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All Might Have Won, But Not All Have the Prize: Optimal Treatment for Substance Abuse Among Adolescents with Conduct Problems

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Abstract: Considerable evidence from the literature on treatment outcomes indicates that substance abuse treatment among adolescents with conduct problems varies widely. Treatments commonly used among this population are cognitive-behavioral therapy (CBT), 12-step facilitation, multisystemic therapy (MST), psychoeducation (PE), and motivational interviewing (MI). This manuscript thoroughly and systematically reviews the available literature to determine which treatment is optimal for substance-abusing adolescents with conduct problems. Results suggest that although there are several evidence-based and empirically supported treatments, those that incorporate family-based intervention consistently provide the most positive treatment outcomes. In particular, this review further reveals that although many interventions have gained empirical support over the years, only one holds the prize as being the optimal treatment of choice for substance abuse treatment among adolescents with conduct problems.

Keywords: substance use, adolescence, treatment outcome, conduct problems

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Introduction

Questions about different psychotherapies and their effectiveness are not new to the field. In fact, over 75 years ago, Rosenzweig¹ first claimed that all systems of psychotherapy were generally equivalent in terms of treatment outcomes. This observation is known as the “dodo bird conjecture,” and it suggests that common factors such as therapeutic alliance, belief in treatment, and therapeutic techniques consistent with the clients’ understanding of the problem can lead to efficacious treatment.² Empirical support for the dodo bird conjecture first came with Luborsky, Singer, and Luborsky’s³ seminal review of the outcome literature. Since then, additional support has been found.^{4,5} Although it is generally well-accepted that treatment works, Addis and Cardemil⁶ more recently argued that there is considerable evidence to suggest the superiority of specific treatments for certain disorders. For example, cognitive-behavioral therapy (CBT) has emerged as one of the preferred treatments for depression,^{7,8} anxiety,^{8–12} and it has even become the treatment of choice in many research and clinical settings for substance abuse.¹³ However, in the case of substance abuse, the National Registry of Evidence-based Programs and Practices recognizes over 240 interventions, including CBT, 12-step facilitation, multisystemic therapy (MST), psychoeducation (PE), and motivational interviewing (MI) among many others.

Despite many notable advances in the treatment outcomes literature, and given the promotion and dissemination of evidence-based treatments, it remains unclear which treatment is superior for substance-abusing adolescents with conduct problems. Advancing the knowledge base in this area is important for many reasons. Among them is the fact that conduct problems and substance abuse are the most prevalent comorbid psychiatric disorders in adolescence.¹⁴ Second, the literature clearly shows that conduct problems and, in particular, a diagnosis of conduct disorder (CD) significantly impacts and leads to poorer treatment outcomes for substance abuse.¹⁵ Third, there is also considerable evidence to show that active conduct problems during substance use treatment predict higher rates of relapse and poorer treatment outcomes.^{16–18} Fourth, given the numerous difficulties in conducting research with this population, substance-abusing adolescents with

conduct problems remain a particularly underserved and under-researched population.

Finally, substance abuse treatment among adolescents with conduct problems varies widely. That is, there are not only numerous interventions, but also considerable variability in how treatment is delivered. Some of the treatments most commonly used in this population are CBT, 12-step facilitation, MST, PE, and MI. Treatment is delivered through individual, group, or family-based sessions, or any combinations thereof. Additionally, interventions can also range from highly structured, manualized protocols to less structured, non-manualized sessions. Length of treatment can also vary based on several factors such as access to providers, healthcare coverage, or whether treatment is voluntary or court-ordered. Further still, treatment can be classified into outpatient, intensive outpatient, partial hospitalization, or residential, with each classification generally referring to varying levels of substance use severity and addiction, as well as to treatment intensity. Moreover, residential treatment can refer to either therapeutic communities, wilderness programs, or even the juvenile justice system. Given these considerations, the purpose of this review is to present a thorough and systematic review of the available literature to determine the optimal treatment for substance abuse among adolescents with conduct problems.

Methods

This research used various search engines (eg, PubMed, Ebscohost) and keywords such as substance abuse treatment, adolescence, and conduct disorder to locate relevant articles from 1979–2012. Inclusion criteria were empirical, peer-reviewed research articles comprised of substance-abusing adolescents with conduct problems. Diagnostic and Statistical Manual (DSM) taxonomy and diagnostic criteria were used to define substance abuse, substance dependence, oppositional defiant disorder (ODD), and conduct disorder (CD), with ODD and CD used to define conduct problems. Adolescence was defined the period of development marked by changes in physiology, personality, emotionality, and neurobiology that includes ages 8 through 20 in humans.¹⁹ Given the paucity of research in some areas, some studies were included that had investigated participants with a mean age of 20 years old, which is in keeping with the definition



of adolescence.^{19,20} Finally, it is also important to differentiate substance abusing adolescents with conduct problems from substance abusing adolescents without conduct problems. This review focused exclusively on research that focused on individuals who met the diagnostic criteria for substance abuse/dependence, adolescence, and ODD, CD, or other conduct problems.

Results

Cognitive-behavioral therapy (CBT)

Cognitive-behavioral models of substance abuse treatment conceptualize substance use and its related problems as learned behaviors that are initiated and maintained in the context of environmental factors.¹³ The goal of CBT as a form of substance use treatment is to identify high-risk situations and implement effective coping strategies to reduce substance use. Consequently, this treatment typically consists of skill-building techniques such as effective communication, alternative coping strategies, and role playing of risky situations²¹ to help individuals identify risky situations, avoid them when possible, and implement acquired coping strategies to abstain from use. Irvin, Bowers, Dunn, and Wang²² were among the first to claim that CBT for substance abuse had demonstrated efficacy in repeated clinical trials. Despite this, CBT remains underutilized in the adolescent alcohol and drug abuse treatment outcome research.¹³

Morganstern et al²³ claimed that only one prior study examined CBT's effectiveness for substance abuse treatment. They cited Ouimette, Finney, and Moos's²⁴ research on the outcomes of inpatient substance abuse treatment on adults in the Veterans Administration (VA) system. This study had three conditions: CBT, 12-step facilitation, and an eclectic treatment group. Lending additional support to the existing literature, they found that the treatment approach had a negligible correlation with treatment outcomes. Further, they reported that, where differences did occur, they seemed to favor 12-step approaches over CBT; however, upon a more critical review of their methods and procedures, CBT may not have been delivered with an adequate level of fidelity, which was an acknowledged limitation in their study. Regardless, this is an important study because it was, at the time, the only study to specifically compare CBT with 12-step facilitation and

a competing, non-overlapping intervention. Their findings suggested that neither CBT nor 12-step facilitation approaches have unique curative factors associated with treatment outcomes, which lends support to the dodo bird conjecture that common factors improve treatment outcomes, and that no one treatment is superior to another.

Although CBT may not have unique curative factors over other competing interventions, the literature does reveal that CBT is not equally efficacious for all youth. Specifically, over a decade ago, Kaminer et al²⁵ found differential treatment outcomes for CBT and adolescents. Lending additional support to the extant literature, they found that older male adolescents benefit more from CBT than females or younger adolescents. Since then, it has been shown that a variety of factors such as delinquent behavior, depression, more severe drug use, deviant peer groups, and familial psychopathology can all affect treatment outcomes and relapse.^{14,26–29} Moreover, while the early literature on CBT's efficacy has been characterized by significant methodological limitations,³⁰ the more recent completion of several randomized clinical trials¹³ has helped clarify CBT's efficacy and effectiveness for substance abuse treatment among adolescents with CD.

Diamond et al³¹ evaluated five manual-guided treatment interventions from the Cannabis Youth Treatment, a study funded by the Center for Substance Abuse Treatment. This study was a critical advancement in intervention research because it was the first multi-site, randomized clinical field trial ever conducted with cannabis-dependent adolescents in outpatient treatment. Moreover, this study evaluated distinct interventions (eg, CBT, family systems, psychoeducation), modalities (individual, group, family), and doses (ie, 6, 12, and 20-week interventions). Ultimately, given that the study offered promising outcome data for each intervention, this researchers concluded that adolescent substance use treatment would benefit from standardized, relatively brief CBT protocols.

A more recent randomized clinical trial by Liddle et al³² compared CBT and multidimensional family therapy (MDFT) with substance abusing adolescents. Both treatments consisted of manual-guided therapies and a one-year follow up to address the limitations of previous studies, which had either not used



manualized therapies in both treatment conditions or they did not adequately follow participants to assess the treatment's durability. This study is distinctive because it fully randomized participants and because it compared two state-of-the-art treatments on both short- and longer-term outcomes. Ultimately, results support the literature on adolescent drug abuse treatment studies indicating that, under certain conditions, both family-based and CBT approaches are efficacious treatments. This study is particularly relevant to adolescents with conduct problems because its participants were very similar in demographic characteristics to the samples of individuals drawn from the national juvenile justice system, the majority of who are also diagnosed with CD.

Hogue et al³³ investigated therapeutic alliance and treatment outcomes associated with CBT and MDFT for adolescent substance abuse treatment. The sample of this randomized clinical trial was mostly comprised of individuals who were male (81%), and reported low income levels (ie, 29% of the sample had an annual household income of <\$10,000); moreover, 63% were on probation, 32% had been court ordered to treatment, 80% met DSM-IV criteria for a substance abuse disorder, and 79% were diagnosed with an externalizing disorder. Thus, while conduct problems were not the specific focus of this study, it is quite likely that a majority of the study participants would have met the criteria for CD. These investigators found that early therapeutic alliances had a significant effect on treatment outcomes. Specifically, therapeutic alliances had no relation to retention or outcomes in the CBT condition; however, therapeutic alliance was a salient predictor of improved outcomes in the MDFT condition, as evidenced by decreased substance use and by the fact that participants began externalizing behavioral problems. In particular, adolescents whose alliance was initially weak but improved by mid-treatment showed a significant reduction in externalizing behavioral problems and substance abuse. These data corroborate previous studies showing that alliance to CBT does not predict outcomes, and that it has a non-significant or negative correlation with treatment attendance for individuals who abuse cocaine.^{34,35} Therefore, lending support to Hogue et al,³³ it does appear that the jury is still out regarding the role of therapeutic alliance with CBT and substance abusers, perhaps even more so for adolescents.

More recently, Stanger, Budney, Kamon, and Thostensen³⁶ investigated motivational enhancement (ME), CBT, and contingency management (CM) among individuals engaging in substance abuse as well as adolescents. Specifically, CM was the experimental condition and consisted of clinic-delivered, abstinence-based incentives, and a substance monitoring contract. The sample was primarily male (86% in the experimental condition and 79% in the control condition), with 58% of the experimental condition and 61% of the control condition also having been diagnosed with ODD or CD. Furthermore, some of this sample was drawn directly from the juvenile justice system; however, no percentages were offered. Overall, these data suggest that programs that rely on CM need further development, and that despite some positive findings, a significant percentage of youth did not meet abstinence criteria during treatment. Furthermore, among those who had met the abstinence criteria, several relapsed within 6 months. Ultimately, the researchers recommended study methods that enhanced the efficacy of parent interventions that specifically target parental monitoring while developing effective discipline practices.

Similarly, Hogue, Liddle, Singer, and Leckrone³⁷ evaluated family-based interventions in comparison with CBT among adolescents at high-risk for developing substance abuse and related behavioral problems. There were three conditions in their study: prevention, family therapy, and CBT. Overall, the treatment sample was comprised of mostly males (72%), African Americans (72%); 47% of participants were on probation at intake, and 40% were court ordered to treatment. Given the demographics of this sample and the notable involvement with the juvenile justice system, these results are generalizable to adolescents with conduct problems. Similar to previous findings, these authors concluded that deficiencies in parental monitoring and developmental knowledge about adolescent substance use requires continued model development for efficacious and effective interventions for this population.

In a meta-analysis of cognitive-behavioral programs for reducing recidivism of criminal offenders, Lipsey, Chapman, and Landenberger³⁸ found that CBT programs are effective, as evidenced by their association with sizable reductions in recidivism. Specifically, the researchers included 14 articles that



examined CBT, and they investigated the offense rates of participants who completed treatment versus those who did not in order to establish a greater understanding of the best evidence for the effectiveness of available treatments. The sample consisted of juveniles (ages 12–21) and adults, with an approximately even distributions of each. Participants were treated while on probation, while incarcerated, or while in aftercare and on parole. The authors asserted that the results clearly showed that CBT is an effective intervention and can lead to reduced recidivism, with CBT groups demonstrating approximately two-thirds of the recidivism rate of treatment-as-usual (TAU) groups. In this case, TAU was defined as any non-CBT or theoretically driven intervention. Of particular note, Lipsey et al³⁸ concluded that the most promising findings from this meta-analysis were found among juvenile offenders. Specifically, juvenile offenders only had one-third the recidivism rate compared to two-thirds in the adult population. One limitation of this study is that although the study included substance-related problems, investigation of these problems was not the primary aim of the study. Therefore, general conclusions can be inferred about CBT's effectiveness for adolescents with substance abuse and conduct problems, but firm conclusions cannot be drawn.

As noted previously, interventions that have received the most attention from researchers may not be representative of the treatments available to individuals in the community. Morral, McCaffrey, and Ridgeway³⁹ found that while strong efficacy research has been conducted on novel treatment approaches for adolescent substance abusers, little is known about the effectiveness of the treatment approaches most commonly available to youths, their families, and referring agencies. Furthermore, the samples examined in effectiveness studies are still typically composed of predominately White, European American adults.³⁰ Therefore, there is a need for future research that uses representative samples of substance abusing adolescents with conduct problems.

So, what does the extant literature suggest about CBT and substance abuse treatment among adolescents with conduct problems? First, CBT is an evidenced-based, efficacious treatment. Second, because CBT has differential effectiveness, with older male adolescents benefiting more than either younger or

female adolescents, additional research may help explain the processes of change or mechanisms of action by which this occurs. Third, CBT intervention is at least as efficacious as multidimensional family therapy. Fourth, CBT does not seem to produce differential treatment outcomes in association with race. This is important because the majority of substance abusing adolescents with conduct problems tend to be of minority status.

12-step facilitation

Another intervention that is commonly used for substance use treatment among adolescents with conduct problems is 12-step facilitation. In contrast to CBT, 12-step facilitation treatment is grounded in the concept of substance use as a spiritual and medical disease, which requires total abstinence through the use of self-help groups.²¹ Consequently, spirituality (ie, reliance on a higher power) is a key element in this treatment approach, as it represents an acknowledgement of denial and a willingness to surrender to a higher power.⁴⁰ Although this is a standalone treatment supported by the National Institute on Alcohol Abuse and Alcoholism, the 12-step model is grounded in Alcoholics Anonymous (AA). First developed in Akron, Ohio in 1935, AA has become a nationally recognized social support network for recovering addicts. In 1989, the National Academy of Sciences claimed that "Alcoholics Anonymous, one of the most widely used approaches to recovery in the United States remains one of the least rigorously evaluated." As an outgrowth of this observation, McCrady and Miller⁴¹ offered one of the first empirical reviews of the 12-step facilitation treatment outcomes. Their findings suggested that 12-step facilitation had a positive, but moderate, salutary effect on drinking behavior and psychosocial functioning. Since then, more rigorous evaluations of the 12-step's efficacy and effectiveness for adolescent SUD have emerged.

Wells, Peterson, and Gainey⁴² compared a traditional 12-step recovery support group with CBT relapse prevention. In this study, 112 adolescents between the ages of 18 and 22 were randomized to either the 12-step or CBT treatment condition. Treatment lasted for 12 weeks, and outcomes were measured at treatment completion and at a six-month follow-up. At the 12-week (ie, treatment completion) assessment, adolescents in the 12-step group had less



alcohol consumption than those in the CBT condition; however, there were no differences found for other drugs (eg, marijuana, cocaine). At the 6-month follow-up, no treatment differences between the two conditions were evident, although the authors reported that both treatment conditions were associated with decreased substance use. This suggests that both treatments at a six-month follow-up were generally equivalent in reducing substance use, and that neither treatment outperformed the other.

Kelly, Myers, and Brown⁴³ argued that the majority of youth substance abuse treatment programs frequently advocate for integration of 12-step fellowships in order to help prevent relapse; however, the relationship between adolescent involvement in AA/NA and outcomes remains unstudied. To address this gap in the literature, Kelly et al⁴⁴ recruited 74 adolescents (mean age = 15.9 years, 62% female) from an inpatient treatment facility with a primary diagnosis of polysubstance use (marijuana, 42%; amphetamines, 30%; and alcohol, 13%). In studying the relationship between the age composition of the group and adolescent 12-step attendance, it was found that older adolescents preferred attending the meetings more than younger adolescents, and that a younger group composition increased adolescent attendance and participation.

A similar developmental trend was found with Mason and Luckey's⁴⁵ research on 12-step facilitation and AA participation. They directly compared a sample of adolescents and young adults (18–25, $n = 48$) with a large sample of treated adults (>25 years, $n = 634$) on prior AA participation at treatment intake and at 3- and 12-month follow-up periods. They found that the younger cohort was less likely to consider themselves a member of the AA community, and that they were less likely to attend the meetings at all. This trend was observed at the 3-month follow-up, and it became even more pronounced at the 12-month follow-up. Specifically, they reported that only 42% of the youth cohort attended at the 3-month follow-up, as compared to 60% of the adult cohort. Only 29% of the youth cohort attended the 12-month follow-up, as compared to 50% of the older sample. This suggests that older adolescents (ie, ages 18–25) are less likely to identify and participate in the AA model and 12-step facilitation, which supports findings from previous studies.

Another study by Winters et al⁴⁶ investigated the treatment outcomes for drug-abusing adolescents who were attending 12-step facilitation. In this sample of 245 adolescents with at least one current dependence disorder on a psychoactive substance, the majority of participants were white (85%) and male (56%), with 28% having previously received substance abuse treatment, 52% being currently involved in the legal/juvenile justice system, 82% having a comorbid psychiatric disorder (eg, AD/HD, ODD/CD, and major depressive disorder were the most prevalent), and 66% having at least one parent with a history of substance use. These results provided empirical evidence that 12-step facilitation is associated with favorable treatment outcomes for adolescent drug abusers, with treatment retention being an important contributor to successful outcomes. Specifically, significant reductions in substance use during post-treatment were observed only for treatment completers versus the non-completers, especially for cannabis use. Another important finding in this study is that residential care, “with its presumed enhanced treatment offerings”⁴⁶ did not differ significantly from outpatient services. This suggests that residential treatment facilities may not promote better outcomes or have an additive benefit despite an adolescent spending increased time in a therapeutic milieu. Taken together, these findings suggest that outpatient 12-step facilitation interventions may be promising for adolescent substance abusers with conduct problems, and that 12-step outpatient services are generally equivalent to residential 12-step treatments.

Bogenschutz, Geppert, and George⁴⁷ reviewed the role of 12-step approaches in dual diagnosis treatment and recovery. Given the extreme heterogeneity of the studies, however, this review was more descriptive than meta-analytic. That is, the 83 peer-reviewed publications included adolescents and adults, psychotic and non-psychotic patients, as well as outpatient, residential, and criminal justice involvement. The authors did not cite specific demographics for each review, but eligibility required a primary SUD (comorbid with another diagnosis), exclusive 12-step facilitation, and outcome assessment. Therefore, the authors acknowledge that it may not be valid to generalize across different psychiatric diagnoses, including different substance abuse diagnoses and demographic characteristics such as age, ethnicity, and gender, as



well as different treatment settings, levels of care, and 12-step programs. This study showed a positive relationship between 12-step facilitation and reduced substance use. The data also consistently indicated that while patients with dual diagnoses benefitted from 12-step programming, it was not possible to reach definitive conclusions about AA's role with those who are seriously mentally ill (eg, those who have a psychosis, or who are living with schizophrenia) patients.

In a critical review of the 12-step literature for adolescent substance abuse treatment, Kelly and Myers⁴⁴ concluded that AA/NA can be beneficial. Specifically, their findings demonstrated that predictors of participation in AA/NA among youth were generally the same as those found in adults, and that youth who are more severely alcohol/drug involved are more likely to attend and become involved with AA/NA. However, Kennedy and Minami's⁴⁸ reported that only 30% of adolescents continue to attend AA/NA at a 12-month follow-up, which is substantially lower than the estimated 60% of adults who continue to attend the sessions. Another important finding from the Kelly and Myers's⁴⁴ review is that the available evidence shows significant linear relationships between greater participation in AA/NA and improved substance use outcomes. Their review also highlighted that there have been no clinical trials investigating 12-step facilitation for youth to date. Given this, additional research is needed.

So, what does the literature suggest about 12-step facilitation and substance abuse treatment among adolescents with conduct problems? First, and similar to CBT, the literature suggests that 12-step facilitation is an effective, evidenced-based treatment. Second, also similar to CBT, treatment retention appears to be the best predictor of successful treatment outcomes. Third, treatment participation and engagement seem to be particularly salient predictors of treatment outcomes with 12-step intervention. Fourth, the literature reveals differential treatment effects for 12-step facilitation in relation to the age of its members. Therefore, this intervention could benefit from groups comprised of adolescents in order to enhance participation and identification with others in the group, which has proven to be an essential component of relapse prevention within adult populations.

Multisystemic therapy (MST)

MST is another intervention common to substance abusing adolescents with conduct problems. Specifically, MST is a family-oriented treatment that uses empirically-supported interventions to assess and treat the multiple determinants of serious antisocial behavior in adolescence,⁴⁹ and it is recognized as an efficacious, effective, empirically-supported intervention for substance abuse among adolescents with conduct problems.^{27,29,50} Moreover, MST targets antisocial youth and adheres to a socioecological, family preservation model that treats adolescents within their natural ecology. That is, MST aims to keep adolescents within the family's custodial care instead of residential or out-of-home placements by improving parental monitoring and supervision, enhancing social supports (eg, prosocial peers, activities), restricting access to deviant peer groups, treating parental psychopathologies, and improving parent-child interactions.^{49,51} Furthermore, MST claims that it offers significant cost savings to the government and private sectors by outperforming competing interventions as evidenced by its association with positive outcomes, lower recidivism rates, reduced hospital visits, and lowered out-of-home placements relative to residential treatment programs, wilderness programs, and the juvenile justice system.^{26,51}

Two randomized clinical trials served as pilot studies to determine whether MST was an efficacious and effective treatment for substance abusing adolescents with CD. Data from both studies supported the fact that MST is an effective intervention for treating substance abuse and CD. In fact, Henggeler, Melton, and Smith⁵² conducted the first study with 84 juvenile offenders randomly assigned to MST or TAU; similar to previous studies, TAU was defined as any non-overlapping or theoretically driven intervention. The researchers concluded that, upon post-treatment follow-up, participants in the MST condition reported significantly less alcohol and marijuana consumption. The second study by Borduin et al⁵³ randomized 200 chronic and violent juvenile offenders to MST or individual treatment. Substance-related arrests at a 4-year follow-up were 4% for the experimental group (ie, MST) and 16% for the controls. This suggests that MST was effective in not only reducing violent crime, but also in reducing substance-related criminality including use, possession, and selling



of drugs. In fact, during a 14-year follow-up, MST participants had fewer drug-related arrests than their counterparts.⁵⁴ Notable limitations of these pilot studies were the small sample sizes and the sole use of self-report measures. This seems especially problematic given that participants may wish to avoid the perception of treatment failure given their involvement with the juvenile justice system, the risk of violating probation, as well as the generally adversarial role of the legal system. Since then, more rigorous procedures and measures have been included into baseline and post-treatment assessments.

Based on the promising preliminary data, two randomized trials focused specifically on substance abusing adolescents with conduct problems. The first study by Henggeler et al⁵¹ randomized 118 juvenile delinquents (56% of whom are classified as substance abusers and 46% who are identified as having a substance dependence using DSM-III criteria) to MST and TAU. Notably, MST retained 100% of its participants, which the Office of Applied Studies⁵⁵ claimed was “especially remarkable” given that this population traditionally has low treatment retention rates. In addition to increased school attendance, decreased familial conflict, and reduced recidivism, MST participants had lower alcohol and marijuana usage at a 4-month follow-up. Of note, self-report and urinalyses at a 4-year follow-up period also showed that participants in the MST condition had significantly higher rates of marijuana abstinence versus those in the TAU condition (55% and 28%, respectively). A cost analysis revealed that the incremental cost of MST was offset by reduced out-of-home placements, hospitalizations, and residential placements at a significant cost savings to the government and taxpayers.

A more recent randomized trial by Henggeler et al⁵⁶ investigated substance abuse treatment for adolescents with CD. The specific aims of this trial were to determine the effectiveness of juvenile drug court, whether the integration of evidenced-based substance abuse treatment (ie, MST) into juvenile drug court improved outcomes for offenders, and whether the integration of CM techniques with MST improved MST substance use outcomes. Findings suggested that drug court was more effective than family court in reducing adolescent-reported substance use and criminal behavior. Specifically, during the 4 months of drug court participation, 70% of

the urinalyses were positive for youths in the Drug Court with Community Services condition, in comparison with only 28% and 18% for counterparts in the Drug Court with MST and Drug Court with MST enhanced with CM conditions, respectively. Furthermore, 8-month urinalysis follow-ups maintained this trend with Drug Court with Community Services, Drug Court with MST, and Drug Court with MST enhanced with CM showing positive screens for 45%, 7%, and 17% of the participants, respectively. Additional clinical and cost-related outcomes will be examined at a 5-year follow-up, and these results will be available in 2012.

In a study investigating the long-term outcomes associated with MST for substance-abusing and substance-dependent juvenile offenders, Henggeler, Clingempeel, Brondino, and Pickrel⁵⁷ found that there were significant long-term treatment effects for aggressive criminal activity (ie, 0.15 versus 0.57 convictions per year), but there were mixed findings for illicit drug use. However, within the mixed results, biological measures revealed that participants in MST had significantly higher rates of marijuana abstinence and reduced alcohol consumption than juveniles involved in a competing, community-based, outpatient treatment.

Clingempeel et al⁵⁸ investigated the sustainability of MST treatment outcomes five years post-treatment. The sample consisted of 80 adults who were initially treated with MST five years prior, and who had met the following diagnostic criteria: between the ages of 12 and 17 years old, involvement with the juvenile justice system, and who had been diagnosed with a primary SUD (92% involving alcohol, marijuana, or both). Although there were several interesting findings in this study, the general conclusion was that dimensional measures of substance use (eg, frequency of use) are better predictors of long-term use than categorical indicators used in the DSM taxonomy.⁵⁸ This study is important because it focused almost exclusively on substance abuse treatment among adolescents with CD and provided 5-year follow-up data demonstrating the effectiveness of the intervention into adulthood.

Interestingly, in addition to decreased substance use for adolescents with conduct problems, MST is also associated with improved relationships between the adolescents and their siblings. Rowland, Chapman,



and Henggeler⁵⁹ examined substance use and delinquency outcomes for the nearest age siblings of substance abusing and delinquent youth involved in MST services. The sample consisted of 70 siblings (mean age = 14.4, 50% male, 71% African American). Data were collected at pretreatment, 4 months, 12 months, and 18 months. Multilevel longitudinal modeling investigated whether delinquency paralleled the treatment effects observed in the identified sibling. Results showed parallel outcomes for siblings and substance use, but not for criminal behavior. This suggests that there are differential treatment effects, and that siblings of substance abusing adolescents with conduct problems had reduced substance use, but not reduced criminal behavior. This important finding provides new evidence that family-based interventions designed to reduce substance use in identified adolescents also has a positive effect on non-referred or identified siblings.

More recently, Ramirez et al⁶⁰ investigated the relationship between sibling substance use, family intervention, and treatment outcomes for adolescents. They found that although family environment was related to family conflict, limit setting, and positive family experiences, it was not related to abstinence outcomes. Specifically, only peer networks were related to abstinence outcomes as adolescents with fewer than four substance-using peers (including siblings) were more likely to remain abstinent at 1-year follow-up than adolescents with four or more substance abusing peers. Their conclusions were that although family environment is an important factor in the development and maintenance of substance abuse problems in adolescence, it does not play a significant role in treatment success.

So, what does the literature suggest about MST and substance abuse treatment among adolescents with conduct problems? First, the past 20 years of research has consistently found that MST is an efficacious and effective intervention for reducing substance use and antisocial behavior in adolescents with conduct problems including ODD and CD. Second, the combination of MST and drug court appears to provide the best treatment outcomes as compared to MST and involvement in either family or criminal court. Third, MST is associated with reduced substance use with siblings who receive MST treatment. Fourth, MST has demonstrated considerable cost savings to the

government and the private sector, although a more thorough cost-benefit analysis is beyond the scope of the present review.

Psychoeducation (PE)

PE is another intervention utilized for substance abuse treatment among adolescents with conduct problems. In contrast to CBT, 12-step, and MST, PE substance abuse treatment can vary widely and tends to have a much less clearly developed theoretical framework. Given this, the following review defined PE as having the core components of either a didactic, experiential, or videotaped presentations about the immediate and/or delayed multidimensional problems associated with adolescent substance abuse.⁶¹ Specific examples of PE include knowledge acquisition interventions that are often delivered in residential settings (eg, correctional facilities or wilderness programs) or other interventions (ie, Scared Straight), which are not part of a programmatic system of intervention such as CBT, 12-step facilitation, or MST.

Kaminer, Burlison, and Goldberger⁶¹ evaluated the efficacy of CBT and PE for substance abusing adolescents. The study consisted of 88 adolescents randomized to either CBT or PE, and who had been referred to an outpatient program for a substance use disorder (SUD). Because exclusionary criteria ruled out any adolescents who were not medication compliant or aggressive in the last 30 days, it is unclear how well these data generalize to adolescents with conduct problems. However, given the paucity of research on PE and substance use, particularly for adolescents, this research was important to discuss. For substance use specifically, data suggest that results in the CBT condition were more favorable; however, this pattern was tempered by a significant group interaction. Specifically, male subjects in the CBT condition showed the most improvements, while males in the PE condition showed no improvement; in contrast, females showed improvement regardless of the treatment condition. In addition, both conditions were associated with decreased legal involvement at the 3-month and 9-month follow-up periods. Results suggested that females benefit from treatment regardless of intervention, but that males are differentially affected, with CBT producing better outcomes. These data are consistent with existing research suggesting



that PE substance abuse treatment can and does work within correctional settings.^{62,63}

Bartholomew et al⁶⁴ evaluated the effectiveness of communication and relationship skills training for men who were court-ordered to residential treatment for substance abuse. Although the average age of participants in the study was 31 years old, the majority of the participants (68%) were between the ages of 17 and 34 years. Thus, this sample met the inclusion criteria for this review despite a slightly older mean age. The experimental group consisted of a PE program called TOFMEN (Time Out! For men) and consisted of listening and assertiveness skills, expressing feelings, and conflict resolution, as well as education about sexual practices and reproduction. Men in the experimental condition showed significant improvement in knowledge about sexuality, sexual health, communication skills, gender roles, and socialization compared to the control group, and the authors concluded that substance abuse treatment programs should consider the benefits of offering gender-specific interventions for men as part of their overall treatment protocol.

Crowley et al¹⁶ conducted a study with 89 male adolescents (aged 13–19 years) who were diagnosed as substance-dependent and conduct-disordered, and who were referred to a residential treatment facility specifically for substance use and CD. Although 12-step groups were available as an adjunctive therapy, treatment primarily consisted of a 6–9 month immersion in a therapeutic milieu, which consisted of behavioral modification (eg, token economies, rewards systems, etcetera), consistent disciplinary action to shape prosocial behavior, vocational counseling, special education services, and psychiatric consultation and treatment (ie, pharmacotherapy). Essential components of 12-step facilitation (eg, surrender, higher power, sponsor, etcetera) were not required. The relevant findings on substance use outcomes were that only reductions in the use of inhalants and hallucinogenics were observed. Given the experimental, non-addictive nature of these drugs versus the chronic nature of alcohol and marijuana use, these results were not compelling. However, the authors concluded that among other favorable outcomes, PE residential treatment can reduce substance use into adulthood.

Wilson and Lipsey⁶⁵ conducted a meta-analysis of programs for delinquent youth that exclusively

targeted substance abuse, antisocial behavior, and/or delinquency. The authors included 28 studies that examined over 3000 participants, and their sample consisted of adolescent males who had been arrested or who were in the juvenile justice system with a primary substance use and comorbid CD. Their findings were that wilderness programs are effective for reducing antisocial and delinquent behavior, including substance use. Specifically, there was a moderately positive effect for wilderness programs on reducing antisocial and delinquent behavior post-treatment, with programs involving rigorous physical activity, family therapy, and individual intervention proving especially effective.

So, what does the literature suggest about PE and substance abuse treatment among adolescents with conduct problems? First, in contrast to previously reviewed interventions, there is a paucity of research evaluating PE and substance abuse treatment outcomes. This is largely due to the fact that PE does not have a clearly developed theoretical framework; therefore, it is difficult to evaluate its mechanisms of change or fidelity. Second, as noted in the available literature, PE seems to be positively associated with substance abuse treatment among adolescents with conduct problems. In particular, PE appears to be especially helpful in residential settings such as residential treatment settings and correctional facilities. Third, although PE has a positive association with treatment outcomes, it does not have the same robust findings as any of the previous interventions.

Motivational interviewing (MI)

MI is another intervention commonly employed with substance abusing adolescents with conduct problems. Specifically, MI is a set of brief, clinical interventions designed to reduce resistance in clients and promote behavior change, particularly with substance use.⁶⁶ In fact, there is a large body of literature supporting MI's efficacy in reducing substance use.^{67,68} With adolescents in particular, Marlatt et al⁶⁹ claimed that MI consistently provided more support to reduce hazardous drinking in young adults when compared with educational or information-only interventions. Although MI has produced some initially encouraging results, Grenard et al⁷⁰ concluded that there is little research about and largely mixed results for MI's effectiveness in reducing alcohol use in adolescents.



Brown and Miller⁷¹ conducted the first empirical study of MI and treatment outcomes with residential participants. Specifically, they tested whether MI could serve as a preparation for treatment, in which MI would increase participant involvement in treatment and thereby exert a beneficial impact on treatment outcomes, regardless of the intervention type. The two conditions were experimental (ie, MI plus 12-step facilitation and group therapy) and control (ie, 12-step facilitation and group therapy). Despite a small sample size, this study was the first to provide evidence that two brief, 1-hour interventions within 48 hours of admission that were conducted prior to the start of treatment could have a lasting and positive impact on treatment outcomes. Specifically, the front-loaded MI intervention was associated with significant beneficial effects in reducing post-treatment alcohol consumption and increased treatment participation. Given the very small sample size, the observed effect size was particularly strong, and was thus statistically significant.

Amrhein et al⁷² investigated how client language during MI intervention predicts drug use outcomes. This study is important because it was the first to evaluate commitment strength (CS) and treatment outcomes within MI intervention. Interviews from 84 drug abusers were coded by trained researchers to rate the frequency and strength of language use that expressed commitment, desire, ability, need, readiness, and their reasons to change drug use habits. In contrast to prior studies that found only change talk (and not commitment language) as predictive of reduced substance use, this study did find that CS during MI was associated with positive treatment outcomes. In fact, three patterns emerged: maintainers, changers, and strugglers. The first referred to those who were abstinent at intake and remained abstinent 12 months post-treatment; the second referred to low abstinence at intake and high abstinence at 12 months post-treatment; and the third referred to low abstinence at intake and low, moderate, or unstable abstinence through treatment and at 12 months post-treatment. This study showed the importance of client language during MI treatment and, in particular, the importance of CS language in promoting reduced substance use.

More recently, Baer et al⁷³ investigated adolescent change language with brief MI interventions and substance use outcomes. This study is unique as its

sample was comprised of 54 homeless adolescents (ages 13–19 years) who were actively using alcohol and/or illicit substances, but who were neither actively seeking nor referred for treatment. The researchers' findings were important because they provided unequivocal evidence in support of one of MI's main premises: that client change talk is directly related to subsequent changes in behavior, and also that change language "significantly and prospectively predicted changes in substance use at 1 and 3-month follow-up." These data are particularly compelling because they provided strong empirical support that MI interventions can reduce alcohol and illicit drug use "despite myriad psychological and social problems among homeless youths and their general disengagement from broader social systems, and despite that this sample was not seeking treatment."⁷³

In a randomized trial of MI and drug use, Miller, Yahne, and Tonigan⁷⁴ investigated whether there was an additive treatment effect of a single MI session on treatment outcomes in a standard treatment protocol for substance abuse. The only difference between treatment conditions was that each participant either received (or did not receive) a 1-hour MI interview prior to treatment. While this study did not demonstrate that MI had an additive treatment benefit, the sample was comprised primarily of cocaine and opioid addictions, not alcohol and marijuana abuse or dependence—the most common substance abuse problems noted among adolescents. Furthermore, it may be the case that adolescents addicted cocaine and heroin could have differential responsiveness to MI interventions given the highly addictive nature of these substances. Nonetheless, this relationship seems unclear, under-investigated, and in need of further investigation.

Ball et al⁷⁵ investigated the effectiveness of motivational enhancement therapy (MET-based on MI) versus counseling as usual (CAU) for increasing retention and reducing substance use in a multisite, randomized trial. Their results showed that there was no difference in treatment retention or drug screen outcomes between the MET and CAU conditions. Further, primary drug users (eg, marijuana, cocaine users) derived no benefit from MET relative to CAU; however, their primary hypothesis that MET exhibited higher rates of effectiveness versus CAU was supported. Thus, this study showed differential treatment effectiveness between MET and CAU,



with MET being associated with more sustainable treatment gains of abstinence at 12 weeks post-treatment follow-up.

Carroll et al⁷⁶ also investigated the use of CM and MI to treat young adults with marijuana dependence. For marijuana use, participants assigned to the MET/CBT condition had significantly longer episodes of continuous abstinence than participants not assigned to the CM condition. Moreover, during 3- and 6-month follow-up periods, random-effect regression analyses revealed that participants generally did not change their frequency of marijuana use 8 weeks after completion of treatment. Additional analyses showed that participants randomly assigned to the CM conditions had greater reductions in marijuana composite scores than the other conditions. Considered together, these data suggest that MI is effective in promoting greater treatment retention and is associated with improved treatment outcomes for substance abusing adolescents; however, CM was the most predictive factor in reducing marijuana use, with optimal results observed in the MET/CBT condition.

Stein et al⁷⁷ investigated whether MI enhanced substance abuse treatment for incarcerated adolescents. Participants were randomized to either MET or relaxation training (RT). Similar to Brown and Miller,⁷¹ their results suggested that frontloading substance abuse treatment with MI reduces resistance and promotes more positive engagement in treatment, which is associated with improved treatment outcomes.

Although MI has generated considerable empirical support as a brief, efficacious, and effective treatment for SUD among adolescents with conduct problems, a recent study has challenged some of these findings. Thush et al⁷⁸ investigated the influence of a single-session of MI on implicit and explicit alcohol-related cognition. They investigated whether the intervention was successful in decreasing alcohol consumption in at-risk youth. They found that those in the MI condition did not exhibit enhanced motivation to change or enhanced negative expectancies of drug and alcohol use. They also found that the MI intervention was not associated with decreased post-treatment alcohol consumption. Ultimately, the researchers concluded that although MI has been proven to be effective in reducing hazardous drinking in young adult populations, this strategy may be less effective

in at-risk adolescents, which could be explained by the differential response to alcohol use in adolescents and young adults.

So, what does the literature suggest about MI and substance abuse treatment among adolescents with conduct problems? First, MI is a brief, efficacious and effective intervention for substance abuse. Second, MI seems especially robust when it is frontloaded to other treatments, particularly CBT. Third, future research could investigate the mechanisms of action involved in MI (eg, change talk, commitment strength, and so on) to evaluate how they mediate outcomes. A greater understanding of the mechanisms of action might help to explain the mixed results found among studies of MI for substance abusing adolescents. Fifth, given its brief nature, MI offers a very practical set of skills that practitioners can incorporate in clinical care or research protocols.

Conclusion

This review initially outlined some of the history and complexities associated with treatment outcomes research. Thereafter, it thoroughly and systematically reviewed the literature on substance abuse treatment among adolescents with conduct problems. Although there have been significant advances in the development of efficacious and effective treatments for SUD,⁷⁹ considerable work remains to be conducted, particularly for this population. First, there is a need for additional research given that many important questions remain unanswered due to a paucity of research, the methodological limitations of the extant literature, and the fact that substance abusing adolescents with conduct problems remain underserved. However, of the available literature, it is clear that there are several evidence-based and empirically supported treatments. Specifically, CBT, 12-step facilitation, MST, PE, and MI are all positively associated with favorable treatment outcomes. Upon a more careful review of the literature, treatments that incorporate family-based interventions seem to consistently provide the most positive treatment outcomes.

More specifically, MST provides the most compelling evidence for the treatment of SUD among adolescents with conduct problems. In addition to being a family-based treatment, MST is often implemented with a high degree of treatment fidelity by well-trained providers who receive rigorous training in MST prior to treatment delivery and who



receive ongoing, weekly supervision from certified MST supervisors and national experts and consultants. Further, MST also addresses numerous factors that are highly related to substance abuse treatment outcomes such as methodological rigor, severity of SUD, treatment intensity and duration, parental substance abuse, and psychopathology, as well as access to deviant peers groups. Given this, MST appears to be best equipped to produce the most favorable treatment outcomes. However, this review does not suggest that MST has unique curative factors that are associated with substance abuse treatment outcomes for adolescents with conduct problems. Until randomized clinical trials between MST and other interventions that address the same multiple determinants of substance abuse in adolescents are conducted, MST currently holds the prize as being the optimal treatment of choice for substance abuse among adolescents with conduct problems.

Author Contributions

Conceived and designed the experiments: JS, LS. Analysed the data: JS, LS, AP, SR. Wrote the first draft of the manuscript: JS. Contributed to the writing of the manuscript: JS, AP, SR, LS. Agree with manuscript results and conclusions: JS, AP, SR, LS. Jointly developed the structure and arguments for the paper: JS, LS. Made critical revisions and approved final version: JS, AP, SR, LS. All authors reviewed and approved of the final manuscript.

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