

MULTISYSTEMIC THERAPY ACROSS THE LIFESPAN:
A 21.9-YEAR FOLLOW-UP TO A RANDOMIZED CLINICAL TRIAL
WITH SERIOUS AND VIOLENT JUVENILE OFFENDERS

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MULTISYSTEMIC THERAPY ACROSS THE LIFESPAN:
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Abstract

In this study, we examined the long-term criminal and civil court outcomes of 176 serious and violent juvenile offenders who had participated in either multisystemic therapy (MST) or individual therapy (IT) in a randomized clinical trial (Borduin et al., 1995). Data on criminal arrests, incarceration, and civil court involvement were obtained on average 21.9 years (range 18.3– 23.8) after treatment completion when participants were on average 37.3 years old. Results showed that MST participants had significantly lower recidivism rates than IT participants for violent crimes (23.2% vs. 39.2%, respectively) and for all felony class crimes (39.5% vs. 58.2%, respectively). Additionally, MST participants were involved in fewer civil court suits related to family instability (e.g., divorces, paternity suits). The present study represents the longest and most comprehensive follow-up to date of a MST clinical trial and suggests that MST is relatively effective in reducing long-term criminal activity among serious and violent juvenile offenders.

Multisystemic Therapy Across the Lifespan: A 21.9-Year Follow-Up to a Randomized Clinical Trial With Serious and Violent Juvenile Offenders

Serious and violent juvenile offenders are at risk for a variety of long-term negative outcomes, including continued criminal behavior, low educational attainment, physical and mental health problems, and interpersonal and financial problems (Bardone, Moffitt, Caspi, & Dickson, 1996; Moffitt, Caspi, Harrington, Milne, 2002; Shepherd, Farrington, & Potts, 2004). Moreover, the offenses committed by these youths have harmful effects on the victims of crime as well as on the families of offenders (e.g., Arditti, Lambert-Shute, & Joest, 2003; Robinson & Keithley, 2000). When these harmful effects are translated into dollar amounts and combined with criminal justice system costs (e.g., incarceration), the financial impact of continued offending is estimated at more than one million dollars over the lifetime of a single offender (Cohen, 1998). Thus, there is a critical need for treatments that effectively reduce serious juvenile offending and prevent the continuation of criminal offending into adulthood.

Research indicates that effective treatments for serious juvenile offenders are delivered in community settings (e.g., home, school, neighborhood) and address a broad range of correlates and causes of youth antisocial behavior (Borduin, 2007; Lipsey, 1992; National Institutes of Health, 2006). Unfortunately, however, most treatments for juvenile offenders have been provided outside of the community (i.e., in institutional and residential settings) and have been narrow in scope (i.e., focusing primarily on the individual youth and not on the youth's family and other key social systems). Consequently, treatments have often resulted in minimal short-term reductions in offending or have even led to increases in offending (Dodge, Dishion, & Lansford, 2006;

Kazdin, 2000; Lipsey, 1992). Furthermore, little is known about the impact of treatments for juvenile offenders on continued offending in adulthood.

Multisystemic therapy (MST) is one of a small number of promising treatments for serious juvenile offenders (for reviews, see Bor, 2004; Cottrell & Boston, 2002; Kazdin, 2000; National Institutes of Health, 2006). MST is an intensive, family- and community-based treatment that addresses the multidetermined nature of juvenile offending within a social-ecological systems framework (Bronfenbrenner, 1986; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998). Across studies, MST treatment developers (C. M. Borduin & S. W. Henggeler) and others (e.g., Ogden & Halliday-Boykins, 2004; Timmons-Mitchell, Bender, Kishna, & Mitchell, 2006) have demonstrated that MST leads to improved functioning on key psychosocial correlates of delinquency (i.e., individual, family, peer, and school) from pre- to posttreatment assessments (see also Curtis, Ronan, & Borduin, 2004). In addition, multiple studies have demonstrated long-term reductions in the number and seriousness of criminal arrests for MST participants versus alternative treatment participants over follow-up periods ranging from 4 years (Borduin et al., 1995; Henggeler, Clingempeel, Brondino, & Pickrel, 2002) to 13.7 years after treatment completion (Schaeffer & Borduin, 2005). Indeed, Schaeffer and Borduin (2005) reported that MST participants had been sentenced to fewer days of incarceration (582 vs. 1357 days, respectively) and were less likely to have been convicted of a felony (50% vs. 81%, respectively) than were alternative treatment (i.e., individual therapy) participants. These findings corresponded to a cumulative net present value of approximately \$200,000 in cost savings per MST participant (Klietz, Borduin, & Schaeffer, 2008).

Although the documented effects of MST on serious criminal offenses (i.e., felonies) extend well into adulthood, little is known about the potential influence of MST on other outcomes relevant to adult functioning. For example, there is some evidence that MST participants who recidivate following treatment are rearrested for less serious felony offenses than are individuals who recidivate following an alternative treatment (Borduin et al., 1995). However, we still know relatively little about the impact of MST on non-felony criminal offenses (i.e., misdemeanors). Such offenses might reflect continued albeit less serious engagement in antisocial lifestyles and engender significant victim and taxpayer costs. We also know relatively little about the impact of MST on non-criminal outcome measures such as civil court judgments. These measures might provide useful indexes of adult functioning in domains such as personal finances or interpersonal and family relations. By examining a wider range of criminal and non-criminal outcomes, we can provide a better picture of the long-term impact of MST on important areas of the lives of former participants.

The purpose of this study is twofold. First, this study follows up a sample of 176 serious and violent juvenile offenders who participated in treatment an average of 21.9 years earlier, thereby extending previous follow-ups (Borduin et al., 1995; Schaeffer & Borduin, 2005). Second, this study expands the range of outcome measures examined in previous follow-ups of MST to include non-criminal variables and less serious offenses (i.e., misdemeanors). The results of this study have implications for future refinements in the MST treatment model (i.e., to strengthen long-term outcomes). Furthermore, to the extent that MST outcomes are sustainable over long periods of time and across multiple domains, public policy expenditures on MST should be increased and should lead to

greater cost savings over alternative treatments. Prior to discussing the methodology of the present study, I will provide a more extensive review of relevant research.

Literature Review

MST targets serious and violent juvenile offenders. By virtue of the seriousness of their criminal behaviors, these youths are different from most other adolescents, who engage in relatively minor antisocial acts (Moffitt, 1993). The broad goals of MST are to expedite the process of desistance from crime for serious juvenile offenders and to place these youths on a more positive life trajectory (see Henggeler et al., 1998). To accomplish these goals in the short term, MST targets correlates and causes of delinquency and promotes prosocial behavior (e.g., engagement in education). The short-term benefits of MST, in turn, may carry forward into adulthood by reducing the negative outcomes associated with continued offending (e.g., disruption of educational progress, placement in institutions with deviant peers) and by facilitating accomplishment of adolescent developmental milestones (e.g., high school graduation) that serve as prerequisites to successful adult functioning (as indicated by stable employment, financial self-sufficiency, etc.).

The present study does not directly examine the mechanisms by which MST produces longer-term benefits for participants. However, to understand the rationale for the proposed study, it is necessary to examine three research areas related to likely mechanisms of longer-term changes: (1) correlates and causes of delinquency and antisocial behavior, (2) mechanisms of short-term change in MST, and (3) factors related to desistance from criminal offending.

Correlates and Causes of Delinquency and Antisocial Behavior

Several factors in youths' social ecologies, including those factors addressed by MST, are related to continuity in delinquency and antisocial behavior. At the level of the individual youth, characteristics such as impulsivity, aggressiveness, and lower intellectual functioning have been linked with antisocial behavior during adolescence (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Moffitt et al., 2002; Nagin, Farrington, & Moffitt, 1995; Rönkä & Pulkkinen, 1995). At the level of the family, factors such as parental mental health problems and substance abuse, poor parental monitoring, high levels of family conflict, and low levels of family support are related to adolescent antisocial behavior (Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006; Dishion & McMahon, 1998; Farrington, Barnes & Lambert, 1996; Ford, Goodman & Metzler, 2004; Formoso, Gonzales, & Aiken, 2000). Peer system correlates of antisocial behavior include association with deviant peers and peer reinforcement of antisocial acts and attitudes (Fergusson & Horwood, 1999; Garnier & Stein, 2002; Poulin, Dishion, & Haas, 1999). Academic correlates of antisocial behavior include poor grades and leaving school early (whether by choice or expulsion; Henry, Caspi, Moffitt, Harrington, & Silva, 1999). More distal correlates of antisocial behavior include neighborhood characteristics such as poverty and high crime rates (Eamon, 2001).

Importantly, many correlates and causes of delinquency and antisocial behavior in youth also predict problems in adulthood. For example, Rönkä and colleagues (Rönkä, Kinnunen & Pulkkinen, 2001; Rönkä & Pulkkinen, 1995) found that aggression measured at age 8 and school behavior problems and family adversity measured at age 14 predicted several intercorrelated problems for males at age 26 (e.g., alcohol abuse,

unstable careers, financial problems, and lower educational attainment). Problems at age 26, in turn, predicted subsequent difficulties at age 36 (e.g., criminal behavior, poor relationships, unemployment, and financial problems; Rönkä et al., 2001). Consistent with conclusions from other researchers (e.g., Moffit et al., 1996; Sampson & Laub, 1993), these researchers suggested that childhood and adolescent problems accumulate and build momentum for continued problems in adulthood.

Together, these findings suggest possible points of intervention (i.e., individual, family, school, peer) for treatment agents targeting criminal behavior. In addition, by addressing the correlates and causes of delinquency and antisocial behavior in youth, treatment agents may also be able to prevent numerous problems in adulthood, including criminal offending.

Mechanisms of Short-Term Change in MST

Several clinical trials point to possible mechanisms of change in MST. These studies demonstrate benefits for MST over alternative treatments in promoting positive changes in individual, family, peer, and school adjustment domains. For individual adjustment, MST has been shown to decrease criminal offending and antisocial behavior in youths and to decrease psychiatric symptomatology in youths as well as parents (Borduin et al., 1995; Borduin, Schaeffer, & Heiblum, in press; Ogden & Halliday-Boykins, 2004). For family functioning, benefits have been documented on both observational and self-report measures of family conflict, adaptability, cohesion, and warmth (Borduin et al., 1995; Huey, Henggeler, Brondino, & Pickrel, 2000; Mann, Borduin, Henggeler, & Blaske, 1990). Peer functioning benefits have included decreased aggression, increased emotional bonding, and increased social maturity in relationships

with friends (Borduin et al., in press; Henggeler, Melton, & Smith, 1992). For academic adjustment, benefits have been documented in attendance and grades (Borduin et al., in press; Brown, Henggeler, Schoenwald, Brondino, & Pickrel, 1999; Schaeffer, 2000).

Only a few studies have directly examined mechanisms of change in MST. One study demonstrated that both (a) decreased youth association with deviant peers and (b) increases in parental monitoring over the course of treatment were related to reduced offending in youths (Huey et al., 2000). In another study, increased supportiveness and decreased conflict in both father-adolescent and father-mother relations were related to decreased psychiatric symptomatology in fathers and adolescents over the course of treatment (Mann et al., 1990). The results of these studies and the aforementioned clinical trials point to likely mechanisms by which MST influences individual outcomes (i.e., criminal offending, psychiatric symptomatology) over relatively modest time periods (i.e., from pre- to posttreatment). Research on desistance from criminal offending provides additional insight into the likely mechanisms by which MST provides benefits over longer time periods.

Factors Related to Desistance from Criminal Behavior

Criminological research suggests that the vast majority of serious juvenile offenders continue offending into adulthood and then gradually age out of crime; more than half of these offenders have no new arrests for felonies by the time they reach 40 years of age (Laub & Sampson, 2001; Sampson & Laub, 2003). However, certain social factors appear to expedite the process of desistance from serious criminal offending. Sampson and Laub (1993) have theorized that key social factors during salient developmental time periods can serve as informal (i.e., naturally occurring) controls on

crime. In support of their theory, Sampson and Laub (1993, 2003; also Laub, Nagin, & Sampson, 1998) found that male juvenile offenders who reported close emotional bonds with parents and high levels of engagement in school were less likely to reoffend in adulthood. Similarly, when these individuals were young adults, those who reported having good marriages and stable jobs were less likely to engage in serious crimes later in adulthood.

Additional criminological and developmental studies provide further support for Sampson and Laub's work. For example, there is some evidence that, in general, adolescents who attend school regularly and have close relationships with prosocial peers or adults (e.g., parents, extended family members, teachers) are less likely to engage in antisocial behavior and more likely to show positive adjustment in domains such as education, work, and interpersonal relations in adulthood (DuBois & Silverthorn, 2005; Rhodes, 2002; Werner & Smith, 2001). In addition, research has indicated that being involved in a committed romantic relationship (e.g., marriage) and having post-high school education or job training are related to desistance early in adulthood as well as to more positive psychosocial adjustment later in adulthood (Arnett, 2004; Horney, Osgood, & Marshall, 2005; Werner & Smith, 2001). Thus, it appears that close relationships with prosocial family members or romantic partners as well as with individuals outside the home (e.g., at school, work) are related to more rapid desistance from offending as well as to better adult adjustment in general. By seeking to increase the presence of positive social bonds in the lives of serious juvenile offenders, treatments such as MST might facilitate the process of desistance in late adolescence and early adulthood.

Summary

Research on the correlates and causes of delinquency and antisocial behavior has guided the development of MST and other promising treatments for serious juvenile offenders. Clinical trials have indicated that MST has more positive effects on these correlates and causes than do alternative treatments. In addition, other studies have indicated several mechanisms by which MST benefits participants over both shorter and longer (e.g., 13.7 years after treatment) periods of time. Research on desistance over the lifespan has provided additional clues about factors that reduce criminal offending in adulthood. The present study examined a range of variables related to desistance and to adult adjustment more generally. Thus, this study will examine whether MST continues to influence long-term outcomes for serious juvenile offenders and may suggest how these long-term outcomes arise.

Overview

Adolescents become increasingly independent as they emancipate from their families of origin and begin to establish themselves as adults. Key developmental tasks during the transition to adulthood include completing educational and employment training, obtaining work experience, and engaging in romantic relationships (Arnett, 2004). Individuals who successfully manage this transition may obtain stable employment and financial self-sufficiency, develop committed romantic relationships, and even begin to rear children. However, as various longitudinal studies have indicated, not all individuals manage the challenges of becoming an adult with equal success (e.g., Sampson & Laub, 1993; Werner & Smith, 2001). In fact, most individuals with histories of serious juvenile offending continue to engage in criminal behavior well into adulthood

(Sampson & Laub, 2003). Research also indicates that serious juvenile offenders are at increased risk for individual, family, school, and peer problems that are likely to carry forward into adulthood, thereby making it more difficult for these individuals to extricate themselves from antisocial lifestyles.

Over the past few decades, researchers have begun to develop effective treatments for serious juvenile offenders. Among these treatments, MST has demonstrated considerable success in reducing criminal offenses among serious and violent juvenile offenders, even when the continued impact of treatment on serious offending is examined more than a decade into adulthood. However, it is important to examine a wider range of criminal and non-criminal outcomes in adulthood to begin to understand how MST may contribute to the longer-term process of desistance from criminal offending.

Developmental and criminological studies have uncovered several key variables that are related to continuity in and desistance from criminal offending. By examining the influence of MST on these variables, we can continue to develop and refine this treatment approach to promote even more positive long-term outcomes.

The present study expands on previous long-term follow-ups of MST by assessing a wider variety of criminal outcomes (i.e., both felony and misdemeanor crimes). This study also extends the length of the longest published follow-up of MST (Schaeffer & Borduin, 2005) from 13.7 years to 21.9 years following treatment completion. Although Schaeffer and Borduin (2005) documented decreased felony offending among MST participants relative to individual therapy (IT) participants at follow-up, evidence from non-clinical research (e.g., Nagin et al., 1995) indicates that juvenile offenders who desist from serious offending in early adulthood often continue to engage in minor antisocial

behaviors. It is possible, then, that the long-term benefits of MST for felony offending may not extend to misdemeanor offending. It is also of interest to examine whether 21.9-year patterns of incarceration and probation sentencing across treatment groups are consistent with earlier patterns reported by Schaeffer and Borduin (2005).

In addition to assessing a wide variety of criminal outcomes, this study assesses civil court judgments indicative of social functioning in adulthood. Previous studies have documented short-term benefits for MST participants in several domains of functioning (e.g., individual, family, peer; see Curtis et al., 2004); the present study will examine whether MST has an impact on various domains of adult functioning as indexed through civil court judgments related to family instability (e.g., presence of divorce or paternity suits), interpersonal violence (e.g., adult abuse suits), and financial problems (e.g., failure to pay rent or credit card bills). Hypotheses for the present study with pertinent citations are presented next and are organized according to criminal versus non-criminal outcome domains.

Hypotheses

Criminal Outcome by Type

1. It was expected that fewer MST participants than IT participants would be rearrested for each of several types (i.e., violent, drug-related, nonviolent) of criminal offenses as well as for criminal offenses overall during the follow-up period.
2. It was also expected that MST participants would have fewer convictions than IT participants for each type of criminal offense as well as for criminal offenses overall (cf. Schaeffer & Borduin, 2005).

Criminal Outcomes by Class

3. It was expected that fewer MST participants than IT participants would be rearrested for either felony class or misdemeanor class criminal offenses during the follow-up period.
4. It was also predicted that MST participants would have fewer convictions than IT participants for felony class or misdemeanor class criminal offenses.

Sentencing Outcomes

5. It was predicted MST participants would be sentenced to fewer days of incarceration during adulthood than would IT participants (cf. Schaeffer & Borduin, 2005).
6. It was also predicted that MST participants would be sentenced to fewer days of probation during adulthood than would IT participants.

Civil Court Outcomes by Type

7. It was expected that fewer MST participants than IT participants would be involved in at least one civil court suit for each of several types (i.e., family instability, interpersonal violence, financial problems) as well as for overall civil suits during the follow-up period.
8. It was also expected that MST participants would have fewer suits than IT participants for each type of civil suit as well as for overall civil suits.

Method

Design

The present study is a long-term follow-up of an earlier clinical trial (Borduin et al., 1995). In the original trial (Borduin et al., 1995), participants were randomly assigned to MST or a traditional, office-based individual therapy condition (IT). Multiagent, multimethod assessment batteries were completed prior to the start of treatment and again after treatment was finished for each participant. Juvenile and adult criminal records were examined for each participant from the completion of treatment to four years later. Borduin and Schaeffer (2005) extended the follow-up for criminal records to an average of 13.7 years after treatment completion. The present study extended the earlier follow-up and also examined non-criminal court records.

Participants

Participants were 176 individuals from the original clinical trial (Borduin et al., 1995). Those individuals were referred to treatment by juvenile court personnel between July 1983 and October 1986 and agreed to participate in treatment. Participants were on average 14.5 years old ($SD = 1.4$) at the time they were referred. Inclusion in the original study required that youths (a) have at least two arrests, (b) live with at least one parent figure, and (c) have no evidence of psychosis or dementia. The families of youths meeting these criteria were randomly assigned via coin toss to either MST ($n = 92$) or IT ($n = 84$). Of those families assigned to treatment, 140 completed treatment (i.e., *completers*) and 36 dropped out (i.e., *dropouts*), defined as having unilaterally terminated treatment after the first session but before the seventh session. The 36 dropouts included 15 (i.e., 16.3%) of those youths assigned to MST and 21 (i.e., 25.0%) of those youths

assigned to IT, a difference that was not statistically significant. Analyses in the proposed study collapsed across completers and dropouts within each treatment group to provide a conservative test of treatment effects (i.e., intent to treat).

Youths referred to treatment averaged 3.9 arrests for felonies prior to referral ($SD = 1.9$), with 47.8% of the youths having been arrested for one or more violent crimes (e.g., assault). The mean age of youths at first arrest was 11.7 years ($SD = 1.9$). All youths had been previously detained in a juvenile detention facility for at least 4 weeks prior to treatment. In addition, 69.3% of the youths were boys and 30.7% were girls; 76.1% were White, 22.2% African American, 1.1% Asian American, and 0.9% Hispanic/Latino; and 56.0% lived with two parent figures (biological parents, stepparents, foster parents, grandparents). Self-identified primary caretakers included biological mothers (89.5%); step-, foster, or adoptive mothers (5.5%); other female relatives (2.5%); and biological fathers (2.5%). Families averaged 3.2 children ($SD = 1.9$), and 63.4% were of lower socioeconomic status (Class IV or V; Hollingshead, 1975). The average age of participants at the time of follow-up was 37.3 ($SD = 1.8$).

Treatment Conditions

Families who completed a pretreatment assessment and agreed to participate in treatment were randomly assigned to treatment conditions. The mean number of hours of treatment was 20.7 ($SD = 7.4$) for MST and 22.5 ($SD = 10.6$) for IT. This difference was not statistically significant.

MST. Interventions in the MST condition were based on the multisystemic conceptualization of the treatment of antisocial behaviors in youth (Henggeler & Borduin, 1990). The emphases of MST interventions are consistent with the empirical

causes and correlates of antisocial behavior in youth and with social-ecological and systemic conceptualizations of antisocial behavior (e.g., Bronfenbrenner, 1979). MST addresses both individual (e.g., cognitive) and systemic (e.g., family, school, peer) influences on youth antisocial behavior. MST interventions are individualized and flexible to account for the specific constellation of influences identified in each case. Treatment is present-focused and action-oriented with specific, well-defined goals. All MST interventions are guided by a set of treatment principles (see Henggeler et al., 1998), which emphasize (a) the fit between problem behaviors and their systemic and developmental contexts, (b) the use of individual and family strengths in promoting responsible behavior, (c) therapist accountability, and (d) treatment generalization and sustainability. Consistent with family preservation models of service delivery (Fraser, Nelson, & Rivard, 1997) and to enhance engagement and generalization, MST treatment sessions are usually held in clients' homes and other natural settings (e.g., school, neighborhood). Services are time-limited and intensive and have the stated goal of empowering parents to deal with the inevitable difficulties that arise in raising adolescents.

IT. Interventions in the IT condition were selected to represent the usual community-based treatment for juvenile offenders within the local judicial district. IT usually focused on personal, family, and/or academic issues, and the therapists provided support and feedback for behavior change. IT interventions included an eclectic blend of theoretical perspectives, including psychodynamic, client-centered, and behavioral approaches. The common element among the varying IT approaches was that treatment focused almost exclusively on the individual youth and not on the youth's social systems.

Therapists

MST therapists in the original study were three male and three female clinical psychology graduate students ranging in age from 23 to 31 years ($M = 26$). Each had approximately 1.5 years of prior clinical experience with youths prior to the study and served as therapists in the study for 12 to 24 months ($M = 16$). MST supervision was provided by C. M. Borduin in a 3-hour weekly supervision meeting throughout the course of the study. During supervision meetings, the supervisor and therapists reviewed videotapes of therapy meetings, discussed therapeutic goals, and decided how to best facilitate the family's progress.

IT therapists for the original study were three female and three male therapists (ages ranged from 25 to 33 years; $M = 28$) at local outpatient mental health agencies, including the treatment services branch of the juvenile court. Each therapist had approximately 4 years of clinical experience with youths prior to the study and held a master's degree or equivalent training in counseling psychology, social work, or another mental health-related field. IT therapists voluntarily served in the clinical trial for 11 to 28 months ($M = 17$). These therapists attended a 2.5-hour weekly case review with the treatment coordinator from the juvenile court to discuss the goals and progress of each case.

Treatment Integrity

To sustain the integrity of MST, therapists documented each therapeutic contact by summarizing what transpired and how much progress had been made in meeting the goals of treatment; ongoing clinical supervision and feedback were provided throughout the investigation. To monitor the integrity of IT, therapists were required to provide

monthly reports that summarized the nature of therapeutic contacts, who was present at contacts, and adolescent progress in meeting the goals of treatment; and the project director (C. M. Borduin) met periodically with the therapists to review selected videotapes of treatment sessions and to ensure that the therapists adhered to their stated treatment plans. Adherence to treatment plans was also promoted by the juvenile court treatment coordinator for IT therapists. Although it was not possible to include an independent assessment of the integrity of either MST or IT, the therapists in both conditions completed a checklist for each of their cases to indicate the systems directly addressed during the course of treatment (i.e., individual, marital, family, peer, school). These checklists revealed that all MST participants received interventions in two or more systems ($M = 3.5$), whereas the vast majority (90.5%) of IT cases received interventions in only one system (always the individual adolescent).

Research Procedures

Original outcome study. Families referred to the treatment project were initially contacted via phone or home visit and told that a 1.5-hour research assessment would be conducted prior to the start of treatment and again after all treatment sessions were completed. Referred families were told that participation in the research was voluntary and that refusing to participate or discontinuing participation would neither jeopardize the receipt of treatment services nor result in sanctions from the court. Families were also informed that juvenile arrest records would be collected through youths' 17th birthdays and that adult arrest records and other public records would be obtained for youths thereafter. Parents provided written consent and youths provided written assent for the

research procedures. All procedures were approved by the Institutional Review Board of the University of Missouri-Columbia.

For the original clinical trial, family members completed extensive pretreatment and posttreatment assessment batteries of self-report instruments, behavior rating inventories, and observational tasks that measured individual, family, peer, and school functioning (see Borduin et al., 1995). Teachers also completed a measure of peer relations for youths. Data from these assessments were not included in the present study. Only those procedures and measures relevant to the present study are described below.

Present study. Public records information was obtained from the Missouri state court system (for criminal and non-criminal court records). A broader search of criminal records in other states was not possible because fingerprints would have been required to conduct a national criminal records search, and these were not obtained at the time of the original study. Nevertheless, we assumed that arrest rates for those participants residing outside of Missouri were not systematically different from those participants remaining in the state. We also assumed that differences between treatment groups in arrest rates would be consistent whether the participant resided within or outside of Missouri.

In the present study, Missouri residency was confirmed using the same procedures as Schaeffer and Borduin (2005) to determine whether participants had resided in the state during the present follow-up period (i.e., over the past 8 years). Several steps were followed to confirm residency. First, state criminal records were searched, and arrests that had occurred since the original clinical trial were noted. Next, for those individuals whose names did not appear in state criminal records, a search of state driver's license records was conducted. An individual was considered to have resided in the state during

the follow-up period if he or she held a Missouri driver's license. Finally, original phone numbers and addresses of parents were used to confirm residence in the state of several additional youths for whom there were no arrest records or driver's license records. Overall, 84.1% of the sample ($n = 148$) was located and determined to have lived in the state during the present follow-up period. The number and percentage of youths found in each group were as follows: MST completers ($n = 63$, or 81.8%), MST dropouts ($n = 12$, or 80.0%), IT completers ($n = 52$, or 82.5%), and IT dropouts ($n = 21$, or 100.0%). The 28 remaining individuals for whom residency could not be verified were considered lost to long-term follow-up (see Figure 1).

Juvenile and adult arrest data that had been collected for this sample during previous follow-ups (Borduin et al., 1995; Schaeffer & Borduin, 2005) were included in binary logistic regression analyses and survival analyses, resulting in at least partial data for those youths lost to long-term follow-up. However, only those youths for whom complete data was available were included in analyses of counts of criminal offenses, incarceration and probation sentences, and civil court suits.

Measures

Juvenile and adult criminal records as well as adult non-criminal court records were used in the present study. For juvenile criminal records, a condition of the original clinical trial was that the juvenile court would provide access to arrest records through consenting participants' 17th birthdays. Youths' criminal arrest data were obtained in the original clinical trial (Borduin et al., 1995) through yearly juvenile office records searches by research assistants who were uninformed as to each participant's treatment condition. Adult criminal and civil court records, which are freely available to the public

in the state of Missouri, were searched using an Internet database. Available adult records included all Missouri court cases between 1985 and the present. Participants' names were used to search court records, including known aliases, alternative first names (e.g., Jim for James), and alternative last names for women whose names may have changed due to marriage (based on state-level court records and county-level marriage records).

Several steps were taken to reduce the possibility of false positives for participants whose names were present in court records. First, participants were matched to records by date of birth, middle name or middle initial, and suffixes (e.g., Jr.). Second, when those indicators were absent for a specific case, participants were matched to records based on similarities to cases that met the first search criterion, including previously recorded addresses, court locations, and names of other individuals listed on the court docket (e.g., spouses, individuals involved in paternity cases). If participants could not be matched to records by this ruling out process, no information was recorded for a given participant. Thus, the data for the present study provided a somewhat conservative estimate of court involvement in the state of Missouri.

For criminal records, data were coded by crime type (violent, drug-related, nonviolent), crime classification (misdemeanor vs. felony), and date of referral. In addition, sentencing information was recorded as the number of days sentenced to incarceration and/or probation. For cases in which incarceration sentences were suspended in favor of probation, only days sentenced to probation were recorded, unless the terms of probation were violated and the incarceration sentence was executed. For criminal cases that were dismissed or that were not yet disposed at the time of data

collection, no data were recorded. Traffic court records, which included minor traffic violations (e.g., speeding), were not included in the dataset.

For civil court records, data were coded by nature of the suit (e.g., paternity, child support, divorce, etc.) and date of referral. Civil court suits were then categorized according to type: family instability (i.e., divorce, child support, and/or paternity suits), interpersonal violence (i.e., adult abuse cases), and financial problems (i.e., contract, rent, account, and/or other suits representing a failure to meet a financial obligation). For suits pertaining to family instability (i.e., divorce, child support, and paternity suits), I recorded whether or not a suit occurred for each participant, regardless of whether the participant was a petitioner (i.e., an individual who initiated a civil court suit) or a respondent (i.e., an individual against whom a civil court suit was filed). For all other types of civil court suits, data were recorded only for cases in which participants were respondents. Given that more than half of adult abuse suits were dismissed by the courts, both substantiated and dismissed claims of adult abuse were recorded as indicating that interpersonal violence was present. As above, only those cases that were disposed at the time of data collection were recorded as having occurred.

Results

Likelihood and Relative Odds of Criminal and Civil Court Outcomes

To examine the likelihood of criminal and civil court outcomes, binary logistic regressions were performed (see Table 1). The average lengths of follow-up for the MST group ($n = 92$) and IT group ($n = 84$) were 7874.54 days ($SD = 498.81$) and 8109.62 days ($SD = 330.78$), respectively. Because the length of follow-up was shorter for the MST group than the IT group ($t [174] = 3.65, p < .001$), follow-up length was centered around

the mean and entered into Step 1 of the regressions, and treatment condition was entered in Step 2. As seen in Table 1, the likelihood of recidivism for any type of offense was significantly higher for IT participants (76.2%) than for MST participants (63.0%), $\chi^2 (1, N = 176) = 4.40, p = .04$. Likewise, the likelihood of recidivism for violent offenses was higher for IT participants (36.9%) than for MST participants (20.7%), and a similar trend ($p = .06$) was found for nonviolent offenses (63.1% vs. 51.1%, respectively). When recidivism was examined in terms of offense class, the likelihood of rearrest for felony offenses was again significantly higher for IT participants (54.8%) than for MST participants (34.8%), $\chi^2 (1, N = 176) = 6.60, p = .01$. Last, there was a nonsignificant trend ($p = .11$) showing greater involvement in civil suits related to family instability for IT participants (47.6%) than for MST participants (30.4%).

To examine the relative odds of criminal recidivism and civil court outcomes, odds ratios were calculated by dividing the odds of recidivism for IT participants (i.e., % arrested divided by % not arrested within the IT condition) by the odds of recidivism for MST participants; hence, numbers greater than one indicate a higher odds of rearrest or civil suit involvement for IT participants relative to MST participants. Youths in the IT condition were 1.88 times more likely than youths in the MST condition to be rearrested (95% confidence interval [CI] = 1.02 – 3.47). More specifically, youths in the IT condition were 2.24 times more likely to have an arrest for a violent offense (95% CI = 1.19 – 4.21) and 1.63 times more likely to have an arrest for a nonviolent offense (95% CI = 0.93 – 2.88) times greater for IT participants. Similarly, youths in the IT condition were 2.27 times more likely to have an arrest for a felony class offense (95% CI = 1.28 – 4.01). Finally, youths in the IT condition were 2.08 times more likely to have a civil suit

related to family instability (95% CI = 1.17 – 3.71) times greater for IT participants than MST participants.

Survival Functions for Criminal Offenses

Survival analyses (based on the SURVIVAL procedure: SPSS 15.0; SPSS, 2007) were used to obtain cumulative survival functions, or survival curves, for criminal arrest data. The cumulative survival function 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 release from treatment (or post-treatment assessment date for treatment dropouts). Survival analyses are appropriate for these data because they model data that are censored, (i.e., when some individuals in the sample do not experience an event, such as arrest; Keiley & Martin, 2005). As before, length of treatment was centered around the mean and then entered in Step 1 of a Cox Regression survival procedure, and treatment condition was entered in Step 2. Chi-square difference tests indicated whether or not treatment group predicted survival length over and above follow-up length.

By the end of the 21.86-year follow-up period, 76.2% of IT participants had been rearrested for criminal offenses of any type/class compared to 63.0% of MST participants, $\chi^2(1, N = 176) = 5.05, p = .03$ (see Figure 2). In addition, as illustrated in Figures 3 and 4 respectively, participants in the MST group were at significantly lower risk of rearrest for violent offenses, $\chi^2(1, N = 176) = 5.02, p = .03$, and for felony class offenses, $\chi^2(1, N = 176) = 6.89, p = .009$. Other results for survival analyses were not statistically significant.

Number of Arrests, Days Sentenced to Incarceration and Probation, and Civil Suits

A final set of analyses examined the number of posttreatment arrests by offense type (i.e., violent, nonviolent, drug-related) and offense class (i.e., felony, misdemeanor), number of days sentenced to incarceration and probation in adulthood, and number of civil court suits (see Table 2 for descriptive statistics). These analyses were conducted only for participants who had complete data through the present follow-up period (i.e., those for whom Missouri residency between 1999 and 2007 could be verified; $N = 148$). Because these outcome variables are continuous, nonnormal, and non-negative, they are considered censored-dependent variables (Green, 1993). These variables contain both a qualitative (e.g., arrested vs. not arrested) and quantitative (e.g., number of arrests among recidivists) component. In all analyses, treatment condition was dummy coded with IT equal to 1 and MST equal to 0. Because the length of follow-up for MST participants ($M = 7878.68$, $SD = 491.18$) was shorter than that of IT participants ($M = 8094.40$, $SD = 337.54$), $t(146) = 3.11$, $p < .01$, follow-up length was centered around its mean and entered into the model as a covariate.

Zero-Inflated Poisson (ZIP) regression analyses were used to examine whether treatment group predicted outcomes. ZIP regressions provide an estimate of the relative odds of an outcome (e.g., arrest) occurring. This estimate of relative odds differs from a traditional odds ratio in that it is an inferential estimate of effect, rather than a description of actual data. In addition, ZIP regressions provide an estimate of the predicted rate of outcomes (e.g., number of arrests among those individuals likely to have committed criminal offenses). Thus, ZIP regressions account for both the qualitative and quantitative components of criminal data. ZIP regressions perform well when sample distributions of

counts or rates are highly skewed due to an excess of zeroes (e.g., individuals with 0 criminal convictions; Lambert, 1992). All ZIP regressions were computed using the MPlus (Version 5) statistical package (Muthen & Muthen, 2007) and used maximum likelihood estimation.

As seen in Table 2, ZIP regressions indicated that IT participants were twice as likely as MST participants to have been arrested for a felony class offense ($OR = 2.16, p < .05$) and to have been sentenced to at least one day of adult incarceration ($OR = 2.35, p < .05$). In addition, a nonsignificant trend indicated that IT participants were nearly two times as likely as MST participants to have been arrested for at least one nonviolent offense ($OR = 1.82, p < .10$). For predicted rates, IT participants had an average of 7.03 more arrests for offenses of any type/class ($p < .01$), 2.51 more arrests for violent offenses ($p < .05$), and 2.43 more arrests for drug-related offenses ($p < .01$) than did MST participants. In addition, IT participants were predicted to have an average of 5.04 more arrests for misdemeanor offenses than did MST participants ($p < .01$). There were no significant treatment group effects on other criminal offense variables or on civil suits.

Discussion

The present study represents the longest and most comprehensive follow-up to date of a MST clinical trial with serious and violent juvenile offenders. As in previous follow-ups (Borduin et al., 1995; Schaeffer & Borduin, 2005), the likelihood of criminal recidivism for any offense was lower for MST participants than for IT participants (63.0% vs. 76.2%, respectively). In addition, the odds of rearrest for violent offenses and for felony class offenses were 2 times lower for MST participants than for IT, and the

odds of involvement in civil suits related to family instability were also 2 times lower for MST participants.

A more fine-grained pattern of results emerged for the number of posttreatment arrests and associated criminal sentencing data. Specifically, among those MST participants likely to have committed offenses (as opposed to those who were arrested), the odds of rearrest for felony class offenses and for having been sentenced to incarceration were two times lower than for IT participants. Among other, broader categories of crimes and less serious crimes (i.e., misdemeanors), the predicted number (i.e., rate) of arrests was substantially higher for IT participants than for MST participants. Specifically, the predicted rates of rearrest for violent, drug-related, or misdemeanor offenses were 2.4 to 5.0 times higher for IT participants than for MST participants.

The overall pattern of results for criminal outcomes indicates that MST has long-lasting effects in preventing the most serious crimes (i.e., violent offenses and felony class offenses, the latter of which include serious offenses of all types) among adults and juveniles alike. This is consistent with results of a 4-year posttreatment follow-up of the same sample, which indicated that treatment effects were greatest for crimes rated as more serious (Borduin et al., 1995). Furthermore, although treatment groups were similar in their likelihood of being arrested for less serious crimes, the number of arrests for less serious crimes was lower for MST than for IT participants. The findings that MST participants (a) were less likely to commit serious crimes and (b) committed fewer crimes of lower seriousness lend strong support for the long-term effectiveness of MST with serious and violent and juvenile offenders.

Analyses of civil court records indicated that the relative odds of having been involved in a suit related to family instability (i.e., divorce, paternity, or child support suits) were two times lower for MST participants than for IT participants. The use of civil court records in this study is unique in the clinical intervention research literature and may provide clues about how MST participants' adult lives differed from those of IT participants. It seems reasonable to suggest that MST participants have better family relationships than IT participants and that, consistent with desistance research (e.g., Horney et al., 1995; Laub et al., 1998), these differences account for lower rates of criminal offending among MST participants. However, future studies are necessary to examine alternative possibilities.

The collective results of this study have important implications for how public policies address youth antisocial behavior. MST is likely to be more effective and less costly in the long term than more restrictive treatments (e.g., residential treatment), which often cost hundreds of dollars per day, remove youths from their natural ecologies, place youths in close contact with antisocial peers, and have only limited evidence of effectiveness in reducing antisocial behavior over any length of time (Aos, Miller, & Drake, 2006; Dodge et al., 2006). Even compared to less restrictive and intensive approaches (e.g., outpatient individual treatment), MST has demonstrated sizeable cost savings to taxpayers and crime victims, conservatively estimated at more \$18,000 through participants' 25th birthdays compared to alternative treatments (Aos et al., 2006). Consequently, policy makers can make the argument that MST serves the public at large by reducing crime and is a sound fiscal investment for constituents' tax dollars.

Previous researchers (e.g., Schaeffer & Borduin, 2005) have suggested that the long-term effectiveness of MST is largely a function of its comprehensive nature and ecologically valid service delivery. Future studies are needed to examine the mechanisms of change for MST by comprehensively assessing treatment participants and their families in adulthood. Although the present study follows participants well into adulthood, there are potentially important variables, such as job stability, post-high school education and employment training, and adult social services (e.g., use of public assistance, psychotherapy in adulthood) that we could not measure. In addition, given the large literature on intergenerational transmission of antisocial behaviors (for reviews, see Serbin & Karp, 2004; Shaw, 2002; Thornberry, 2005), it would be of interest to examine whether the beneficial effects of MST carry over to the next generation. For example, research could examine the quality of treatment participants' relationships with their children and how their children function in key areas of adjustment (e.g., academic performance, emotional health, peer relations).

It must be acknowledged that this study has several limitations. First, we assessed criminal activity during the follow-up period using official arrest records, which are likely to underestimate the actual number of crimes (Loeber & Farrington, 1998). However, arrest records are one useful index of criminal involvement and probably provided an accurate estimate of the relative effectiveness of MST in reducing serious criminal activity. Second, we could not confirm continuous residency in Missouri throughout the follow-up period, and we cannot rule out the possibility that some youths may have committed crimes in other states. However, it seems unlikely that length of residency in the state would vary systemically by treatment group. Lastly, the

classifications (e.g., financial problems) used to index civil court suits have not been used in prior research and may not be as valid as the classifications of criminal offenses. However, the assessment of civil suits in the present study was advantageous in extending the breadth of our follow-up and may provide a useful index for other long-term follow-ups.

In summary, the results of this long-term follow-up provide additional support for the efficacy of MST in reducing serious antisocial behavior both in adolescence and adulthood. Findings showed that MST participants were half as likely as IT participants to have been rearrested for any crime as well as half as likely to have been rearrested for violent crimes and felony class crimes. The prevention of these crimes likely results in considerable savings to taxpayers and crime victims. The clinical and cost effectiveness of MST relative to other types of treatment (e.g., individual therapy, residential treatment) should encourage policymakers and researchers to promote those practices that best serve serious juvenile offenders and the public at large.

References

- Aos, S., Miller, M., & Drake, E. (2006). *Evidence-based public policy options to reduce future prison construction, criminal justice costs, and crime rates*. Olympia, WA: Washington State Institute for Public Policy.
- Arditti, J. A., Lambert-Shute, J., Joest, K. (2003). Saturday morning at the jail: Implications of incarceration for families and children. *Family Relations*, 52, 195-204.
- Arnett, J. J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties*. New York: Oxford University Press.
- Bardone, A. M., Moffitt, T., Caspi, A., & Dickson, N. (1996). Adult mental health and social outcomes of adolescent girls with depression and conduct disorder. *Development and Psychopathology*, 8, 811-829.
- Barnes, G. M., Hoffman, J. H., Welte, J. W., Farrell, M. P., & Dintcheff, B. A. (2006). Effects of parental monitoring and peer deviance on substance use and delinquency. *Journal of Marriage and Family*, 68, 1084-1104.
- Bor, W. (2004). Prevention and treatment of childhood and adolescent aggression and antisocial behaviour: A selective review. *Australian and New Zealand Journal of Psychiatry*, 38, 373-380.
- Borduin, C. M. (2007). Multisystemic treatment with violent youths and their families. In T. A. Cavell & K. T. Malcolm (Eds.), *Anger aggression, and interventions for interpersonal violence* (pp. 239-265). Mahwah, NJ: Erlbaum.
- Borduin, C. M., Mann, B. J., Cone, L. T., Henggeler, S. W., Fucci, B. R., Blaske, D. M., et al. (1995). Multisystemic treatment of serious juvenile offenders: Long-term

- prevention of criminality and violence. *Journal of Consulting and Clinical Psychology*, 63, 569-578.
- Borduin, C. M., Schaeffer, C. M., & Heiblum, N. (in press). A randomized clinical trial of multisystemic therapy with juvenile sexual offenders: Effects on youth social ecology and criminal activity. *Journal of Consulting and Clinical Psychology*
- Bronfenbrenner, U. 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.
- Brown, T. L., Henggeler, S. W., Schoenwald, S. K., Brondino, M. J., & Pickrel, S. G. (1999). Multisystemic treatment of substance abusing and dependent juvenile delinquents: Effects on school attendance at posttreatment and 6-month follow-up. *Children's Services: Social Policy, Research, and Practice*, 2, 81-93.
- Cohen, M. A. (1998). The monetary value of saving high-risk youth. *Journal of Quantitative Criminology*, 14, 5-33.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2002). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd Ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Cottrell, D., & Boston, P. (2002). Practitioner review: The effectiveness of systemic family therapy for children and adolescents. *Journal of Child Psychology and Psychiatry*, 43, 573-586.
- Curtis, N. M., Ronan, K. R., & Borduin, C. M. (2004). Multisystemic therapy: A meta-analysis of outcome studies. *Journal of Family Psychology*, 18, 411-419.
- Dishion, T. J., McCord, J., & Poulin, F. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist*, 54, 755-764.

- Dishion, T. J., & McMahon, R. J. (1998). Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation. *Clinical Child and Family Psychology Review, 1*, 61-75.
- Dodge, K. A., Dishion, T. J., & Lansford, J. E. (2006). Deviant peer influences in intervention and public policy for youth. *Social Policy Report, XX* (1).
- DuBois, D. L., & Silverthorn, N. (2005). Characteristics of natural mentoring relationships and adolescent adjustment: Evidence from a national study. *The Journal of Primary Prevention, 26*, 69-92.
- Eamon, M. K. (2001). Poverty, parenting, peer, and neighborhood influences on young adolescent antisocial behavior. *Journal of Social Service Research, 28*, 1-23.
- Farrington, D. P., Barnes, G. C., & Lambert, S. (1996). The concentration of offending in families. *Legal and Criminological Psychology, 1*, 47-63.
- Fergusson, D. M., & Horwood, L. J. (1999). Prospective childhood predictors of deviant peer affiliations in adolescence. *Journal of Child Psychology and Psychiatry, 40*, 581-592.
- Ford, T., Goodman, R., & Meltzer, H. (2004). The relative importance of child, family, school, and neighbourhood correlates of childhood psychiatric disorder. *Social Psychiatry and Psychiatric Epidemiology, 39*, 487-496.
- Formoso, D., Gonzales, N. A., & Aiken, L. S. (2000). Family conflict and children's internalizing and externalizing behavior: Protective factors. *American Journal of Community Psychology, 28*, 175-198.
- Fraser, M. W., Nelson, K. E., & Rivard, J. C. (1997). Effectiveness of family preservation services. *Social Work Research, 21*, 138-153.

- Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin, 118*, 392-404.
- Garnier, H. E., & Stein, J. A. (2002). An 18-year model of family and peer effects on adolescent drug use and delinquency. *Journal of Youth and Adolescence, 31*, 45-56.
- Henggeler, S. W., & Borduin, C. M. (1990). *Family therapy and beyond: A multisystemic approach to treating the behavior problems of children and adolescents*. Pacific Grove, CA: Brooks/Cole.
- Henggeler, S. W., Clingempeel, W. G., Brondino, M. J., & Pickrel, S. G. (2002). Four-year follow-up of multisystemic therapy with substance-abusing and substance-dependent juvenile offenders. *Journal of the American Academy of Child and Adolescent Psychiatry, 41*, 868-874.
- Henggeler, S. W., Melton, G. B., & Smith, L. A. (1992). Family preservation using multisystemic therapy: An effective alternative to incarcerating serious juvenile offenders. *Journal of Consulting and Clinical Psychology, 60*, 953-961.
- Henggeler, S. W., Schoenwald, S. K., Borduin, C. M., Rowland, M. D., & Cunningham, P. B. (1998). *Multisystemic therapy of antisocial behavior in children and adolescents*. New York: Guilford Press.
- Henry, B., Caspi, A., Moffitt, T. E., Harrington, H., & Silva, P. A. (1999). Staying in school protects boys with poor self-regulation in childhood from later crime: A longitudinal study. *International Journal of Behavioral Development, 23*, 1049-1073.

- Horney, J., Osgood, D. W., & Marshall, I. H. (1995). Criminal careers in the short-term: Intra-individual variability in crime and its relation to local life circumstances. *American Sociological Review, 60*, 655-673.
- Huey, S. J. Jr., Henggeler, S. W., Brondino, M. J., & Pickrel, S. G. (2000). Mechanisms of change in multisystemic therapy: Reducing delinquent behavior through therapist adherence and improved family and peer functioning. *Journal of Consulting and Clinical Psychology, 68*, 451-467.
- Kazdin (2000). Treatments for aggressive and antisocial children. *Child and Adolescent Psychiatric Clinics of North America, 9*, 841-858.
- Keiley, M. K., & Martin, N. C. (2005). Survival analysis in family research. *Journal of Family Psychology, 19*, 142-156.
- Klietz, S. J., Borduin, C. M., Schaeffer, C. M. (2008). *Cost-benefit analysis of multisystemic therapy with serious and violent juvenile offenders*. Unpublished manuscript.
- Lambert, D. (1992). Zero-inflated Poisson regression, with an application to defects in manufacturing. *Technometrics, 34*, 1-14.
- Laub, J. H., Nagin, D. S., Sampson, R. J. (1998). Trajectories of change in criminal offending: Good marriages and the desistance process. *American Sociological Review, 63*, 225-238.
- Laub, J. H., & Sampson, R. J. (2001). Understanding desistance from crime. In M. Tonry (Ed.), *Crime and Justice: A Review of Research, Vol. 28* (pp. 1-69). Chicago: University of Chicago Press.

- Lipsey, M. W. (1992). The effect of treatment on juvenile delinquents: Results from meta-analysis. In F. Losel, D. Bender, & T. Bliesener (Eds.), *Psychology and law: International perspectives* (pp. 131-143). Berlin, Germany: Walter DeGruyter.
- Mann, B. J., Borduin, C. M., Henggeler, S. W., & Blaske, D. M. (1990). An investigation of systemic conceptualization of parent-child coalitions and symptom change. *Journal of Consulting and Clinical Psychology, 58*, 336-344.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 4*, 674-701
- Moffitt, T. E., Caspi, A., Dickson, N., Silva, P., & Stanton, W. (1996). Childhood-onset versus adolescent-onset conduct problems in males: Natural history from ages 3 to 18 years. *Development and Psychopathology, 8*, 399-424.
- Moffitt, T. E., Caspi, A., Harrington, H. & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited pathways: Follow-up at age 26 years. *Development and Psychopathology, 14*, 179-207.
- Nagin, D. S., Farrington, D. P., & Moffitt, T. E. (1995). Life-course trajectories of different types of offenders. *Criminology, 33*, 111-138.
- National Institutes of Health (2006). National Institutes of Health state-of-the-science consensus statement. *Journal of Abnormal Child Psychology, 34*, 457-470.
- Ogden, T., & Halliday-Boykins, C. A. (2004). Multisystemic treatment of adolescents in Norway: Replication of clinical outcomes outside of the US. *Child and Adolescent Mental Health, 9*, 77-83.

- Poulin, F., Dishion, T. J., & Haas, E. (1999). The peer influence paradox: Friendship quality and deviancy training within male adolescent friendships. *Merrill-Palmer Quarterly, 45*, 42–61.
- Rhodes, J. E. (2002). *Stand by me: The risks and rewards of mentoring today's youth*. Cambridge, MA: Harvard University Press.
- Robinson, F., & Keithley, J. (2000). The impacts of crime on health and health services: A literature review. *Health, Risk, & Society, 2*, 253-266.
- Rönkä, A., Kinnunen, U., Pulkkinen, L. (2001). Continuity in problems of social functioning in adulthood. A cumulative perspective. *Journal of Adult Development, 3*, 161-171
- Rönkä, A., & Pulkkinen, L. (1995). Accumulation of problems in social functioning in young adulthood: A developmental approach. *Journal of Personality and Social Psychology, 69*, 381-391.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Sampson, R. J., & Laub, J. H. (2003). Life-course desisters? Trajectories of crime among delinquent boys followed to age 70. *Criminology, 41*, 301-339.
- Schaeffer, C. M. (2000). *Moderators and mediators of therapeutic change in multisystemic treatment of serious juvenile offenders*. Unpublished doctoral dissertation. University of Missouri-Columbia.
- Schaeffer, C. M., & Borduin, C. M. (2005). Long-term follow-up to a randomized clinical trial of multisystemic therapy with serious and violent juvenile offenders. *Journal of Consulting and Clinical Psychology, 73*, 445-453.

- Serbin, L. A., & Karp, J. (2004). The intergenerational transfer of psychosocial risk: Mediators of vulnerability and resilience. *Annual Reviews in Psychology, 55*, 333-363.
- Shaw, D. S. (2003). Advancing our study of intergenerational continuity in antisocial behavior. *Journal of Abnormal Child Psychology, 31*, 193-199
- Shepherd, J., Farrington, D., & Potts, J. (2004). Impact of antisocial lifestyle on health. *Journal of Public Health, 26*, 347-352.
- Thornberry, T. P. (2005). Explaining multiple patterns of offending across the life course and across generations. *Annals of the American Association of Political and Social Science, 602*, 156-195.
- Timmons-Mitchell, J., Bender, M., Kishna, M. A., & Mitchell, C. C. (2006). An independent effectiveness trial of multisystemic therapy with juvenile justice youth. *Journal of Clinical Child and Adolescent Psychology, 35*, 227-236.
- Werner, E. E., & Smith, R. S. (2001). *Journeys from childhood to midlife: Risk, resilience, and recovery*. Ithaca, NY: Cornell University Press.

Table 1

Likelihood of Criminal and Civil Court Outcomes.

Variable	%	$\chi^2(1)$	<i>p</i>
Offense type (%)			
Violent		5.47	.02
IT	36.9		
MST	20.7		
Nonviolent		3.45	.06
IT	63.1		
MST	51.1		
Drug-related		0.67	.41
IT	46.4		
MST	40.2		
Any offense		4.40	.04
IT	76.2		
MST	63.0		
Offense class (%)			
Misdemeanor offense		0.79	.37
IT	65.5		
MST	60.9		
Felony offense		6.60	.01
IT	54.8		
MST	34.8		

(table continues)

Variable	%	$\chi^2(1)$	<i>p</i>
Civil court suit type (%)			
Interpersonal violence		0.01	.91
IT	29.8		
MST	28.3		
Family instability		2.59	.11
IT	47.6		
MST	30.4		
Financial problems		0.23	.63
IT	33.3		
MST	34.8		
Any suit		1.91	.17
IT	60.7		
MST	47.8		

Note. IT = individual therapy; MST = multisystemic therapy. Sample sizes for therapy conditions are as follows: IT ($n = 84$); MST ($n = 92$).

Table 2

Descriptive Statistics and ZIP Regression Results for Criminal and Civil Suit Outcomes

Variable	Treatment Group				ZIP Model Coefficients	
	MST		IT		OR	PR
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Offense type (number)						
Violent	0.45	1.03	1.04	2.12	1.46	2.51*
Nonviolent	2.48	3.90	3.25	4.01	1.82 [†]	4.70
Drug-related	0.97	1.46	1.26	1.95	0.63	2.43**
Any offense	3.91	5.29	5.55	6.65	1.76	7.03**
Offense class (number)						
Misdemeanor offense	2.39	3.15	3.58	5.16	1.16	5.04**
Felony offense	1.53	2.94	1.99	2.61	2.16*	3.40
Adult sentencing (days)						
Incarceration	1915.55	4713.02	2874.89	5028.06	2.35*	6578.15
Probation	628.61	963.11	673.71	991.38	1.08	1387.95
Civil suit type (number)						
Interpersonal violence	1.01	1.94	1.12	2.18	0.99	3.13
Family instability	0.57	0.92	0.93	1.21	1.62	1.30
Financial problems	0.73	1.11	0.70	1.11	0.64	0.79
Any suit	2.37	3.05	2.78	3.32	1.42	4.44

(table continues)

Note. ZIP = Zero-Inflated Poisson; *OR* = odds ratio; *PR* = predicted rate; IT = individual therapy; MST = multisystemic therapy. For all analyses, only those youths with complete 21.9-year follow-up data were included, and completers and dropouts within each treatment condition were combined. Sample sizes for therapy conditions are as follows: IT ($n = 73$); MST ($n = 75$). All analyses controlled for each individual's length of follow-up period.

† $p < .10$, * $p < .05$, ** $p < .01$.

Figure Captions

Figure 1. Flow diagram of participants from randomization to follow-up.

Figure 2. Survival functions for multisystemic therapy (MST) and individual therapy (IT) groups on time to first arrest for any type of offense following treatment.

Figure 3. Survival functions for multisystemic therapy (MST) and individual therapy (IT) groups on time to first violent offense arrest following treatment.

Figure 4. Survival functions for multisystemic therapy (MST) and individual therapy (IT) groups on time to first felony offense arrest following treatment.







