Gang involvement moderates the effectiveness of evidence-based intervention for justice-involved youth

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ABSTRACT

There are no validated, evidence-based intervention approaches to helping youth who are involved in gang activity. The goal of this study was to evaluate the impact of gang involvement on the effectiveness of evidence-based intervention services for problem behavior delivered to youth referred by the justice system. We analyzed data drawn from 421 youth (69% male; M age = 15.08 years, SD = 1.32; 38% Black/African-American, 18% Latino/a, 34% White, 10% other) referred consecutively over a 13-month period for Multisystemic Therapy (MST; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009) across clinical service sites in 7 different Eastern states of the US. Outcomes were indicated by successful or unsuccessful case closures, and gang involvement was indicated by a validated multi-factored classification scheme. We conducted analyses of outcomes related to gang involvement for the whole sample as well as a propensity score-matched (PSM) reduced sample. Analyses of treatment success rates indicate that gang involvement significantly and substantially reduces the effectiveness of MST in this population.

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1. Introduction

Gang activity is more entrenched and more widespread than in years past (Dinkes, Kemp, Baum, & Snyder, 2009; Egley & Howell, 2013; Robers, Kemp, Rathbun, Morgan, & Snyder, 2014). Youth involved in gangs exhibit very high levels of violent and nonviolent antisocial behavior relative to their peers who are not in gangs, and even in comparison to other youth who are involved in antisocial behavior but not in gangs (Barnes, Beaver, & Miller, 2010; Boxer, Veysey, Ostermann, & Kubik, 2015; Dishion, Véronneau, & Myers, 2010; Howell & Egley, 2005). Although antisocial youth in general experience a broad array of personal and contextual risk factors (Dodge & Pettit, 2003; Guerra & Huesmann, 2004), gang-involved youth tend to encounter levels of risk substantially higher and more broadly-based than do typical antisocial youth who are not gang-involved (Barnes et al., 2010; Boxer et al., 2015). These issues pose a significant challenge to practitioners, scholars, and policymakers attempting to intervene with youth involved in gang activity, even beyond the acknowledged difficulties with intervening in youth violence and delinquency more generally (Boxer & Goldstein, 2012; Simon, Ritter, & Mahendra, 2013; Thornton, Craft, Dahlberg, Lynch, & Baer, 2000).

Despite the existence of several "best practice," evidence-based approaches to helping antisocial youth (Henggeler & Schoenwald, 2011; Hoge, Guerra, & Boxer, 2008), no single approach has been identified as efficacious or even effective for reducing problem behavior or otherwise improving functioning for gang-involved youth (Boxer & Goldstein, 2012). In fact, via analysis of retrospective clinical chart data, Boxer (2011) found that involvement with gangs significantly and substantially diminishes the effectiveness of a recognized best-practice intervention (i.e., Multisystemic Therapy [MST]). This is a striking observation given that MST targets peer group factors as a principal driver of positive change (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009; Huey, Henggeler, Brondino, & Pickrel, 2000). In the present study, we explore this issue further via a quasi-experimental prospective field study of MST effectiveness for gang-involved youth compared to uninvolved youth in a sample of justice-referred cases. Our study drew data from routine service delivery in the field. Cases were assessed at service intake for gang affiliation and followed through service discharge, and treatment effectiveness was determined by successful case closure (i.e., all treatment goals met). We examined effectiveness in relation to a variety of indicators of gang involvement across our full sample as well as a reduced sample created through propensity score matching of gang-involved youth to uninvolved peers on an array of background characteristics.

1.1. Evidence-based interventions for antisocial youth

There currently is a great need for effective intervention services in the juvenile justice population, which by all accounts is quite large. The most recent official estimates from the US Department of Justice note that in 2010 there were 1.37 million juvenile arrests, which

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included 347,000 arrests for person crimes with 71,000 for index violent crimes (Puzzanchera & Hockenberry, 2010). This report also estimated that about 31 million juveniles were on some form of court supervision (e.g., probation, parole) in 2010. Unaddressed, youth antisocial behavior exerts considerable costs on victims, perpetrators, and society more broadly (Boxer & Frick, 2008). Interventions for antisocial youth vary widely and cover a wide range of services, from school-based "pull out" programs, to outpatient counseling services, to intensive, home-based family therapy services (Boxer & Dubow, 2002; Boxer & Frick, 2008; Guerra, Boxer, & Kim, 2005). Although antisocial youth can be referred by a number of different potential sources (e.g., caregivers, teachers, judges), many are brought into contact with helping professionals after contact with the justice system. Importantly, the justice system also appears to be the primary referral source for the most well-established intervention packages for youth exhibiting high levels of problem behavior (see Henggeler & Schoenwald, 2011), and some of the most extensive "vetting" of intervention practices has been conducted with juvenile justice programming (Lipsey, 2009).

Many of the treatment services used currently in the juvenile justice system have proven to be ineffective for reducing antisocial behavior (e.g. residential placement, shock incarceration, surveillance) and in fact have resulted in the unintended consequences of increasing antisocial behavior (Henggeler & Schoenwald, 2011). The most effective services available to youth in the justice system are those that divert youth into community-based services. These effective interventions are behavioral in nature, target specific cross-system risk factors in the maintenance of problem behavior, emphasize family dynamics, and focus on building the positive parenting skills of caregivers (Boxer & Frick, 2008; Boxer & Goldstein, 2012; Greenwood, 2008; Guerra, Williams, Tolan, & Modecki, 2008; Henggeler & Schoenwald, 2011; Howell, 2003; Lipsey, 2009). Evidence-based services for juveniles generally are considered effective or "best practice" based on the following criteria: evaluation through experimental designs, successful replication across multiple sites with different lead evaluators, significant deterrence of antisocial behavior, and sustainability of effects for at least one year (see Henggeler & Schoenwald, 2011).

Only three programs (out of hundreds vetted) for justice-involved youth have been identified as best-practice, "model" programs by the University of Colorado's *Blueprints for Healthy Youth Development* (formerly *Blueprints for Violence Prevention*) initiative (Boxer & Goldstein, 2012; Henggeler & Schoenwald, 2011). These are Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003), Functional Family Therapy (FFT; Alexander & Parsons, 1982), and Multisystemic Therapy (MST; Henggeler et al., 2009). Although these programs vary with respect to the risk levels and settings of service delivery for their target populations, they share the basic foundation of behaviorally-based intervention involving multiple systems and placing the onus of sustained change on caregivers and caregiver-youth dynamics (Boxer & Frick, 2008). All three programs typically serve youth who have been directly referred by or to some extent involved in the juvenile justice system, and increasingly all three are addressing youth with particular co-occurring conditions such as mental health diagnoses, substance abuse, and child welfare system involvement (MTFC primarily serves the child welfare community).

The present study examines specifically the application of MST to gang-involved youth referred by the justice system. MST is a multiple-component intervention strategy for youth bridging agents from various community-based agencies in the service of assisting individual youth and their families. Interventions are implemented and managed by masters-level therapists with small caseloads (5 or fewer at any time) and close expert supervision. Over 30 separate studies have demonstrated the efficacy of MST, including effects sustained over 20 years (Sawyer & Borduin, 2011; also see http://mstservices.com/outcomestudies.pdf), and MST has been recognized as a model program by a number of evaluative entities including the US Department of Justice and the US Surgeon General. Although a fair amount of research has examined the

dissemination and implementation of MST in "real world" clinical service environments (Glisson et al., 2010; Schoenwald, 2008), less work by comparison has investigated directly the outcomes of MST as delivered in these environments.

As with MTFC and FFT, MST promotes change through systemic intervention and the promotion of new, positive behavioral patterns and social experiences. Most relevant to interventions for gang-involved youth, positive outcomes in MST are mediated in part by declines over time in delinquent peer affiliations (Huey et al., 2000). Addressing peer factors in intervention for gang-involved youth should be essential to treatment success in this population (Boxer, 2014), but is not necessarily accomplished easily (Boxer, 2011) — and at present, no individually-focused interventions for gang-involved youth have shown effectiveness to the same degree as MST, FFT, or MTFC (Boxer & Goldstein, 2012; Howell, 2012; Parker, Negola, Haapanen, Miranda, & Asencio, 2008).

1.2. Intervening with gang-involved youth

A variety of personal and ecological risk factors increase the likelihood of youth becoming involved in antisocial behavior (see, e.g., Dodge & Pettit, 2003; Guerra et al., 2008). Many if not most of the factors associated with antisocial behavior generally – for example, socioeconomic strain in families and neighborhoods, poor parental monitoring or supervision of youth behavior, and problems related to academic engagement and achievement – also account for youths' involvement in gang activity (e.g., Boxer et al., 2015; Hawkins et al., 2000; Howell & Egley, 2005; Huizinga, Lovegrove, & Thornberry, 2009; Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003). Typically, studies of youth entry into gang activity have shown that risk factors for gang membership are not different in kind from risk factors for general antisocial behavior, but different in level. Gang involvement is associated with significantly greater risk for participation in violent and nonviolent offending, violent victimization, mental health problems, and academic failure (Barnes et al., 2010; Gordon et al., 2014; Howell, 2012; Huizinga et al., 2009; Thornberry et al., 2003). Importantly, it should be noted that youth involvement in gangs can represent one extreme form of adolescent adaptation — including, for example, the formation of meaningful peer bonds, the maintenance of safety and self-protection, and an antidote to boredom (Brown, Hippensteele, & Lawrence, 2014; Lauger, 2012). However, the current consensus is that gang involvement is much more likely than not to be highly problematic for youth, with consequences that potentially last well into early adulthood (Augustyn, Thornberry, & Krohn, 2014; Decker, Pyrooz, & Moule, 2014).

What this means for intervention is that gang-involved youth represent a particularly complicated population with respect to reducing their current and preventing their future involvement in violent and nonviolent offending. Despite the existence of several best practice evidence-based approaches to helping justice involved youth (Henggeler & Schoenwald, 2011), it has been a challenge for practitioners and researchers to identify best practice interventions for gang-involved youth in particular. As noted, there currently are no empirically-supported, best-practice designated model packages for serving youth who are gang-involved (Boxer & Goldstein, 2012). Yet, this is not to say that no interventions targeting gang involvement in some form have been useful. For example, there do appear to be several promising strategies for preventing youth from joining gangs (Simon et al., 2013). But when it comes to youth who are fully entrenched in gang activity and consequently involved in the justice system as well, there are no approaches that have met typical evaluative standards for success — not even among the top-rated evidence-based approaches reviewed above.

Only one published study so far has assessed the effectiveness of MST specifically for youth involved in gangs (Boxer, 2011). In this naturalistic study, when therapists identified problems at intake with gang involvement, youth were significantly more likely to "fail" out of treatment through lack of engagement or re-arrest (χ^2 [1] = 8.73, p =

.003). In more concrete terms, for youth who were involved in gangs, about 62% of cases closed successfully (i.e., all treatment goals met). For youth who were not involved in gangs, about 85% of cases closed successfully (Boxer, 2011). However, these provocative findings were obtained utilizing data from closed MST cases provided by a partner clinical agency, and gang involvement was only indicated by inferences drawn from referral problem summaries (e.g., if "youth is involved in a gang" was noted as a referral issue). In the present study, we apply a prospective design with enhanced measurement of gang affiliation to examine MST effectiveness in the context of "real world" clinical service delivery for gang-involved youth.

1.3. The present study

This study compares the effectiveness of MST services delivered to gang-involved and uninvolved youth via a prospective, quasi-experimental naturalistic field research design. Data collection and MST services were overseen by Community Solutions, Inc., a large not-for-profit clinical service agency. Cases in this study were assessed from MST service intake through discharge, and all data used in the investigation were collected during routine clinical procedures and used for treatment planning and ongoing assessment. As in Boxer (2011), effectiveness in this study was indicated by short-term case outcomes: successful case closures, when all treatment goals were met; and unsuccessful closures, when treatment ceased due to lack of family engagement or the re-arrest or re-placement of target youth. Gang involvement was indicated via a validated multifactored assessment (Boxer et al., 2015). We examined outcomes as the function of gang involvement for the full sample with clearly-discerned outcome data (n = 394), as well as a reduced sample defined through propensity score matching analysis yoking gang-involved youth to uninvolved youth via multiple risk factor and demographic indicators (n = 168). Following Boxer (2011), we hypothesized that the short-term effectiveness of MST would be reduced for gang-involved youth relative to uninvolved youth.

2. Methods

2.1. Participants

Participants in this study were drawn from a larger pool of data on 421 youth (69% male; mean age = 15.08 years, SD = 1.32; 38% Black/African-American, 18% Latino/a, 34% White, 10% other) and one of their caregivers (68% single-parent headed families; median family income = $20,000–$30,000; median highest caregiver education level = high school diploma/GED). Youth were admitted consecutively over a 13-month period to intensive home-based intervention services at a nonprofit youth service agency with clinical sites in 7 different eastern states. All youth were referred by local justice authorities for Multisystemic Therapy (MST; Henggeler et al., 2009) to address their involvement in serious problem behavior. In order to address the goals of the study, we utilized two subsamples culled from the initial 421 cases.

First, a reduced dataset was created to include *only those cases with clear indications of treatment success or failure* (see below in the Outcome section for more information). This led to a dataset containing 394 cases, or 94% of the larger pool (68% male; mean age = 15.08 years, SD = 1.35; 39% Black/African American, 34% White, 18% Latino/a, 9% other; 68% single-parent headed families; median family income = $20,000–$30,000; median highest caregiver education level = high school diploma/GED). There were no differences between cases retained or excluded for analysis in terms of gender, age, ethnicity, family structure, household income, or caregiver education level (all p values for tests ≥.10).

Second, we created a reduced dataset including gang-involved youth matched to not-gang-involved youth along a number of different demographic, behavioral, and contextual characteristics. Gang-involved youth were identified via a multifactored classification metric (see

below for description), and matched to uninvolved youth via propensity score matching (PSM) analysis (Guo & Fraser, 2010; Rosenbaum & Rubin, 1983, 1985). Variables included in the PSM analysis were gender, age, ethnicity, treatment site location, substance use involvement, caregiver knowledge of youth behavior via self-report, risk-taking, impulsivity, beliefs about education, peer involvement in deviant behavior, problem behavior, and violent victimization (see below for variable information). These variables were selected to parallel Barnes et al.'s (2010) approach to matching gang-involved youth to uninvolved peers in the *Add Health* study.

The matching strategy involved the construction of a probit regression model to predict the likelihood that an individual would be involved in a gang (=1) relative to the counterfactual condition of not being involved in a gang (=0). Gang-involved youths were matched to non-gang-involved youths through the use of the estimated likelihood scores that were produced by the probit regression model. Matches between gang and non-gang youths were ascertained through a one-to-one "nearest neighbor" strategy without replacement, and using a caliper distance of +/−.25. This means that a given gang involved youth was matched to a non-gang involved youth that had a likelihood score within +/−.25 of their score, that each gang involved youth was matched to only one non-gang involved youth, and that once a comparison group member was identified as a viable match, they were not able to be matched to another similar treatment group member (see, e.g., Apel & Sweeten, 2010; Cochran, Mears, & Bales, 2014).

The matching strategy was successful at balancing all of the covariates that were entered into the probit regression model. Prior to matching, gang and non-gang involved groups significantly differed from one another across 11 of the 22 covariates entered into the probit model, and standardized bias estimates for 14 of the covariate comparisons exceeded |20|. After matching, none of the covariate differences were statistically significant, and no covariate comparison standardized biases exceeded |20|. The average reduction in standardized bias was approximately 72% after the propensity score matching routine was completed. From our initial set of 94 gang-involved youth, the PSM procedure was able to find appropriate matches for 90 gang-involved youth, resulting in a final PSM sample of 180 youth. Of these 180, 168 (81% of the pool of 180 cases) were available for the present analysis based on the outcome coding (77% male; mean age = 15.09 years, SD = 1.38; 49% Black/African American, 23% Latino/a, 17% White, 11% other; 66% single-parent headed families; median family income = $10,000–$20,000; median highest caregiver education level = high school diploma/GED). There were no differences between cases retained or excluded for analysis in terms of gender, age, ethnicity, family structure, household income, or caregiver education level (all p values ≥.20).

2.2. Measures

Four broad classes of data were utilized: a) *Outcome* (i.e., whether MST treatment was determined to be successful, b) *Process* (i.e., how MST therapists allocated their time in the service treating youth), c) *Gang involvement* status (i.e., whether a youth was classified as "gang involved" along a number of salient dimensions), and d) *Background characteristics* for the purposes of propensity score matching analysis.

2.2.1. Outcome

Outcome was measured by a single, ecologically valid indicator reporting a categorical reason for case closure, following Boxer (2011). *Positive case closure* (i.e., successful treatment) was indicated by "completion," meaning that the therapist and family agreed that treatment goals were met satisfactorily. *Negative case closure* (i.e., treatment failure) was indicated by one of two possible categories: a) "lack of engagement" (i.e., therapist was unable to engage or encourage caregivers and/or youth to commit to treatment, despite concerted

effort) or b) "placement" (i.e., participant was removed from home by authorities and placed in detention or restrictive residential care due to behavior exhibited during the course of treatment, via arrest or probation revocation). Other discharge categories emanated from factors beyond the scope of the specific treatment relationship, including a family's need to relocate, a loss of funding for the family to receive MST, or administrative issues related to the MST program and not to the participating family. These cases (n = 27) were not considered in subsequent analyses because the reasons for discharge are neither positive nor negative with respect to the MST services provided (i.e., no clear indication of treatment success or failure).

2.2.2. Process

Treatment process variables were available indicating: 1) Total length of time (days) of MST treatment from case open through case discharge; 2) total number of therapist contacts made in the service of the case; and 3) total number of therapist contacts made in which the target youth was present.

2.2.3. Gang involvement status

As noted briefly above, we measured gang involvement via a validated, multifactored classification strategy (Boxer et al., 2015). Our classification of gang involvement relied on five different indicators: First, during routine treatment intake procedures, youth completed three survey items related to their gang involvement: "Have you ever been a gang member?"; "Are you now in a gang?"; and "Have you been involved in gang fights?" All three items were scored as dichotomous indicators (yes or no, with affirmative responses indicating gang involvement). Next, we drew two indicators from participants' clinical records: whether gang involvement, in any form, was part of a youth's presenting problems or referral issues (see Boxer, 2011); and whether gang involvement, in any form, was identified during treatment as a contributor to a youth's problem behaviors. Case records reviewed included intake summaries and supervision summaries. The mean time to discovering gang involvement among cases classified as gang-involved in this manner was 8.33 days (SD = 8.63), with a median of 6 days and a range spanning 0 days (i.e., determined at first contact) through 31 days; in 75% of these cases, gang involvement was discovered in under two weeks' time. Table A.1 shows the number of youth classified as gang-involved via these different indicators. Along with these discrete single-item indicators, we included four aggregate indicators: any gang indicator (affirmative response to any of the 5 indicators); any survey indicator (affirmative response to any of the 3 survey indicators); any therapist indicator (affirmative response to either of the 2 therapist indicators); and a "precision" indicator integrating the most specific (lower base-rate) indicators from the two assessment methods (current gang membership, prior gang membership, and identification of gang involvement as a referral problem at intake). This latter category represents an integration of common survey assessment methods (currently or ever in a gang; Decker, Pyrooz, Moule, &

Table A.1
Descriptive statistics on gang involvement indicators.

Indicator	Proportion classified as gang-involved	N classified as gang-involved
From survey:		
Ever in a gang	12.8%	54
Currently in a gang	5.0%	21
Ever in a gang fight	15.6%	66
Any of the above	21.3%	81
From therapist:		
Intake assessment	5.2%	22
Ongoing problem	7.3%	31
Either of the above	9.5%	40
Aggregated:		
Any of the above	22.3%	94
Precision indicator (current or intake)	15.2%	64

Sweeten, 2014; Esbensen, Winfree, He, & Taylor, 2001; Fox, Lane, & Akers, 2010) and the indicator utilized in the prior study of gang effects on intervention outcomes (Boxer, 2011).

2.2.4. Background characteristics

As described above, several variables were utilized to populate our propensity score matching (PSM) analysis for yoking gang-involved youth to similar non-involved youth. We describe those variables briefly here; more detail is available in Boxer et al. (2015). Aside from demographic factors (gender, age, ethnicity, treatment site location), we included: 1) *Substance use* (alcohol, tobacco, marijuana) as indicated by youth self-reports on the World Health Organization's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST; WHO, 2002); 2) *Caregiver knowledge of youth behavior* via youth self-reports on items drawn from the Denver Youth Survey (Huizinga, Esbensen, & Weiher, 1991); 3) *Risk-taking and impulsivity* as measured by youth self-reports on scales drawn from the assessment battery implemented in the national evaluation of the Gang Resistance, Education, and Training program (GREAT; e.g., Esbensen & Osgood, 1999); 4) *Beliefs about education* via youth self-reports on items taken from the Denver Youth Survey (Institute for Behavioral Science, 1990, excerpted in Dahlberg, Toal, Swahn, & Behrens, 2005); 5) *Self-reported problem behavior and peer involvement in problem behavior*, two scales with similar item sets drawn from the GREAT battery; and 6) *Violent victimization* across multiple social settings through youth self-reports, and also taken from the GREAT battery. As shown previously (Boxer et al., 2015), most of these measures evinced criterion validity through their robust discrimination between gang-involved and uninvolved youth per our classification scheme. Table A.2 shows the means and standard deviations for these measures for the full gang-involved sample, the full non-gang sample, and the reduced, propensity score-matched gang and non-gang samples. As can be seen in the table, the PSM grouping successfully reduced or eliminated significant differences between the gang and non-gang samples.

2.3. Procedures

All procedures were reviewed and approved by the university Institutional Review Board overseeing the project as well as by the host agency. As noted above, youth were enrolled consecutively in the study over a 13-month period as they entered services with the host agency. The agency is a large nonprofit clinical service provider licensed to deliver Multisystemic Therapy in seven eastern states. Survey measures were administered to youth and their caregivers as part of a larger, routine intake battery during which therapists collected information necessary to evaluate treatment needs and formulate initial treatment plans. Survey data were transmitted anonymously to the research team via scanned and emailed PDF survey images or FAX transmissions. Clinical record data also were extracted and coded anonymously prior to inclusion in analysis datasets. Families were informed at the time of intake that the service provider routinely engages in performance monitoring and quality improvement procedures that can involve analyses of client data.

3. Results

3.1. Overall rates of successful and unsuccessful case closure

Across the entire sample, 71% (n = 299) of youth completed treatment successfully, 23% (n = 95) experienced some form of unsuccessful treatment closure, and 6% (n = 27) did not complete treatment for reasons unrelated to the intervention. Focusing only on cases where there was clearly discernible treatment success or failure (n = 394), the success rate was 76%. Of the remaining cases, unsuccessful case closure was due to lack of engagement by family or youth in 30 cases (32% of failure

Table A.2
Descriptive data for background variables used in propensity score matching (PSM) analysis.

Variable	All gang involved (n = 94)			All nongang (n = 327)			PSM gang (n = 90)			PSM nongang (n = 90)		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
1. Substance use												
Tobacco	10.88_a	9.76	0–34	8.97_b	9.97	0–34	10.26_a	9.49	0–34	8.85_a	9.42	0–34
Alcohol	6.24_a	8.29	0–37	4.67_b	6.80	0–35	5.66_a	7.32	0–37	5.35_a	6.84	0–35
Marijuana	10.83_a	10.54	0–36	8.58_b	10.62	0–42	10.20_a	9.99	0–36	9.97_a	11.46	0–42
2. Caregiver knowledge of youth behavior	3.37_a	.89	1–5	3.71_b	.77	1–5	3.34_a	.89	1–5	3.37_a	.80	1–5
3. Youth self-control												
Risk taking	3.26_a	.95	1–5	2.90_b	.95	1–5	3.21_a	.93	1–5	3.21_a	.88	1–5
Impulsivity	3.04_a	.81	1–5	2.97_a	.82	1–5	3.03_a	.80	1–4.8	3.14_a	.73	1–5
4. Beliefs about education	3.42_a	.85	1–5	3.42_a	.89	1–5	3.41_a	.85	1–5	3.34_a	.88	1–4.7
5. Problem behavior												
Youth problem behavior	1.09_a	1.19	0–5	$.47_b$	.61	0–3.8	$.96_a$	1.0	0–4.1	$.77_a$	.79	0–3.8
Peer problem behavior	1.14_a	.91	0–4	$.64_b$	.57	0–2.9	1.06_a	.83	0–3.7	$.94_a$	.67	.06–2.7
6. Violent victimization	$.72_a$	1.49	0–12	$.25_b$	.71	0–6.7	$.58_a$	.90	0–4	$.44_a$	1.09	0–6.7

Different superscripts within rows denote significant differences at p < .05.

cases) or placement of the youth outside of the home by the justice system in 65 cases (68% of failure cases).

3.2. Rates of successful and unsuccessful case closure for gang and non-gang youth

Table A.3 shows differences in success rates as the function of gang involvement via the various indicators first defined in Table A.1, along with chi-square significance tests (with exact p estimates) of the differences in successful case closure between gang-involved and uninvolved youth and effect sizes (Cohen's w and d estimates) for the observed differences. The rates shown in Table A.3 are based on the full sample of cases with clearly discerned success or failure (n = 394). As shown, aside from the "any gang indicator" classifier, gang-involved youth were uniformly less likely than were uninvolved youth to complete treatment successfully. The success rate differential was largest for the classifier defined by self-reports of current gang membership at service intake (i.e., 38% for gang-involved, 78% for uninvolved; Cohen's w = .210, d = .430).

Table A.4 shows differences in success rates as the function of gang involvement via the same indicators as in Table A.3, but using only the subsample of youth derived through our propensity score matching (PSM) strategy. It should be recalled that the PSM process equated gang-involved and uninvolved youth on a variety of background demographic and risk factor variables. Limiting the analysis sample only to PSM cases reduced the power of our significance tests somewhat, and significant differences in success rates were not observed for the "any gang indicator" classifier as well as the "gang fight" and "any survey indicator" classifiers. However, the PSM analysis yielded uniform differences otherwise in success rates for gang-involved and uninvolved youth, and the theoretically greater precision of this strategy produced larger effect-size estimates. Again, the largest differences were observed for the self-report of current gang membership (i.e., 33% for gang-involved, 80% for uninvolved; Cohen's w = .333, d = .706).

3.3. Treatment characteristics for successful gang and non-gang youth

We next explored differences between gang-involved and non-gang youth with respect to available data on the characteristics of successful treatment. Treatment failures were omitted from this analysis due to the confounding impact of failure on the frequency of therapist contacts. Thus we considered whether success was obtained through differing configurations of service provision for cases involving or not involving gang-affiliated youth. Tables A.5 and A.6 illustrate these analyses for the full sample (Table A.5; n = 299) and the PSM-reduced sample (Table A.6; n = 126). Across all the gang indicator categories, differences were tested via nonparametric analysis (Mann–Whitney U tests). As shown, in general, there were no significant differences between the successful gang and non-gang cases in terms of length of treatment (in days from intake through discharge), discrete number of overall contacts recorded by the therapist, and discrete number of contacts directly involving the youth recorded by the therapist. The only analysis suggesting significant variation between the gang and non-gang cases was with respect to the "any gang" indicator in the PSM sample: successful gang-involved cases had shorter length of treatment (M = 136 days) than did successful non-gang cases (M = 146, p = .039). However, this should be considered with caution given the large number of tests conducted. All other tests revealed p-values greater than .05 and in most cases greater than .20.

4. Discussion

In this study we utilized data obtained during the course of routine Multisystemic Therapy (MST; Henggeler et al., 2009) provided to 421 youth referred by the justice system on account of their problem behavior involvement. The study sample was ethnically/racially diverse, with a gender breakdown generally consistent with typical justice system referral streams, and representing urban and rural communities in the

Table A.3
Short-term case outcomes related to gang involvement – full sample (N = 394).

Gang involvement category	Gang-involved success rate	Not gang-involved success rate	Chi square	p	Cohen's w	Cohen's d
Any gang indicator	69%	78%	3.39	.065	.093	.187
Survey indicators						
Ever in a gang	57%	79%	12.45	.000	.178	.362
Currently in a gang	38%	78%	17.32	.000	.210	.430
In gang fight	66%	78%	4.40	.036	.106	.213
Any survey indicator	67%	78%	4.18	.041	.103	.207
Therapist indicators						
Intake assessment	52%	77%	6.70	.010	.130	.262
Ongoing problem	57%	77%	5.79	.016	.121	.244
Any therapist indicator	59%	78%	6.02	.014	.124	.250
Precision indicator	58%	79%	12.78	.000	.180	.366

Table A.4
Short-term case outcomes related to gang involvement — PSM-reduced sample (N = 168).

Gang involvement category	Gang-involved success rate	Not gang-involved success rate	Chi square	p	Cohen's w	Cohen's d
Any gang indicator	69%	81%	2.87	.090	.131	.264
Survey indicators						
Ever in a gang	57%	82%	11.77	.001	.265	.550
Currently in a gang	33%	80%	18.67	.000	.333	.706
In gang fight	67%	80%	3.46	.063	.144	.291
Any survey indicator	68%	81%	3.54	.060	.145	.293
Therapist indicators						
Intake assessment	55%	78%	4.84	.028	.170	.345
Ongoing problem	58%	78%	4.91	.027	.171	.347
Any therapist indicator	60%	79%	5.31	.021	.178	.362
Precision indicator	59%	84%	12.68	.000	.275	.572

northeast, mid-Atlantic, and southeastern regions of the US. For these reasons, and given that cases were drawn from routine service provision (i.e., not randomly selected or sampled), the findings reported here are likely quite generalizable to the wider field and ecologically valid. Following a previous study (Boxer, 2011) and via a prospective design (service intake through discharge), we considered whether gang involvement indicated at intake or shortly thereafter was related meaningfully to the short-term case outcome of success (completion of treatment) or failure (lack of engagement or arrest/placement).

Analyses of data from 394 cases with clear success/failure outcomes, as well as data from 168 of those cases selected through propensity-score matching of gang-involved and uninvolved youth on demographics and background risk factors, revealed that gang involvement is a meaningful modifier of treatment outcomes. Specifically, and especially for youth who self-reported current gang membership, gang involvement was associated with significantly lower success rates. For successful cases, there were essentially no differences in our measured treatment process variables between gang-involved and uninvolved youth. The findings from this investigation contribute to the slowly but surely expanding literature on the treatment of problem behavior among gang-involved youth. Further, this study underscores the challenge of meeting the intervention needs of particularly high-risk youth engaged in the justice system.

The central finding from this study is that gang involvement reduced the likelihood of successful treatment even in the context of MST, which has been recognized by multiple evaluative authorities as a well-established and empirically-support treatment package. Importantly, previous studies of MST outcomes in randomized controlled trials have found that success in MST is mediated partially and significantly by reductions over time in youths' contact with delinquent peers (e.g., Huey et al., 2000). It might be the case that when those delinquent peers are gang members or affiliates, therapists are less able to reduce

youths' contacts or commitments to them. This would be consistent with recent research showing that gang ties can be intense, long-lasting, and difficult to sever (Decker, Pyrooz & Moule, 2014). Indeed, gang activity has been theorized as emanating from very powerful social relationship forces, with some evidence to suggest that gang affiliations might begin with and be sustained by youths' desire to connect with close, family-like networks of peers. In some cases these networks also involve family members directly through multi-generational membership in specific gangs (Dishion, Nelson, & Yasui, 2005; Lauger, 2012). Post-treatment "debriefs" with gang-involved youth were not possible in this study, but would be critical in future studies and program designs aimed at serving gang-involved youth more effectively.

Besides these more or less positively-valenced reasons for gang affiliation, gang involvement also is very much related to neighborhood of residence (see Lauger, 2012) — youth might affiliate with a gang in their neighborhood out of necessity in order to avoid victimization near home, and secure some modicum of protection beyond their immediate neighborhood. According to national surveys of law enforcement, gang activity is associated with violent crimes in general as well as drug crimes and gun crimes (see Egley & Howell, 2013), and thus gang-involved youth might live in or close to neighborhoods that might appear very unsafe to outsiders. These "hotspots" of violent crime (Caplan, Kennedy, & Piza, 2013) are also likely to include obvious indications of social and physical disorder such as broken windows, vandalism, trash from drug and alcohol use, and of course spray-painted gang symbols (Boxer, Schappell, Middlemass, & Mercado, 2011; Sampson & Raudenbush, 1999). Thus, as proposed by Henggeler et al. (2009) in their text describing the MST model, gang involvement might signal serious safety issues with respect to implementing treatment. Although MST therapists might feel empowered to enter those neighborhoods by virtue of their training or general orientation to working with high-risk youth, in some instances this might still be too

Table A.5
Process characteristics — successful cases, full sample (N = 299).

Gang involvement category	Length of treatment (days)						Total number of therapist contacts						Total number of therapist contacts with youth present					
	Gang			No gang			gang			No gang			Gang			No gang		
	M	SD	R	M	SD	R	M	SD	R	M	SD	R	M	SD	R	M	SD	R
Any gang indicator	135	27	86–232	139	29	80–234	80	30	24–161	83	37	7–228	51	21	10–97	55	27	5–159
Survey indicators																		
Ever in a gang	135	30	91–232	139	29	80–234	79	28	24–138	83	36	7–228	50	23	10–92	55	27	5–159
Currently in a gang	126	26	91–162	139	29	80–234	76	32	24–131	82	36	7–228	46	20	18–85	55	26	5–159
In gang fight	134	25	91–183	139	29	80–234	82	31	24–161	82	36	7–228	53	22	17–97	55	27	5–159
Any survey indicator	136	27	91–232	139	29	80–234	81	31	24–161	82	36	7–228	52	21	10–97	55	27	5–159
Therapist indicators																		
Intake assessment	130	30	86–180	139	29	80–234	82	29	35–127	82	36	7–228	64	23	29–91	54	26	5–159
Ongoing problem	132	22	93–162	139	29	80–234	69	21	24–102	83	36	7–228	47	20	18–85	55	27	5–159
Any therapist indicator	133	24	86–180	139	29	80–234	73	26	24–127	83	36	7–228	52	23	18–91	55	27	5–159
Precision indicator	133	31	86–232	139	28	80–234	80	30	24–138	82	36	7–228	52	23	10–92	55	27	5–159

Note. All figures rounded to nearest whole number to facilitate presentation. M = mean; SD = standard deviation; R = range (minimum to maximum).

Table A.6
Process characteristics — successful cases, match sample (N = 126).

Gang involvement category	Length of treatment (days)						Total number of therapist contacts						Total number of therapist contacts with youth present					
	Gang			No gang			Gang			No gang			Gang			No gang		
	M	SD	R	M	SD	R	M	SD	R	M	SD	R	M	SD	R	M	SD	R
Any gang indicator	136	27	86–232	146	30	98–222	80	30	24–161	80	36	16–201	52	22	10–97	56	29	9–158
Survey indicators																		
Ever in a gang	136	30	97–232	143	28	86–222	80	29	24–138	81	35	16–201	51	23	10–92	54	26	9–158
Currently in a gang	131	26	93–162	142	29	86–232	78	38	24–131	81	34	16–201	50	22	18–85	54	26	9–158
In gang fight	135	25	93–183	144	30	86–232	83	32	24–161	79	35	16–201	54	22	17–97	54	27	9–158
Any survey indicator	137	27	93–232	144	30	86–222	82	31	24–161	80	36	16–201	52	22	10–97	55	28	9–158
Therapist indicators																		
Intake assessment	130	30	86–180	142	28	97–232	82	29	35–127	80	34	16–201	64	23	29–91	53	26	9–158
Ongoing problem	132	23	93–162	142	29	86–232	69	22	24–102	82	35	16–201	48	20	18–85	54	26	9–158
Any therapist indicator	133	25	86–180	143	29	97–232	74	27	24–127	82	35	16–201	53	23	18–91	54	26	9–158
Precision indicator	134	31	86–232	144	28	97–222	81	31	24–138	80	35	16–201	53	24	10–92	54	26	9–158

Note. All figures rounded to nearest whole number to facilitate presentation. M = mean; SD = standard deviation; R = range (minimum to maximum).

personally threatening of a proposition. Reduced commitment or engagement by therapists in those cases might translate into poorer treatment outcomes. Studies examining the motivations and concerns of therapists who provide in-home interventions to very high-risk youth and families are warranted to shed additional light on this finding. For example, recent research on MST therapists suggests that therapists' subjective discomfort in disadvantaged home and community settings detrimentally impacts therapeutic alliances with client families (Glebova, Foster, Cunninghma, Brennan & Whitmore, 2012).

Considerable prior research has shown that gang-involved youth, even by comparison to other antisocial youth who are not gang-involved, show elevated profiles of personal and well as contextual risk characteristics that include more aggressive responding, impulsivity, and academic difficulties as well as harsh family and community environments (e.g., Barnes et al., 2010; Boxer et al., 2015). Separate from the effects of gang affiliation, these factors might inhibit the success of treatment for gang-involved youth. We addressed this issue head-on by using a propensity-score matching (PSM) analysis to evaluate intervention effects. Specifically, via a battery of survey indicators in tandem with demographic characteristics we applied a quasi-experimental design by constructing a subsample of non-gang youth yoked via PSM to gang-involved youth. Analyses of outcomes for this reduced sample, in theory, parallel a true experimental design in which youth receiving MST were assigned randomly to be gang-involved or not. Application of a quasi-experimental design is useful when random assignment to conditions of interest is not tenable due to practical or ethical considerations. The results of our analysis of the PSM subsample were generally in line with those of the larger sample analysis, but yielded greater clarity. Given the wide range of variables used to construct the matches, it seems reasonable to conclude that gang involvement per se, and not any of the typical covariates of gang involvement, inhibited the success of MST treatment in this study. Of course, the PSM cannot take into account any unmeasured factors that might be linked to gang involvement and thus cannot fully substitute for randomization. Still, isolating as closely as possible (given the constraints of our design) the moderating impact of gang involvement on treatment effectiveness is an important finding that warrants replication across other treatment modalities.

In contrast to a previous study using a similar approach (Boxer, 2011), we generally did not observe differences in treatment process characteristics between gang and non-gang youth who completed treatment successfully. On the one hand, this might be due to having fairly limited information available on those characteristics in the present study relative to the 2011 paper. The 2011 study reports differences with respect to therapists meeting more often with court officials in gang-involved cases, and we did not have access to information at that level of detail in this study. On the other hand, it really might just be the case that when cases close successfully the therapist has put in place the right plan of intervention and was simply able to work effectively with the youth and family. Along with examining "what went wrong" in cases of unsuccessful treatment, as suggested earlier, future research also might take up the critical question of "what went right" through post-treatment debriefing with gang-involved youth who completed treatment successfully. This will be particularly useful in studies that extend outcome analysis beyond closure of cases to examine longer-term impacts on, for example, re-offending.

5. Conclusions

There continues to be a pressing need for research on how to help youth who have been affected by gangs. Recently, the US Centers for Disease Control and the US National Institute of Justice released a jointly-edited volume on strategies for preventing youth from joining gangs (Simon et al., 2013), and the US Office of Juvenile Justice and Delinquency Prevention is increasingly emphasizing research and programming on helping youth who are at-risk of joining gangs. However there continues to be relatively less attention in terms of intervention research with youth who already are involved in gang activity and at high risk of violence and/or violent victimization on account of this involvement. Findings from the present study suggest two key conclusions: First, as discussed, gang involvement represents a potential complicating or inhibiting factor in treatment. Gang-involved youth in this study were significantly less likely to complete a best-practice, evidence-based treatment successfully that were uninvolved youth. Second, it should be emphasized that despite that general finding, some gang-involved youth did indeed complete treatment successfully. The present study underscores the great need for research addressing this challenge in the field, and highlights the importance of gang involvement as a potentially serious impediment to intervention success.

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