

# Effects of Multisystemic Therapy on Caregivers of Serious Juvenile Offenders: A 20-Year Follow-Up to a Randomized Clinical Trial

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**Objective:** Caregivers of serious juvenile offenders often hold favorable attitudes about criminality and frequently have histories of involvement in antisocial behaviors themselves. In the present study, the authors examined the long-term criminal and noncriminal outcomes for caregivers of serious juvenile offenders who had participated two decades earlier in a randomized clinical trial of multisystemic therapy (MST; Borduin et al., 1995). **Method:** Participants were 276 caregivers of serious juvenile offenders who were originally randomized to MST or individual therapy (IT). Criminal and civil suit data for caregivers were obtained during a 20.7-year follow-up when caregivers were on average 61.5 years old. **Results:** Caregivers in the MST condition had 94% fewer felonies and 70% fewer misdemeanors than did caregivers in the IT condition. In addition, caregivers in the IT condition were sentenced to 92% more days of incarceration and had 50% more family-related civil suits. Moreover, the favorable long-term effects of MST on caregiver criminality and civil suits were mediated by improved family relations during treatment. **Conclusion:** The present study represents the only follow-up to date of caregivers in an MST clinical trial and demonstrates the broader clinical benefits of a family-based treatment for serious juvenile offenders. Implications of the findings for policymakers and researchers are discussed.

## What is the public health significance of this article?

This study demonstrates that an effective family-based treatment for serious juvenile offenders can also have lasting clinical benefits for their caregivers. The findings are useful for policymakers and service providers to consider in their selection of mental health interventions for juvenile offenders (and their families).

**Keywords:** caregiver, serious juvenile offender, multisystemic therapy (MST), evidence-based treatment, randomized clinical trial

A growing body of evidence points to the effectiveness of family-based treatments in attenuating criminal activity among serious juvenile offenders (Borduin, Dopp, & Taylor, 2013; McCart & Sheidow, 2016). Although these treatments represent an important advance in our ability to produce lasting change in youth antisocial behavior, the broader effect of such treatments on criminality in other family members has rarely been examined. However, from a systems perspective, it seems likely that treatments that include the entire family would have a positive impact beyond

the individual offender and may be particularly cost-beneficial. Indeed, empirical evidence demonstrating the wider clinical and economic benefits of family-based treatments for serious juvenile offenders would be useful for administrators and policymakers to consider in their selection of interventions for this population of youths.

The role of both genetic and environmental influences in the intergenerational transmission of serious criminal offending from caregivers to their children has been well documented (e.g., Auty,

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Farrington, & Coid, 2015; Kendler, Ohlsson, Morris, Sundquist, & Sundquist, 2015; Roettger, Boardman, Harris, & Guo, 2016). Regarding environmental influences, caregivers of youths who engage in serious criminal offenses often hold favorable attitudes about criminality and frequently have histories of involvement in antisocial behaviors themselves (Besemer & Farrington, 2012; Bijleveld & Wijkman, 2009; Gorman-Smith, Tolan, Loeber, & Henry, 1998). These caregiver attitudes and behaviors are barriers to effective parenting and represent risks for further criminal activity in juveniles with histories of serious offending (Dogan, Conger, Kim, & Masyn, 2007; Ge et al., 1996; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009). Although caregiver modeling of antisocial and aggressive behavior is probably one mechanism by which these risks are conveyed in the family environment (Loeber & Farrington, 1998; Sheehan & Watson, 2008), it also seems highly likely that caregivers with antisocial attitudes and behaviors possess cognitive and interpersonal deficits that interfere with their capacity for positive parenting (Patterson, Reid, & Dishon, 1992; Simons, Wu, Conger, & Lorenz, 1994; Smith & Stern, 1997). Here, the criminal behavior of offspring might be linked more directly with negative caregiver–youth affective relations and the use of ineffective caregiver control strategies than with the modeling of caregiver deviance (Henggeler, 1989; Thornberry, Freeman-Gallant, & Lovegrove, 2009). To the extent that these barriers to effective parenting are amenable to treatment, they are a logical target of family-based interventions seeking to reduce or prevent criminality in serious juvenile offenders.

Multisystemic therapy (MST; Henggeler & Borduin, 1990) is an intensive family- and community-based treatment that has demonstrated significant effects on the criminal activity of serious juvenile offenders in more than a dozen clinical trials (Henggeler et al., 2009). MST focuses on caregivers as the primary conduits of change and empowers them to engage in effective parenting practices (e.g., conflict management, nurturance, monitoring) that improve youth functioning across family, peer, school, and community contexts. It seems reasonable to suggest that changes in parenting practices that result from MST may also have benefits for caregivers' own functioning. In fact, several studies have found that caregivers of juvenile offenders who participated in MST demonstrated decreased global psychiatric symptomatology (e.g., Borduin et al., 1995; Borduin, Schaeffer, & Heiblum, 2009) and increased warmth in caregiver–youth relations and in caregivers' marital relations (Henggeler et al., 1986; Mann, Borduin, Henggeler, & Blaske, 1990) from pre- to posttreatment relative to caregivers of offenders who participated in treatment as usual.<sup>1</sup> These findings are generally consistent with those of other family-based treatments that have demonstrated improvements in caregiver depression (DeGarmo, Patterson, & Forgatch, 2004) and stress (Fisher & Stoolmiller, 2008), caregiving skills (Forgatch, Patterson, DeGarmo, & Beldavs, 2009; Sandler, Ingram, Wolchik, Tein, & Winslow, 2015), and caregiver–child relationships (Zhou, Sandler, Millsap, Wolchik, & Dawson-McClure, 2008) in families of youths at risk for antisocial behavior. However, it is not known whether the positive effects of MST and other family-based treatments on participating caregivers extend to reductions in those caregivers' own involvement in antisocial activities.

The present study examined criminal (i.e., arrests, incarceration, probation) and civil (i.e., suits related to family stability) out-

comes, as well as potential mediators and moderators of those outcomes, for caregivers of serious juvenile offenders who participated two decades earlier in a clinical trial of MST. Regarding criminal outcomes, prior follow-up studies of MST participants have focused on index offenses (i.e., primarily felonies), but the present study investigated caregiver arrests, incarceration, and probation for a broader range of crimes (i.e., both felony and misdemeanor offenses). Indeed, although felony offenses generally represent a greater threat to public safety, misdemeanor offenses are more common and result in substantial costs to victims (e.g., property damage and loss, health care, lost productivity) and to the public treasury (e.g., police, court, and detention expenses; McCollister, French, & Fang, 2010).

This study also examined noncriminal outcomes among caregivers of former MST participants. To date, the long-term impact of MST on areas of adult functioning outside of involvement in criminal activities remains poorly understood. However, there is considerable evidence that adults who engage in antisocial activities experience a wide range of problems that together interfere with their ability to meet key developmental tasks (e.g., establish and maintain a family; Sampson & Laub, 1990; Thompson & Petrovic, 2009). In the present study, we used civil suits as indices of caregiver functioning in the domain of stable family relationships to provide a more complete picture of the long-term impact of MST on caregivers' lives.

Finally, for caregiver outcomes that differed significantly between treatment conditions, we evaluated theoretically plausible mediators as well as possible moderators of treatment effects on caregiver outcomes. Given that the MST theory of change (Henggeler et al., 2009) emphasizes that improved caregiver and family functioning are key mechanisms in reducing antisocial behaviors of family members, we assessed caregiver psychiatric symptoms and family relations (i.e., adaptability, cohesion, defensive communication, conflict) as potential mediating variables. Furthermore, based on findings that youths and caregivers exhibit reciprocal coercive processes that promote antisocial behavior (Patterson, 2016), we examined whether changes in youth antisocial behavior mediated changes in caregiver outcomes. Regarding possible moderators, we examined the impact of demographic and criminal history variables on caregivers' long-term outcomes to evaluate the effectiveness of MST across families from different backgrounds.

In summary, the current study provided a 20.7-year follow-up of criminal and civil court outcomes among caregivers of serious juvenile offenders who participated in the largest randomized clinical trial of MST (Borduin et al., 1995). As such, the present study represents the first follow-up of caregivers from an MST clinical trial. Consistent with prior findings regarding the effects of MST on juvenile offenders (e.g., Schaeffer & Borduin, 2005) and other family members (e.g., closest-in-age siblings; Wagner, Borduin, Sawyer, & Dopp, 2014), we predicted that participation in MST would decrease caregivers' likelihood and number of (a) arrests for felony or misdemeanor offenses, (b) days sentenced to incarceration or probation, and (c) civil court suits related to family

<sup>1</sup> The results from Borduin et al. (1995) and Mann et al. (1990) were based on the same clinical trial (i.e., same sample of caregivers and youths) as in the present study.

instability. We also predicted that MST-associated increases in family adaptability and cohesion, as well as decreases in caregiver–youth defensive communication, caregiver–youth conflict, caregiver psychiatric symptoms, and youth antisocial behavior, would each partially (but significantly) mediate the relationship between MST and caregiver outcomes. Consistent with conclusions from reviews regarding the cultural effectiveness of MST (see Henggeler, 2011; Huey & Polo, 2008), we did not expect that the relative efficacy of MST would be moderated by demographic or criminal history variables.

## Method

### Design

In the present study, we examined long-term criminal and civil court outcomes among caregivers of juvenile offenders who received either MST or individual therapy (IT) in a randomized clinical trial (Borduin et al., 1995). The original trial used a pretest–posttest control group design, with random assignment to treatment conditions, to compare the effectiveness of MST versus IT.

### Participants

Participants were caregivers ( $N = 276$ ) from families of serious juvenile offenders who participated in the original clinical trial (Borduin et al., 1995). These caregivers (60.9% females) were living in the same homes as the juvenile offenders during the clinical trial. The majority (56.8%) of families in the original clinical trial had two caregivers (married or unmarried), were of lower socioeconomic status (63.4%; Class IV or V; Hollingshead, 1975), and were White (75.7%). The primary caregiver included biological mothers (89.5%); step-, foster, or adoptive mothers (8.0%); and biological fathers (2.5%). The mean age of all caregivers at the time of treatment was 40.3 years ( $SD = 7.7$ ) and at the time of follow-up was 61.5 years ( $SD = 10.2$ ). About two thirds of the families had at least one caregiver with an arrest history prior to treatment (MST = 69.0%, IT = 72.6%). *T* tests and chi-square tests revealed that caregivers in the two treatment conditions (MST vs. IT) did not significantly differ in terms of demographic characteristics or pretreatment arrest histories.

The families were consecutively referred to the Missouri Delinquency Project between July 1983 and October 1986 and agreed to complete pretreatment and posttreatment assessment measures. Referrals to the project included all families in which the youth (a) had at least two arrests (i.e., convictions), (b) lived with at least one caregiver, and (c) had no evidence of psychosis or dementia. The 176 families who met these criteria were randomized by coin toss to either MST ( $n = 92$ , including 143 caregivers) or IT ( $n = 84$ , including 133 caregivers). The mean age of the youths at the time of their first arrest was 11.7 years ( $SD = 1.9$ ) and at the time of treatment was 14.5 years ( $SD = 1.4$ ). In addition, 69.3% of the youths were boys and 30.7% were girls. The arrest histories of the youths attested to their serious criminal involvement; the youths 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., sexual assault, assault and battery with intent to kill, aggravated assault).

### Treatment Conditions

Families were randomized to treatment conditions and to therapists within each condition. The mean numbers of hours of treatment were 20.7 ( $SD = 7.4$ ) for MST and 22.5 ( $SD = 10.6$ ) for IT; these means were not significantly different. Details about therapists and treatment fidelity are provided by Borduin et al. (1995) and Schaeffer and Borduin (2005).

**MST.** Interventions in this condition were based on the multisystemic approach to the treatment of behavior problems in adolescents and are explained in detail in a clinical volume (Henggeler & Borduin, 1990) and a treatment manual (Henggeler et al., 2009). The treatment emphases of MST fit closely with findings on the causes and correlates of serious juvenile offending (Lieberman, 2008; Loeber, Burke, & Pardini, 2009). MST uses family focused, action-oriented interventions to address systemic risk factors (e.g., low cohesion in family relations, association with problem peers, academic difficulties) that are linked with serious antisocial behavior in youths. MST also uses cognitive–behavioral interventions to address individual variables in youths (e.g., cognitive distortions, impulsivity) and their caregivers (e.g., psychiatric difficulties, substance abuse). Treatment is individualized and provided to youths and their caregivers in the natural environment (e.g., home, school, neighborhood).

A critical assumption in MST is that caregivers are usually the main conduits of change. MST addresses barriers to effective parenting (e.g., high levels of caregiver–youth conflict, caregiver mental health problems, difficulties relating with extrafamilial systems) as a primary clinical emphasis and empowers caregivers with the skills and resources needed to independently address youth problem behaviors. For example, caregivers learn to communicate more effectively with the youth, set clear rules and expectations for the youth's behavior, and monitor the youth's academic performance and peer relations. In addition, MST aims to surround caregivers with indigenous (i.e., extended family, friends, neighbors) support to sustain the changes achieved during treatment. Indeed, helping caregivers to surround themselves with positive social supports is critical to attenuating the stresses and strains of raising youths with behavioral problems and promoting positive adjustment in both youths and caregivers.

**IT.** Interventions in this condition were consistent with treatment as usual for juvenile offenders in the local judicial district and in the majority of other judicial districts as well (see Loeber & Farrington, 1998). All of the youths in this condition received individual therapy that focused on personal, family, and academic issues. This therapy provided support, feedback, and encouragement for behavior change. Therapists' theoretical orientations included a blend of psychodynamic (e.g., encouraging insight and expression of feelings), client-centered (e.g., developing a close relationship, providing empathy and warmth), and behavioral (e.g., providing social approval for school attendance and other prosocial behaviors) treatments. Although there were some differences in the therapists' techniques (e.g., some therapists provided more warmth or were less directive than other therapists), all focused on intervening with the individual youth rather than with his or her social ecology.

## Research Procedures

**Original outcome study.** Families referred to the treatment project were contacted by telephone or home visit and informed that a 1.5-hr research assessment would be conducted before the start of treatment and again after the end of treatment. Families were informed that participation in the research was voluntary and that refusing to participate or discontinuing participation would not jeopardize the receipt of treatment services or result in sanctions from the court. Families were also informed that arrest records and other public records would be obtained for individual family members at follow-ups. Family members provided written consent (caregivers) or assent (youths) for the research procedures. All procedures were approved by the institutional review board of the University of Missouri. Only those procedures and measures relevant to the present study are described below.

**Present study.** Public court records for caregiver arrests, sentencing, and civil suits were obtained within the state of Missouri. A broader search of criminal and noncriminal records in other states was not possible because fingerprints would have been needed to conduct a national records search, and these were not obtained from caregivers at the time of the original study. However, we assumed that most caregivers would still be residing in Missouri at follow-up and that criminal and noncriminal outcomes for those caregivers residing outside of Missouri did not systematically differ from outcomes for caregivers remaining in the state. In addition, we assumed that variation between treatment groups in criminal and noncriminal outcomes would be consistent whether the caregiver resided within or outside of Missouri.

The present study used procedures similar to those of Wagner et al. (2014) to determine whether and when each individual resided in Missouri during the follow-up period and, consequently, whether he or she was available to have a court record (i.e., arrests, sentencing, civil suits) in the state through May 2015, when the follow-up was completed. Accordingly, several steps were used to confirm residency. First, state court records were searched and all records dated after the end of treatment for a given caregiver were noted. Second, for those caregivers whose names did not appear in state court records, a search of state driver's license records was conducted; a caregiver was considered a Missouri resident if he or she held a Missouri driver's license. Third, property ownership and marital records were searched for caregivers for whom there were no court records or driver's license records. Each date of location, including the most recent date of location, was recorded for each caregiver.

Overall, 92.4% ( $n = 255$ ) of the caregivers were located and confirmed to have resided in Missouri at one or more points in time during the follow-up period, including those caregivers ( $n = 51$ ) who had died in Missouri before the end of follow-up. More specifically, we found 93.7% ( $n = 134$ ) of the caregivers in the MST condition and 91.0% ( $n = 121$ ) of the caregivers in the IT condition; attrition rates did not differ significantly between conditions. The 7.6% ( $n = 21$ ) of caregivers for whom residency could not be confirmed were considered lost to follow-up (see Figure 1). For the vast majority (90.2%) of caregivers who were located, the most recent date of location was 20.7 years or more after treatment ( $M = 25.6$ ,  $SD = 5.0$ , range = 1.6 to 31.2). Thus,

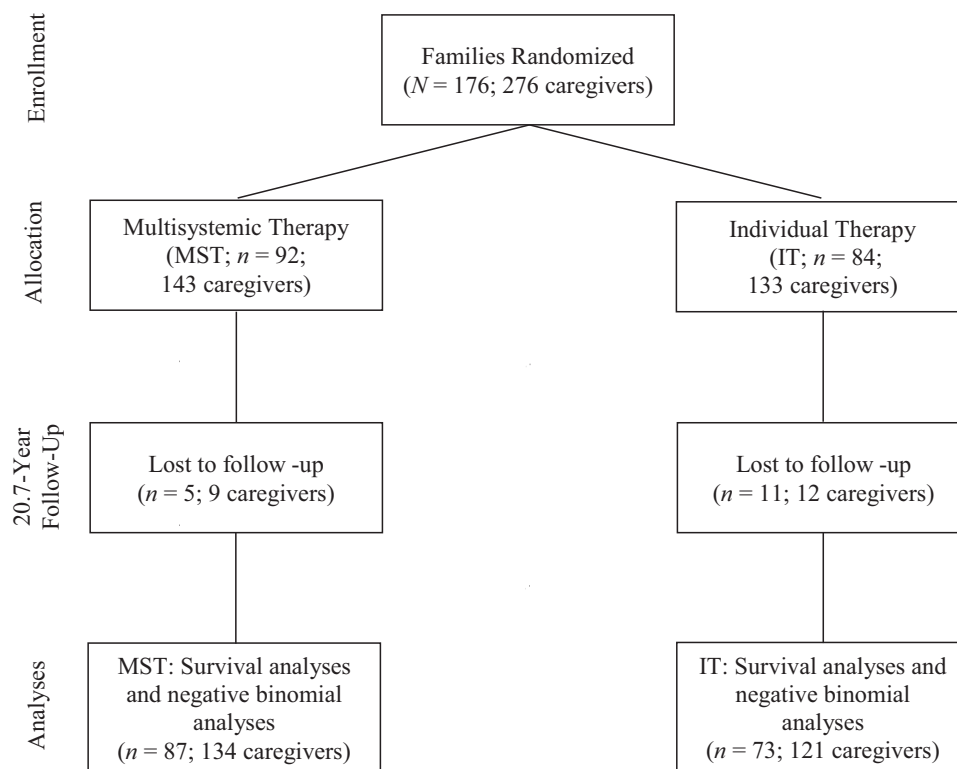


Figure 1. Flow diagram of families from referral to follow-up.

we considered the length of follow-up for this study to be 20.7 years (20.8 for MST and 20.5 for IT). The length of follow-up and number of caregivers who had died before the end of follow-up did not differ by treatment group. In addition, there were no demographic differences between caregivers located at follow-up versus caregivers considered lost to follow-up. The demographic characteristics of caregivers who were located at follow-up, as well as *T* tests and chi-square tests that demonstrate no differences in these characteristics between the two conditions (MST vs. IT), are presented in Table 1.

## Outcome Measures

Criminal and civil court records, which are freely available to the public in the state of Missouri, were obtained using an Internet database searched separately by two research assistants, both of whom were blind to each caregiver's treatment condition. Court records were searched using caregivers' names, known aliases, alternative first names (e.g., Dick for Richard), and alternative last names for female caregivers whose names may have changed due to marriage or remarriage (based on state-level court records and county-level marriage records).

Several steps were taken to reduce the possibility of false positives for those caregivers whose names were present in court records. First, caregivers were matched to records by date of birth, middle name or middle initial, and suffix (e.g., Jr.). Second, when such indicators were absent for a given case, the caregiver was matched to records based on similarity 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). For cases in which caregivers could not be matched to records by this rule-out process, no information was recorded. Thus, the data for the current study provided a conservative esti-

mate of criminal and civil court involvement in the state of Missouri.

Criminal record data were coded by crime classification (i.e., felony or misdemeanor) and date of arrest. In addition, sentencing data were recorded as the number of days sentenced to (a) incarceration, (b) probation, or both. When an incarceration sentence had been suspended in favor of probation, only the days sentenced to probation were recorded, unless the terms of probation had been violated and the incarceration sentence was executed. Only criminal arrests that had resulted in convictions were included in the present study. Criminal cases that had been dismissed or not yet disposed at the time of data collection were not recorded. Minor traffic violations (e.g., speeding) were not included in the data set.

Civil suits reflective of family instability (i.e., divorce, paternity, and child support suits) were recorded regardless of whether the caregiver was the petitioner (i.e., person who filed the suit) or the respondent (i.e., person against whom the suit was filed) because it was assumed that both petitioners and respondents would likely experience family conflict and instability surrounding such suits. Again, only those cases disposed at the time of data collection were recorded.

The two research assistants received approximately 20 hr of training prior to the actual coding of criminal and civil court records. Interrater reliability was checked throughout the study and was determined on 30% of the caregivers. No discrepancies were found between the results obtained by the research assistants ( $k = 1.0$ ).

## Measures of Potential Mediators of Treatment Effects

We examined three sets of hypothesized mediators of treatment effects on caregivers' long-term outcomes. The putative mediators included caregiver psychiatric symptoms, family relations, and youth criminal activity (i.e., arrests). The measures of psychiatric symptoms and family relations were completed during the aforementioned 1.5-hr pretreatment and posttreatment assessment sessions in the original clinical trial. We also included measures of youth criminal behavior at both (a) posttreatment (i.e., from pretreatment to posttreatment assessment in the original clinical trial) and (b) a 13.7-year follow-up (i.e., from posttreatment to follow-up, when the youths were on average 28.8 years old; Schaeffer & Borduin, 2005). Each of the mediators that was selected had demonstrated favorable outcomes in prior clinical trials of MST with juvenile offenders (e.g., Borduin et al., 2009; Henggeler et al., 1986), including the trial on which the present study is based (Borduin et al., 1995).

**Psychiatric symptomatology.** Symptomatology in caregivers was assessed with the Symptom Checklist-90—Revised (SCL-90-R; Derogatis, 1983), a 90-item self-report inventory that includes nine subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The items are rated on a scale ranging from 0 (*not bothered in the previous week by the symptom*) to 4 (*extremely bothered by the symptom*). The Global Severity Index (GSI), which is considered the best single index of respondent emotional distress, was used to provide an overall symptom score for the sole caregiver in single-caregiver homes and for both caregivers (average score) in two-caregiver homes. The GSI is formed by summing scores across items and dividing

Table 1  
*Demographic Characteristics of Caregivers Located at Follow-Up*

Variable	Group		Analyses	
	MST	IT	<i>T</i>	$\chi^2$
Age <sup>a</sup> (years)			0.89	
<i>M</i>	40.9	40.0		
<i>SD</i>	9.2	7.7		
Female gender (%)	60.4	57.0		0.31
Social class <sup>b</sup> (%)				3.53
Class V	20.0	12.5		
Class IV	14.1	22.2		
Class III	28.2	33.3		
Class II	30.6	25.0		
Class I	7.1	6.9		
Race (%)				0.37
African American	20.9	25.6		
White	79.1	74.4		
Two-caregiver households (%)	56.3	67.1		1.95

*Note.* Sample sizes for therapy conditions are as follows: individual therapy (IT;  $n = 121$ ); multisystemic therapy (MST;  $n = 134$ ). For age,  $df = 253$ ; for social class,  $df = 4$ ; for gender, race, and two-parent households,  $df = 1$ . For all *T* and  $\chi^2$  values,  $ps > .05$ .

<sup>a</sup> Age as reported at the beginning of treatment. <sup>b</sup> Based on Hollingshead's (1975) Four-Factor Index of Social Status.

by the total number of items. Coefficient alpha for the GSI in the present study was .94.

**Family relations.** We included measures of both self-reported family functioning and observed family interactions.

**Perceived family functioning.** Caregiver and youth perceptions of family relations were evaluated with the 30-item Family Adaptability and Cohesion Evaluations Scales—II (FACES-II; Olson, Portner, & Bell, 1982). The FACES-II assesses the dimensions of adaptability, which refers to the capacity of the family system to change its power structure, role relations, and relationship rules in response to situational and developmental stress, and cohesion, defined as the emotional bonding and individual autonomy of family members. The Likert-type items are rated on a scale from 1 (*almost never*) to 5 (*almost always*). Coefficient alphas for the adaptability and cohesion subscales, respectively, were .78 and .90 for caregivers' reports, and .83 and .88 for youths' reports. Family composite ratings of adaptability and cohesion were created by averaging caregiver and youth scores on each scale.

**Observed family interactions.** Observational measures were based on a videorecorded family interaction task in which the caregiver(s) and youth discussed nine items pertaining to family affect, decision making, and discipline (see Borduin et al., 1995; Mann et al., 1990). Family members were instructed to work at their own pace in completing the task (mean discussion time = 11.81 min). Two measures that have been widely used by developmental and clinical researchers (see Alexander, 1973; Kerig & Lindahl, 2001; McHale, 1997) were coded by raters. The first measure was the frequency of caregiver–youth defensive communication statements; to control for differences in lengths of family discussions, the frequencies of defensive statements were converted to rates by dividing by the corresponding family members' talking times. The second measure was a global 7-point rating of caregiver–youth conflict, which was completed after the raters had watched the entire videotaped discussion. Interrater reliability was checked throughout the original clinical trial and was determined on 30% of the families. The Pearson product–moment correlation coefficient for defensive communication statements was .85, and the Cohen's kappa value for the global rating of conflict was .83.

**Youth criminal activity.** We used arrest data that were previously obtained for each youth based on procedures described more fully in the original clinical trial (Borduin et al., 1995) and a subsequent follow-up (Schaeffer & Borduin, 2005). These data were collected in Missouri from both the juvenile court (for youths below 17 years of age) and state public court records (for individuals 17 years of age and above, as well as youths waived to adult court).

### Measures of Potential Moderators of Treatment Effects

We also examined demographic and criminal history variables as possible moderators of treatment effects on caregivers' long-term outcomes. These variables included caregiver age (in years) at time of treatment, race (all families were African American or White), number of caregivers in the home (one vs. two), socioeconomic status (five categories based on the work of Hollingshead, 1975), gender, and number of pretreatment arrests.

## Results

We conducted three sets of analyses to evaluate differences between treatment groups (MST vs. IT) on criminal and civil court outcomes for caregivers in each family. First, we used descriptive statistics to examine the percentages and relative odds of dichotomous outcomes (e.g., arrested vs. not arrested) for each group. Second, we conducted survival analyses to evaluate between-groups differences in length of time to the first occurrence of a given outcome (i.e., arrests, civil suits). Third, we used negative binomial regression analyses to estimate between-groups differences on continuous outcomes (i.e., number of arrests, days sentenced, and civil suits). In addition, causal mediation analyses were used to evaluate the effects of potential mediators of treatment on criminal and civil court outcomes, and negative binomial regression analyses were used to evaluate the effects of potential moderators of treatment.

Households (i.e., families) were used as the unit of analysis because caregivers were nested within households. Of the 255 caregivers located for the present follow-up, 61.3% resided in two-caregiver homes. Using households as the unit of analysis is also consistent with the reality that, in many families, caregivers function as a unit whether in regard to their own behavior (e.g., criminal activity) or the socialization of their children (e.g., parenting practices). Furthermore, caregivers who live in the same home are likely to share the same attitudes and beliefs about criminality (Capaldi, Kim, & Shortt, 2004; Herrera, Wiersma, & Cleveland, 2011; Moffitt, Caspi, Rutter, & Silva, 2001). Thus, in two-caregiver households in the present study, the occurrence of a given outcome (i.e., arrests, days sentenced, civil suits) was based on at least one of the caregivers in the household having experienced the outcome, whereas the nonoccurrence of a given outcome was based on neither caregiver having experienced the outcome. In single caregiver households, each outcome depended on the sole caregiver alone. To examine whether using households as the unit of analysis introduced bias when there were two caregivers, we compared one- and two-caregiver households on each outcome variable; *T* tests revealed that one- and two-caregiver households did not significantly differ on any of the outcome measures.

### Relative Odds of Arrests and Civil Suits

We calculated the percentages and relative odds of arrests and civil suits in the IT group versus the MST group. Odds ratios greater than 1.0 indicated higher odds for caregivers in IT households relative to caregivers in MST households. Confidence intervals that did not include 1.0 indicated that results were unlikely to occur by chance (J. Cohen, 1994). As described in Table 2, 13.7% of IT households (i.e., families) versus 1.1% of MST households had a caregiver who had been arrested at least once for a felony offense by the end of the 20.7-year follow-up period. The odds of arrest for any felony offense during follow-up were 13.65 times higher for caregivers in IT households than for caregivers in MST households ( $p = .002$ ). Similarly, when family civil suit outcomes were examined, 24.7% of IT households versus 11.5% of MST households had a caregiver who had been involved in at least one civil suit related to family instability. The odds of being involved in suits related to family instability were 2.52 times greater for caregivers in IT households than for caregivers in MST households ( $p = .029$ ).

Table 2  
Percentages and Odds of Arrests and Civil Suits During Follow-Up by Therapy Condition

Variable	%	OR	95% CI
Criminal arrests			
Felony		13.65	[1.70, 109.40]
IT	13.7		
MST	1.1		
Misdemeanor		1.69	[0.79, 3.62]
IT	26.0		
MST	17.2		
Family civil suit		2.52	[1.08, 5.89]
IT	24.7		
MST	11.5		

Note. Households (i.e., families) were used as the unit of analysis; sample sizes for therapy conditions are as follows: individual therapy (IT;  $n = 73$ ); multisystemic therapy (MST;  $n = 87$ ). OR = odds ratio; CI = confidence interval.

### Survival Functions for Arrests and Civil Suits

Survival analyses (Cox proportional hazards regressions; IBM SPSS for Windows, Version 22.0) were used to obtain cumulative survival functions (or survival curves) for caregiver criminal and civil suit outcomes in families of youths who received either MST or IT. The cumulative survival function represents the proportion of households with caregivers who survived any type of arrest or civil suit (i.e., were not arrested or involved in a civil suit, respectively) in each group by the length of time (in years) from release from treatment. Survival analyses are appropriate here because they model data that are censored (i.e., when some individuals in the sample do not experience an event, such as an arrest; Keiley & Martin, 2005).

A log-rank test (with the Kaplan–Meier estimator; Kaplan & Meier, 1958) revealed that the survival functions for the two groups on felony arrests were significantly different,  $\chi^2(1, N = 160) = 9.76, p = .002$ , with caregivers in MST households at lower risk of arrest for a felony offense (i.e., more likely to survive) during follow-up than were caregivers in IT households (see Figure 2). The hazard ratio for treatment condition was 0.97, suggesting a large effect size for the lower risk of felony arrest observed for caregivers in MST households. The difference in survival probability between treatment groups for misdemeanor offenses was not significant ( $p = .23$ ).

We also used survival analyses to compare caregivers in MST and IT households on time to a civil suit related to family instability. As depicted in Figure 3, caregivers in MST households were at lower risk of involvement in family instability suits than were caregivers in IT households,  $\chi^2(1, N = 160) = 4.57, p = .03$ . The hazard ratio indicated a large effect of treatment group on family instability suit involvement ( $\beta = 0.97$ ).

### Number of Arrests, Days Sentenced, and Civil Suits

We evaluated the impact of treatment condition on the number of caregiver criminal and civil suit outcomes in families of youths who received either MST or IT. Because the outcome variables in the present study are continuous, nonnormal, and nonnegative (i.e., there are no negative values), they are considered censored-dependent variables (Greene, 1993). In addition, the majority of

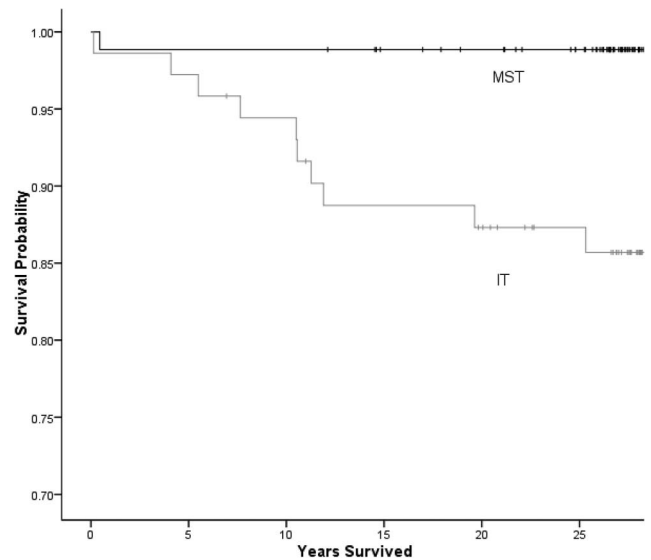


Figure 2. Survival functions for caregivers in multisystemic therapy (MST) and individual therapy (IT) households on time to first felony arrest following treatment.

the variables were overdispersed (i.e., variance exceeded mean). Accordingly, as recommended by Osborn and Tseloni (1998), negative binomial regression analyses were used to evaluate between-groups differences in the number of (a) posttreatment arrests, (b) days sentenced to incarceration or probation, and (c) posttreatment civil suits. These differences were expressed as the rate of a given outcome among caregivers in IT households relative to caregivers in MST households. We computed all negative binomial regressions using the package (“MASS”) developed by Venables and Ripley (2002) in R (version 3.1.2; RCore Team, 2014). Treatment condition was dummy coded with IT equal to 1

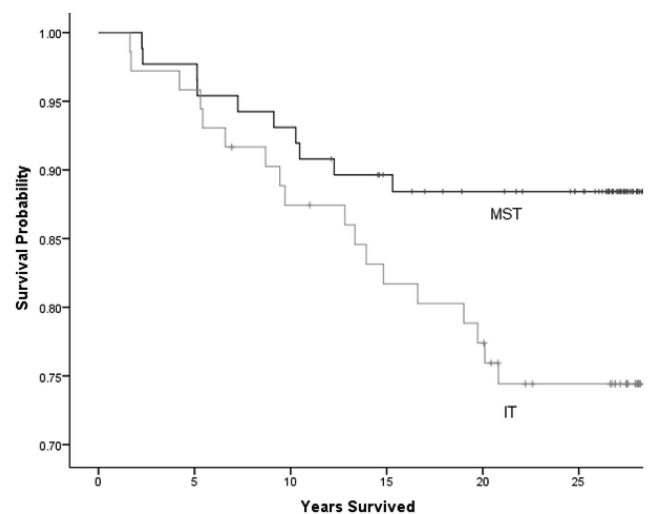


Figure 3. Survival functions for caregivers in multisystemic therapy (MST) and individual therapy (IT) households on time to first civil suit related to family instability following treatment.

and MST equal to 0. Descriptive statistics and regression coefficients are presented in Table 3.

Regarding criminal outcomes, the results revealed that the estimated rate of felony arrests for caregivers in IT households was 3.41 times higher than for caregivers in MST households. In addition, the estimated rate of misdemeanor arrests was 1.55 times higher for caregivers in IT households than for their MST counterparts. Moreover, results demonstrated that the estimated rates of days sentenced to incarceration and probation, respectively, were 1.40 and 1.17 times greater for IT caregivers than for MST caregivers. Regarding civil suit outcomes, results indicated that the estimated rate of involvement in family instability suits was 4.29 times greater for caregivers in IT households relative to caregivers in MST households.

### Potential Mediators of Arrests, Days Sentenced, and Civil Suits

Causal mediation analyses (Imai, Keele, & Tingley, 2010; Tingley, Yamamoto, Hirose, Keele, & Imai, 2014) were used to estimate whether the favorable effects of MST on caregiver long-term outcomes were mediated by pre- to posttreatment (a) decreases in caregiver psychiatric symptomatology, (b) improvements in family relations, and (c) decreases in youth criminal activity; we also examined the possible mediating effects of decreases in youth/adult criminal activity from posttreatment to a 13.7-year follow-up. Confidence intervals that did not include zero indicated that results were unlikely to occur by chance. The causal mediation framework developed by Imai and colleagues (2010) is capable of testing mediation for linear models with continuous and count variables, which makes it an ideal technique for analyzing our outcome data. We computed all causal mediation analyses using the package ("Mediation") developed by Tingley et al. (2014) in R (version 3.1.2; R Core Team, 2014).

Although the youths (and their households) were randomly assigned to MST or IT, it was important to control for possible between-groups differences on caregiver psychiatric symptomatology, family relations, and youth criminal activity at pretreatment. Thus, residualized change scores were calculated for each group on these variables. The residuals derived from this procedure were used as the indices of change. In addition, we used multiple imputation (Little & Rubin, 2014) to estimate missing data at posttreatment on the measures of psychiatric symptomatology and

family relations, which were equally distributed across the treatment dropouts in MST ( $n = 8$ ) and IT ( $n = 12$ ).

As shown in Table 4, the results revealed significant causal mediating effects for improvements in family relations but not for decreases in caregiver global psychiatric symptomatology (i.e., the GSI on the SCL-90-R) or youth criminal arrests (i.e., neither from pretreatment to posttreatment, or from posttreatment to 13.7-year follow-up). Thus, the remainder of this section will focus on the results for the causal mediating effects of improved family relations on MST outcomes for caregivers (i.e., criminal arrests, punitive sentencing, family civil suits).

**Criminal arrests.** An increase in family members' perceived cohesion on the FACES-II mediated the decreased rates of both felony and misdemeanor arrests for MST households, although the mediating effect on misdemeanor arrests was marginally significant ( $p < .10$ ). In addition, a reduction in observed caregiver-youth defensive communication mediated the positive effect of MST on rates of caregiver felony arrests.

**Punitive sentencing.** An increase in family members' perceived cohesion also mediated the decreased number of days that caregivers were sentenced to either incarceration or probation in MST households, although the mediating effect on days sentenced to probation was only marginally significant ( $p < .10$ ). In addition, the results showed that a reduction in observed caregiver-youth defensive communication mediated the positive effect of MST on days that caregivers were sentenced to incarceration. Furthermore, a decrease in observed conflict in caregiver-youth relations mediated the effect of MST on days that caregivers were sentenced to probation.

**Family civil suits.** An increase in family members' perceived adaptability on the FACES-II mediated the positive effect of MST on caregivers' involvement in family instability civil suits. In addition, the observational measures revealed two mediated effects: Both decreased conflict and decreased defensive communication mediated the decrease in involvement in family instability suits for MST households.

### Potential Moderators of Arrests, Days Sentenced, and Civil Suits

Negative binomial regression analyses were also used to evaluate the effects of potential moderators (age, race, two-caregiver

Table 3  
Descriptive Statistics and Negative Binomial Regression Results for Criminal and Civil Suit Outcomes

Variable	MST		IT		Regression coefficient
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Criminal arrests (no.)					
Felony	0.02	0.21	0.34	1.06	3.41***
Misdemeanor	0.24	0.60	0.81	2.03	1.55**
Punitive sentencing (days)					
Incarceration	21.98	195.61	274.61	1,171.32	1.40*
Probation	107.06	272.24	379.79	1,050.15	1.17***
Family civil suits (no.)	0.13	0.37	0.26	0.50	4.29*

Note. IT = individual therapy; MST = multisystemic therapy. Households (i.e., families) were used as the unit of analysis; sample sizes for therapy conditions are as follows: IT ( $n = 73$ ); MST ( $n = 87$ ).

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



Table 4  
Causal Mediation Analyses Evaluating Family Relations Measures as Mediators of Multisystemic Therapy Outcomes

Outcome variable	Self-report measures (FACES-II)				Observational measures			
	Adaptability		Cohesion		Conflict		Defensive communication	
	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI
Criminal arrests								
Felony	0.01	[-0.04, 0.08]	0.06*	[0.01, 14.27]	0.03	[-0.06, 0.14]	-0.12*	[-0.27, 0.01]
Misdemeanor	0.02	[-0.09, 0.14]	0.07 <sup>†</sup>	[-0.02, 0.22]	0.03	[-0.06, 0.13]	0.21	[-0.92, 1.34]
Punitive sentencing								
Incarceration	16.21	[-25.31, 77.19]	63.34*	[2.31, 166.65]	44.43	[-53.38, 162.30]	-173.43**	[-348.02, 395.01]
Probation	42.74	[-12.23, 120.54]	39.36 <sup>†</sup>	[-8.20, 115.18]	-142.98***	[-266.70, -44.89]	-104.61	[-268.39, 157.83]
Family civil suits	-0.03*	[-0.08, 0.01]	-0.01	[-0.05, 0.01]	0.13*	[0.02, 0.25]	0.07*	[0.01, 0.16]

Note. Sample sizes for therapy conditions are as follows: individual therapy ( $n = 73$ ); multisystemic therapy ( $n = 87$ ). FACES-II = Family Adaptability and Cohesion Evaluation Scales—II; CI = confidence interval.

<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

household, socioeconomic status, gender, and pretreatment arrests) of MST effectiveness. These potential moderators were examined for all outcomes with significant or near-significant treatment effects (i.e., numbers of felonies, misdemeanors, civil suits related to family instability, days sentenced to incarceration, and days sentenced to probation). For each regression analysis, a dummy variable that represented treatment group, the moderating variable, and the cross-product term of the treatment group and the moderating variable were entered simultaneously. Moderator variables that were continuous were centered around their means in each cross-product term. A significant regression coefficient for the cross-product term indicated whether MST was differentially effective with caregivers from divergent backgrounds. The regression analyses revealed that none of the coefficients for the cross-product terms (i.e., moderator effects) were significant.

## Discussion

The present study represents the first follow-up of caregivers of serious juvenile offenders who participated in an MST clinical trial. The results indicated that caregivers of MST participants were less likely to be arrested for felony crimes than were caregivers of IT participants (1.1% vs. 13.7%, respectively) within 20.7 years of treatment termination. More specifically, caregivers in the MST condition had 94% fewer felonies than did caregivers in the IT condition. In addition, caregivers in the MST condition had 70% fewer misdemeanor arrests than did caregivers in the IT condition. Furthermore, caregivers of MST participants were sentenced to 92% fewer days of incarceration and 72% fewer days of probation than were caregivers of IT participants. Moreover, caregivers in the MST condition had 50% fewer family-related civil suits than did comparison counterparts. Notably, the favorable effects of MST on caregiver criminality and civil suits were mediated by improved family relations as indexed by both self-report and observational measures. In addition, the relative efficacy of MST was not moderated by measured demographic characteristics (e.g., race, gender, social class), suggesting that the effectiveness of MST did not vary significantly by caregiver background.

The results demonstrate that MST produced long-lasting reductions in arrests and incarceration among caregivers from the orig-

inal clinical trial (Borduin et al., 1995). These findings build on those of previous follow-ups of the original trial in which youth offenders (Sawyer & Borduin, 2011) and their closest-in-age siblings (Wagner et al., 2014) who received MST were less likely to be arrested and imprisoned for serious crimes more than two decades following treatment. Although it seems likely that some of the caregivers in the present study had already desisted from criminal offending at the time of treatment (see Farrington, Coid, & West, 2009), our results show that MST has long-term benefits for those caregivers whose criminal activity would likely continue in midlife and beyond. Moreover, the findings suggest that MST is an effective treatment for families of juvenile offenders in which more than one individual is at elevated risk to engage in criminal behavior (see Farrington et al., 2001).

The relative impact of MST in reducing caregiver criminal activity is likely due, at least in part, to the emphasis that MST places on the identification and amelioration of barriers to effective parenting. Indeed, as hypothesized, the results of the causal mediation analyses suggested that favorable MST effects on long-term outcomes for caregivers (i.e., criminal arrests and days sentenced) were mediated by decreased negativity in family relations (i.e., defensive communication, conflict) and increased family warmth (i.e., cohesion). On the other hand, contrary to expectations, the positive effects of MST on caregiver criminality were not mediated by reductions in another important barrier to effective parenting (i.e., caregiver psychiatric symptomatology) nor by reductions in youth criminal offending. Even so, it is possible that other aspects of caregiver individual adjustment (e.g., substance abuse) and of youth functioning (e.g., positive attitudes toward delinquency) that were not measured in the original clinical trial (and thus could not be evaluated as mediators in the present study) also serve as mechanisms of change that lead to favorable outcomes for caregivers in MST. For the present, it seems reasonable to suggest that treatments for serious juvenile offenders that do not target family causes and correlates of antisocial behaviors in youths, such as the IT condition in the present study, are unlikely to have long-term benefits for caregivers.

Civil court records showed that caregivers of youths who participated in MST were involved in 50.0% fewer suits related to family instability (i.e., divorce, paternity, or child support) than

were caregivers of youths who received individual therapy. Similar to the findings for caregiver criminality, the positive effect of MST on caregiver civil suits was mediated by reductions in caregiver–youth conflict and defensive communication, again suggesting that the amelioration of high levels of negative emotionality between family members is an important mechanism of change for caregiver outcomes in MST. Interestingly, and unlike the mediational results for caregiver criminality, the favorable effect of MST on civil suits was also mediated by increased family adaptability. Assuming the veracity of this latter finding, it supports a central emphasis of MST—the empowerment of caregivers to make positive changes in the family in response to developmental and situational stress. Although caregiver empowerment in MST is typically aimed at reducing antisocial behavior in adolescents, it appears that helping caregivers to be more adaptable in managing family problems may play a key role in preventing long-term difficulties in family relations (i.e., as indexed by divorce, paternity, or child support suits). In future work, we plan to more directly assess long-term family relations and other domains of functioning among caregivers (e.g., physical health, social support) and their children (e.g., educational achievement, emotional adjustment, marital quality) who participated in MST.

The collective results of this study have implications for the cost savings and fiscal viability of MST. Indeed, a family-based treatment that is clinically effective is also likely to be cost-effective. A recent cost–benefit study with the 176 families from our original clinical trial indicated that reductions in criminality associated with MST produced lasting economic benefits for both taxpayers and crime victims at a 25-year follow-up, with cumulative benefits of MST estimated at \$35,582 per juvenile offender and \$7,798 per sibling (Dopp, Borduin, Wagner, & Sawyer, 2014). The relative efficacy of MST in reducing caregiver criminality and incarceration, as demonstrated in the current study, should result in even greater cumulative benefits of MST, creating a persuasive argument for increased funding of MST and other evidence-based family interventions for serious juvenile offenders (e.g., Treatment Foster Care Oregon [Chamberlain, 2003]; Functional Family Therapy [Alexander & Parsons, 1982]).

It should be noted that the present study has several methodological limitations. First, we were unable to confirm that caregivers maintained continuous residence in Missouri for the entire follow-up period and we cannot rule out the possibility that some caregivers may have committed crimes in other states. Even so, it seems unlikely that length of residency in the state would vary systematically by treatment condition. Moreover, at least partial outcome data were available for the entire sample, and complete follow-up data were available for 90.2% of the sample through 20.7 years of follow-up. Second, we measured caregiver involvement in criminal activity during the follow-up using arrest records, which are believed to underestimate the actual number of crimes committed by offenders (e.g., Elliott, 1995; Farrington et al., 2009). Nevertheless, arrest records are one useful index of involvement in criminal activity and likely provided an accurate estimate of the relative effectiveness of MST versus IT in reducing caregiver criminal behavior. Third, the original clinical trial used a pretest–posttest design and did not measure potential mediating variables at other times during the course of treatment. As such, it is possible that some important mediational pathways were missed because they had already been completed by the time of the

posttreatment assessment. Fourth, it was not possible for us to track ongoing contact between caregivers and youths following treatment because resources were not available to do so. However, based on the positive changes in caregiver–youth relations that were observed for MST participants during the original clinical trial (Borduin et al., 1995), we assume that these caregivers and youths continued to enjoy better relations with each other following treatment (and thus spent more time engaged in supportive communication and family activities) than did their counterparts who participated in IT. Fifth, although we examined several dimensions of family relations as putative mediators of caregiver outcomes in the present study, measures of other potentially important family-related mediators (e.g., caregiver monitoring; see Huey, Henggeler, Brondino, & Pickrel, 2000) could not be examined because they were not included in the original trial.

In summary, the current findings demonstrate that the long-term positive effects of MST extend to caregivers of juvenile offenders. Over a follow-up period of two decades, MST produced lasting reductions for caregivers in a broad range of criminal outcomes and in civil suits related to family instability. Moreover, the favorable effects of MST on caregiver outcomes during follow-up were mediated by positive changes in family relations during treatment. These results are important because they suggest that the process of change in MST, which addresses barriers to parenting and empowers caregivers to be more effective with their youths (e.g., increased cohesion and adaptability, reduced conflict and defensive communication), has enduring benefits for caregivers' own functioning. Our findings likely reflect improved life trajectories for the caregivers, increased cost savings for society, and lower risks of victimization for community members. We encourage researchers to investigate whether other family-based treatments for child and adolescent clinical problems have durable positive effects on caregivers.

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