due in part to its explicit focus on ameliorating key social–ecological risk factors that are related to problem sexual behaviors and that place youths on a developmental pathway (or pathways) for sexual offending. That is, MST may have been relatively effective because interventions (a) targeted important socialization processes that contributed to or maintained problem sexual behaviors and (b) promoted healthier (i.e., prosocial, strength-focused, and age-appropriate) interpersonal transactions in family, peer, and school contexts. Although an examination of specific mechanisms of change was beyond the scope of this study, it is possible that improved family support, peer relations, and academic performance allowed MST participants to experience increased success in accomplishing educational, occupational, and other important developmental tasks (e.g., the formation of healthy romantic relationships) during late adolescence and early adulthood. We suggest that a major limitation of typical treatments for juvenile

sexual offending is their relatively narrow focus and failure to account for the multidetermined nature of problem sexual behaviors and other serious antisocial behaviors.

A second implication of our findings for the design of treatment programs for juvenile sexual offenders pertains to the accessibility and ecological validity of services. Traditionally, mental health services for juvenile sexual offenders either have been inaccessible (i.e., office based) or have provided interventions that have little bearing on the natural ecology of youths (e.g., residential treatment centers, incarceration). In contrast, MST, with its family preservation model of service delivery, is provided in natural community contexts (e.g., home, school, recreation center). The delivery of services in the natural ecology of juvenile sexual offenders has several advantages, including the promotion of family engagement and acceptance of responsibility for the sexual offense, the development of comprehensive and effective safety and relapse prevention plans, and the acquisition of more accurate data regarding the assessment of identified problems (e.g., patterns of family sexuality, difficulties in peer relations) and the results of interventions. In fact, there is a growing consensus that providers of children's mental health services should recognize the natural ecology of the child and diminish barriers to service access (e.g., Burns & Hoagwood, 2002; Snell-Johns, Mendez, & Smith, 2004).

At the policy level, the findings also have implications for the potential cost savings and fiscal viability of MST with juvenile sexual offenders. For almost 9 years of follow-up, MST reduced the rate of incarceration by an average of 174.1 days per year. An economic evaluation of taxpayer and crime victim benefits with this sample indicated a total cost–benefit of \$182,789 for each youth receiving MST, or a benefit-to-cost ratio of \$38.52 for every dollar spent on MST (Klietz, Borduin, & Schaeffer, 2007). Nevertheless, to conclude with greater confidence that the MST delivered in the present study was less costly than UCS, we need a broader assessment of service utilization across various sectors (e.g., mental health, juvenile justice, social welfare) to more fully explicate the types of services received by these youths and to explore whether costs shifted.

Several limitations should be noted. First, although we are suggesting that the favorable results of this study may have been due to two crucial aspects of MST (i.e., its comprehensive nature and ecologically valid delivery), it must be noted that the design of this study confounds the examination of this issue, as the comparison treatment (i.e., office-based group and individual therapy) was neither comprehensive nor delivered in youths' natural ecologies. A study, for example, that compared MST with a less comprehensive home-based treatment would address the issue of whether both comprehensiveness and ecological validity are necessary conditions of success. Second, because the therapists were not randomly assigned to treatment conditions, it is possible that therapist characteristics such as motivation, commitment, social facility, and flexibility were confounded in this study. Even so, one can safely assume that these characteristics are not sufficient for favorable outcomes with juvenile sexual offenders. Third, although we were able to confirm that all of the youths were living in Missouri at the time of follow-up, we were unable to confirm that youths maintained continuous residence in Missouri throughout the follow-up period and cannot rule out the possibility that a portion of youths may have committed crimes in other states. However, it seems

unlikely that residency length or crimes committed outside the state would vary systematically across treatment conditions. Fourth, resources were not available to track treatment utilization by participants during the follow-up period, and thus we do not know how other treatment services may have contributed to the between-groups differences that were observed in ultimate outcomes. Finally, it must be noted that the MST therapists were graduate students and that the supervisor was an expert in the MST model, thus limiting the generalizability (external validity) of the findings. Another project (Letourneau et al., 2008) is using clinicians and a supervisor from a community provider agency to deliver MST to juvenile sexual offenders.

In summary, the results of this study indicate that a comprehensive intervention, addressing the multiple determinants of sexual offending in youths' naturally occurring systems, can successfully reduce sexual and nonsexual criminal activity in juvenile sexual offenders at high risk of committing additional serious crimes. When considered along with other findings regarding MST (e.g., Aos, Phipps, Barnoski, & Lieb, 2001; Curtis et al., 2004), recommendations from national (Center for Sex Offender Management, 2006) and international (e.g., Miner et al., 2006) organizations, and conclusions from recent reviews (e.g., Weisz, Sandler, Durlak, & Anton, 2005), the present findings suggest that family- and community-based interventions, especially those with an already established evidence base in treating adolescent antisocial behavior, hold considerable promise in meeting the clinical needs of juvenile sexual offenders. The clinical effectiveness of MST, as well as possible cost effectiveness, should be considered by policymakers and the public at large in the selection of interventions for juvenile sexual offenders.

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