

Treatment Effectiveness With Dually Diagnosed Adolescents: A Systematic Review

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The treatment of dually diagnosed adolescents is challenging for many reasons, including complex treatment needs, poor treatment engagement and retention, and a lack of sustainable treatment outcomes. Although a large percentage of adolescents are diagnosed with both substance abuse and mental health diagnoses, research is only beginning to identify effective treatments for this population. The current study systematically reviews randomized clinical trials of interventions for dually diagnosed adolescents. Results examining both between-group effect sizes and within group changes indicate the efficacy of several treatment modalities in improving specific aspects of treatment needs but highlight family behavior therapy and individual cognitive problem-solving therapy as showing large effect sizes across externalizing, internalizing, and substance-abuse outcomes in dually diagnosed youth. The study further discusses the complexities of systematically evaluating the currently limited state of research on dually diagnosed youth. Finally, preliminary guidelines for treating dually diagnosed adolescents are derived from a review of those treatments shown to be most effective. [*Brief Treatment and Crisis Intervention* 6:177–205 (2006)]

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Addressing the unique treatment needs of “dually diagnosed” adolescents has become increasingly pressing in recent years as a result of high prevalence rates and serious clinical concerns associated with this population. Several issues make comorbid disorders extremely challenging to treat, including complex treat-

ment needs, increased severity of symptoms, high cost of treatment, necessity to integrate several interventions, and low treatment retention among dually diagnosed youth. Despite these complexities, recent studies have demonstrated the effectiveness of interventions aimed at treating dually diagnosed adolescents. The primary aim of this article is to systematically review empirically supported interventions for dually diagnosed adolescents.

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Definitions. Dually diagnosed adolescents are identified as simultaneously having substance-use disorders (SUDs) and comorbid psychiatric

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mental health disorders. The term dually diagnosed remains rather ambiguous, however, because it encompasses adolescents with a variety of substance-use problems and a spectrum of mental health disorders. This lack of uniformity creates challenges for those who seek to study and treat dually diagnosed adolescents (Crome, 2004). For example, adolescents with SUD and comorbid mood disorders may have different needs and responses to treatment than do adolescents with SUD and conduct disorder (CD) or attention deficit hyperactivity disorder (ADHD). For purposes of this review, adolescents with a combination of an SUD and at least one mental health diagnosis are categorized as dually diagnosed. For purposes of this review, an adolescent is any youth between the ages of 12 and 18.

Prevalence. Despite the difficulty in creating a uniform definition, several studies have reported extremely high prevalence rates of comorbid conditions. Among substance-abusing adolescents, 50–90% report comorbid psychiatric problems (Greenbaum, Foster-Johnson, & Amelia, 1996; Greenbaum, Prange, Friedman, & Silver, 1991; Rounds-Bryant, Kristiansen, & Hubbard, 1999). Roberts and Corcoran (2005) assert that dually diagnosed adolescents are in fact not a special subpopulation of adolescents but, instead, the norm. The majority of adolescents seeking services today are thus likely to have substance-use problems, mental health diagnoses, as well as myriad social, behavioral, and familial problems.

Characteristics. Dually diagnosed adolescents are characteristically a very challenging population to treat. Although prevalence rates are high, few interventions have been developed or tested to treat this population. There is a dearth of development and testing of treatments for dually diagnosed youth for several reasons. The majority of federally funded mechanisms have been focused on Type I

and II clinical trials with homogeneous samples. Dually diagnosed adolescents are likely to have poor attendance in treatment, to be difficult to engage, and to have high rates of noncompliance (Crome, 2004; Donohue et al., 1998; Flanzer, 2005; Wise, Cuffe, & Fischer, 2001). Early termination of treatment is especially problematic for youth with comorbid SUDs and ADHD or CD, whereas those with comorbid adjustment or mood disorders have better rates of retention (Flanzer, 2005).

Early termination and disengagement is associated with poor treatment outcomes (Williams & Chang, 2000). Consequently, dually diagnosed adolescents are at increased risk for hospitalization, relapse, and poor prognosis (Crome, 2004; Flanzer, 2005). Thus, comorbidity—especially the mixed type (internalizing and externalizing disorders in addition to SUD)—is linked to poor treatment outcomes for adolescent substance abusers (Rowe, Liddle, Greenbaum, & Henderson, 2004). Even when initial treatment outcomes are positive, dually diagnosed youth are less likely to sustain treatment gains over time (Dakof, Tejada, & Liddle, 2001; Shane, Jasiukaitis, & Green, 2003).

Dually diagnosed adolescents also represent a more clinically severe subsample of adolescents seeking treatment. They are likely to have earlier onset of substance use and tend to use substances more frequently and more chronically than adolescents with SUDs alone (Greenbaum et al., 1991; Rowe et al., 2004). Examining the severity of SUDs in the population further, Libby, Orton, Stover, and Riggs (2005) found that levels remain similarly high regardless of whether the youth developed mental health disorder or SUD first, suggesting that different pathways to dual diagnosis have consistently high treatment needs.

Not only are substance-use risk factors higher among this population but also dually diagnosed adolescents are also more at risk for myriad other social problems, including familial

and academic problems, as well as increased criminal behavior (Grella, Hser, Joshi, & Rounds-Bryant, 2001). Many youth who are dually diagnosed have also experienced early significant loss in their lives (Libby et al., 2005). Considering these complex needs, it is not surprising that dually diagnosed youth tend to have more service needs, receive more services during treatment, and are twice as likely to involve family members in treatment (Grella, Vandana, & Hser, 2004).

Treatment. Currently, three models of treatment guide interventions for dually diagnosed clients, including serial treatment (treating one disorder before the other), parallel treatment (treating both disorders simultaneously by separate clinicians), and integrated treatment (treating both disorders concurrently).

To date, treatment modalities for dually diagnosed adults have received more empirical attention than have interventions for adolescents. Dumaine (2003) conducted a comprehensive meta-analysis of dually diagnosed adults and reported intensive case management services followed by standard aftercare services with specialized outpatient psychoeducational groups having the greatest treatment effects, whereas inpatient treatments had the least effects.

However, studies have found that simply replicating adult-oriented treatments for adolescents is not adequate; adolescents require specialized treatment to meet their unique developmental needs. Lysaught and Wodarski (1996) highlight the importance of integrating treatment formats by addressing the influences of both peers and parents through peer group treatment and parent group psychoeducational groups. Many researchers and treatment providers, recognizing the unique clinical needs of dually diagnosed adolescents, have called for better screening and assessment in facilities treating adolescents (Robertson, Dill, Husain, & Undesser, 2004). Others have begun to test

treatments with established efficacy for adults for their applicability, with modifications, to dually diagnosed adolescents. For example, Crome (2004) states that the best treatment approaches for dually diagnosed youth are those that combine addiction treatments for adults and treatments for adolescents with behavioral problems.

Intervention researchers may be apprehensive about empirically testing the treatment of dually diagnosed adolescents because it is costly and time intensive and requires interventions that are integrative and complex. For instance, dually diagnosed adolescents often require behavioral treatments unique to their mental health disorders in addition to those treatments required for substance abuse (Flanzer, 2005). Cost of treatment for comorbid adolescents can be twice as high as treatment for adolescents with only one of these disorders (King, Gaines, Lambert, Summerfelt, & Bickman, 2000). Due to these challenges, services for co-occurring youth are often lacking in availability and quality, creating a gap of comprehensive, appropriate treatment for this population (Flanzer, 2005).

Despite this population's challenges and complexities, researchers recognizing the prevalence and severity of needs have begun studying effective treatments for dually diagnosed adolescents. Below, we comprehensively describe the recent nonrandomized outcome studies related to the treatment of dually diagnosed youth and then provide a systematic review of six treatment studies that utilized randomized designs.

Nonrandomized Outcome Studies

Pretest–Posttest Designs. We found five studies that utilized a pretest–posttest design to measure improvement in mental health symptoms and substance abuse in dually diagnosed youth (see Table 1 for study details).

TABLE 1. Nonrandomized Outcome Studies

Study	Sample	Design	Treatment	Findings
Bean et al. (2005)	Dually diagnosed adolescents (<i>N</i> = 53)	Pretest, posttest	Intensive psychiatric residential treatment	Reduction in anxiety symptoms, depression symptoms, CD, ADHD symptoms. Significant improvement in family relationships and educational status
Clark et al. (2004)	Troubled adolescents; 50% dually diagnosed (<i>N</i> = 109)	Pretest, posttest	Wilderness therapy	Wilderness therapy improved scores of depressive affect, substance-abuse proneness, delinquent predisposition, and impulsive propensity
Grella et al. (2004)	Adolescents with SUD; 62% dually diagnosed (majority CD) (<i>N</i> = 810)	Pretest, posttest	Residential, outpatient, and short-term inpatient	Dually diagnosed youth had more service needs, received more services, and were twice as likely to involve family in tx; positive outcomes related to rapport with counselor and participation in 12-step groups
Rogers et al. (2004)	Adolescent offenders; 73.2% SUD, 65.9% CD, and 26.8% mood disorder (<i>N</i> = 82)	Pretest, posttest	Designed especially for youth with both SUD and behavioral disruptive disorders; psychoeducation, therapeutic groups with behavioral level system	CD did not predict tx outcome; strongest predictor of hospital course and time to discharge was the breadth of substance use
Whitmore et al. (2000)	Dually diagnosed female adolescents (<i>N</i> = 46)	Pretest, 1 year posttreatment	Weekly individual, family, and group therapy sessions addressing drug use and criminal behavior	Improvement in CD, criminality, number of ADHD symptoms, and educational/vocational status; no improvement in substance use or depression; peer problems predicted CD; number of ADHD symptoms predicted substance outcomes
Jenson and Potter (2003)	Dually diagnosed juvenile detainees (<i>N</i> = 107)	Pretest, 3-month follow-up, and 6-month follow-up	Cross-system collaborative intervention: psychoeducation, psychiatric, case management, group therapy; substance abuse tx, family therapy	Reduction in MH symptoms, delinquency, and substance use in 6 months postrelease from detention

TABLE 1 *continued*. Nonrandomized Outcome Studies

Study	Sample	Design	Treatment	Findings
Shane et al. (2003)	Three groups: youth with SUD, SUD + either internal or externalizing disorder, SUD + both internal and externalizing disorder ($N = 419$)	Posttest, 3-month follow-up, 6-month follow-up, 12-month follow-up	Short-term and long-term residential substance-abuse treatment programs	Mixed comorbid youth entered treatment with higher levels of substance use, maintained highest levels through tx and at posttreatment compared to other groups; they initially responded to tx with decrease in substance use relapsed at higher rates
Grella et al. (2001)	Adolescents with SUD; 64% dually diagnosed (majority CD) ($N = 992$)	Pretest, 12-month follow-up	Drug treatment in residential, outpatient, and short-term inpatient	Dually diagnosed youth had more severe substance use (earlier onset, more substance dependence, greater number of substances); dually diagnosed youth had more problems with family, school, criminal behavior; at 12-month, showed improvement but still greater use than SUD-only group
Randall et al. (1999)	Juvenile offenders with SUD; 72% dually diagnosed ($N = 118$)	Pretest, posttest, and 6-month follow-up	MST and community SAUs	Comorbid externalizing disorders associated with worse substance-abuse and criminal activity outcomes; the presence of internalizing disorders buffered the effects of externalizing disorders
Crowley et al. (1998)	Dually diagnosed male juvenile delinquents ($N = 89$)	Pretest, 6-month follow-up, 12-month follow-up, 24-month follow-up	Residential tx; behavior tx, group, family, vocational counseling, 12-step groups, aftercare available	2-year follow-up: improvement in criminality, CD, and depression but no change in substance use; outcomes predicted by intensity of substance involvement, CD severity, and onset of CD as reported at intake

Note. tx = treatment.

These studies covered a variety of interventions and reported mixed results.

Two studies (Bean, White, Neagle, & Lake, 2005; Clark, Marmol, Cooley, & Gathercoal, 2004) reported positive treatment outcomes. Bean et al. (2005) reported positive outcomes in their study of dually diagnosed youth receiving intensive psychiatric residential services, including reductions in anxiety, depression, CD, and ADHD symptoms. Clark et al. (2004)

found similar improvements using wilderness therapy in reducing depressive affect, substance-use proneness, delinquency, and impulsivity.

In contrast to these two studies, Whitmore, Mikulich, Ehlers, and Crowley (2000) reported more mixed results. Youth receiving more traditional individual, family, and group outpatient therapy showed improvement in CD, criminality, and ADHD symptoms; however, two major outcomes, depression and substance

use, did not improve significantly in this sample (Whitmore et al., 2000).

Two studies (Grella et al., 2004; Rogers, Jackson, Sweell, & Johansen, 2004) identified substance abuse as a particularly persistent and influential factor in treatment. Clarifying the differential effects of drug treatment for dually diagnosed youth versus SUD-only youth, Grella et al. (2004) found that dually diagnosed youth had more severe substance use. Although treatment did reduce substance use for this vulnerable group, the dually diagnosed youth still maintained higher levels of use post-treatment. Rogers et al. (2004) further explored the effects of dual diagnosis on treatment, reporting that severity of substance use, not CD, predicted successful completion of treatment in a hospital setting.

Pretest–Posttest and Follow-up Designs. An important aspect of treatment, enduring treatment effects, has been evaluated using follow-up data in a few nonrandomized studies. Again, these five outcome studies report equivocal results.

Among those reporting more positive findings was an evaluation of a cross-system collaborative intervention for dually diagnosed juvenile detainees. The intervention focused on treatment coordination through case management and was associated with a reduction in mental health symptoms, delinquency, and substance use 6 months after being released from detention (Jenson & Potter, 2003). Crowley, Mikulich, MacDonald, Young, and Zerbe (1998) had similar positive findings when they examined the effects of residential treatment on male juvenile delinquents 2 years after leaving treatment. Although the sample of Crowley et al. improved in criminality, depression, and CD, they showed no change in substance use.

Three other studies reported more negative results. Shane et al. (2003) found that youth with both externalizing and internalizing men-

tal health disorders in addition to SUD entered treatment with higher levels of substance use when compared to youth with only one type of mental health diagnosis and SUD or those with SUD only. This mixed group, with more complex diagnoses, maintained elevated rates of substance use throughout treatment and at posttreatment. Furthermore, although mixed comorbid youth initially responded to residential treatment with a decrease in substance use, they relapsed at higher rates (Shane et al., 2003). Grella et al. (2001) similarly found that dually diagnosed youth reduced their substance use after completing treatment in various residential, outpatient, and short-term inpatient substance-abuse programs, but 12 months after treatment, they were more likely to be using substances and engaging in criminal behavior than adolescents with SUD only (Grella et al., 2001). In a study of multisystemic therapy (MST), Randall, Henggeler, Pickrel, and Brondino (1999) found the presence of externalizing disorders to be especially detrimental; youth with both SUD and externalizing disorders had higher rates of antisocial behavior and worse substance-use outcomes at 16-month follow-up. Interestingly and contrary to the finding of Shane et al. that youth with mixed disorders had poorer outcomes, Randall et al. (1999) found that the additional presence of internalizing disorders buffered the effects of externalizing disorders and SUD on drug use and criminal behavior.

From the few available studies examining the treatment outcomes of dually diagnosed adolescents, it appears that treatment is a complex task often resulting in mixed outcomes. Substance abuse appears to be a particularly difficult problem to treat and for which maintaining lasting improvements is challenging. The difficulty in treating substance use is further compounded by intertwined mental health conditions, especially comorbid externalizing disorders. Treatments appear to be successful at

reducing certain mental health or substance-abuse symptoms, but reducing both problem areas to clinically meaningful levels is difficult.

A limitation of the above studies is the lack of randomization, preventing researchers from controlling for various threats to internal validity and drawing causal inferences through isolating the effects of manualized treatments. In other words, the results from these studies cannot be unambiguously interpreted. Thus, the focus of the current study is to systematically review randomized clinical trials of interventions for dually diagnosed adolescents.

Aim

The primary goal of the current study is to systematically review the effectiveness of current empirically supported treatments for dually diagnosed adolescents. To accomplish this goal, the authors systematically reviewed empirical intervention studies and, for each intervention examined, asked the following questions. (a) What is the evidence in support of this intervention as an effective treatment for dually diagnosed adolescents? (b) What degree of change is associated with this intervention? (c) Examining the common factors among treatments with demonstrated effectiveness, what are some preliminary guidelines for treating dually diagnosed youth?

Methods

Review Criteria

To identify intervention studies to be included in this review, the authors conducted several keyword searches of electronic databases, including Education Resources Information Center (ERIC) PsycINFO, MedLine, Social Services Abstracts, and Social Work Abstracts. Terms used in these searches included “adoles-

cent, youth, teen, juvenile, substance abuse, drug abuse, treatment outcome, intervention, efficacy, mental health, co-occurring, dual diagnosis, and comorbid.” In addition, the authors reviewed Campbell Collaboration and Cochrane databases to identify studies or other reviews meeting the established selection criteria discussed below.

Once studies were identified by topic area, they were reviewed for inclusion according to their ability to best address the research questions of the current study. Studies included in this review were those that met the following selection criteria established by the authors: (a) randomized clinical trials, allowing authors to determine effectiveness; (b) treatment for dually diagnosed disorders, meaning treatment for both substance-abuse and mental health disorders concurrently; (c) peer reviewed in past 10 years, to provide the most current literature available; (d) treatments designed for youth with already existing dual diagnoses, excluding prevention studies; (e) studies published in English; and (f) treatment for youth aged 12–18, narrowing our studies to those of adolescents only.

Data Analysis

To address Aims a and b, studies were examined according to three outcome categories targeted by each study. The three categories included (a) externalizing problems, (b) internalizing problems, and (c) substance-abuse problems. The effect size formulas used in this study are based on the article of Morris and DeShon (2002) on effect size metric. The independent-group design metric is appropriate if the research question examines differences between treatment and control groups, whereas the repeated measures group design metric should be used if the research question examines change within an individual.

For each study, one effect size was calculated for each outcome measure using independent-group

pretest–posttest design sample estimator (Equation 1) when pretest and posttest scores for both groups were available:

$$d_{IG} = \frac{M_{\text{post,E}} - M_{\text{pre,E}}}{SD_{\text{pre,E}}} - \frac{M_{\text{post,C}} - M_{\text{pre,C}}}{SD_{\text{pre,C}}}, \quad (1)$$

where $M_{\text{pre,E}}$ and $M_{\text{pre,C}}$ represent the mean pretest scores for the experimental and control groups, respectively, $M_{\text{post,E}}$ and $M_{\text{post,C}}$ represent the mean posttest scores for the experimental and control groups, respectively, and SD represents the standard deviation. This allowed us to examine the magnitude of treatment effects between two groups for each of the studies based on the three outcome measure constructs. It also allowed us to answer the first research question investigating the evidence in support of these interventions as an effective treatment for dually diagnosed adolescents. Effect sizes for pretest–follow-up scores were also calculated using the same formula (Equation 1) because we were interested in the long-term sustainability of the treatment effects for the various therapy models.

To address Aim b investigating the degree of change associated with each therapy model, effect sizes were calculated for each treatment modality (excluding services as usual [SAU] groups), resulting in measures of change for the MST, interactional group treatment (IT), family behavior therapy (FBT), individual cognitive problem solving (ICPS), cognitive behavior therapy (CBT), ecologically based family therapy (EBFT), and seeking safety therapy (SS). Calculating effect sizes using Formula 2 allows us to further examine whether the change occurred within the individual and the magnitude of the treatment effect. A repeated measures design consists of each individual participant in a group being measured before and after treatment, with the difference between the individual score representing the estimate of the treatment effect. The formula

used to calculate a repeated measures effect size for each of the studies was

$$d_{RM} = \frac{M_{\text{post,E}} - M_{\text{pre,E}}}{SD_{\text{pre,E}}}, \quad (2)$$

where $M_{\text{pre,E}}$ represents the mean pretest scores and $M_{\text{post,C}}$ represents the mean posttest scores. This allowed us to see if there were any treatment effects or changes in individuals based on the different interventions. Again, effect sizes for follow-up scores were also calculated using the same formula (Equation 2) because we were interested in the long-term sustainability of the treatment effects for the various therapy models. Effect sizes were interpreted based on the classification by Cohen (1988), with 0.20 or less indicating a small effect size, 0.50 moderate, and 0.80 and above large.

A common issue that arises when calculating effect sizes for a primary study is what to do when there are multiple measures for a single construct. The approach taken for this study is based on Lipsey's (1994) suggestion to calculate individual effect sizes for each of the different measures in a single study and then average them to generate one effect size for that measure. Similarly, a study may have an effect size for all the dependent variables in that primary study. It is recommended that only one effect size value should represent a study in any analysis in order to ensure statistical independence of the data (Bangert-Drowns, 1997; Devine, 1997). In addition, all effect sizes are calculated so that a positive score indicates favorable direction. Effect sizes for measures where a negative score is the desired direction were reserved so that all effect sizes were in the same direction when averaging multiple measures for a single construct.

Results

Our search identified seven interventions for dually diagnosed adolescents reported across six different studies that met our selection

criteria. These studies included MST (Henggeler, Pickrel, & Brondino, 1999), IT (Kaminer, Burleson, Blitz, Sussman, & Rounsaville, 1998; Kaminer & Burleson, 1999), FBT (Azrin et al., 2001), ICPS (Azrin et al., 2001), CBT (Kaminer, Burleson, & Goldberger, 2002), EBFT (Slesnick & Prestopnik, 2005), and SS (Najavits, Gallop, & Weiss, in press). Table 2 provides a brief overview of each of the selected studies.

Review of Interventions for Dually Diagnosed Adolescents

Multisystemic Therapy. MST (Henggeler & Borduin, 1990; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998) was developed by Scott Henggeler and his colleagues at the Family Services Research Center, Department of Psychiatry and Behavioral Sciences at the Medical University of South Carolina in Charleston. MST is a family- and community-based treatment approach that is theoretically grounded in a social-ecological framework (Bronfenbrenner, 1979) and family systems (Haley, 1976; Minuchin, 1974). The social-ecological model views human development as a reciprocal interchange between the client and “nested concentric structures” that mutually influence each other (Henggeler, 1999). Furthermore, the ecological perspective asserts that one’s behavior is determined by multiple forces (e.g., family, school, work, peers) and is supported by causal modeling of delinquency and substance abuse (Henggeler, 1997).

A basic foundation of MST is the belief that a juvenile’s acting out or antisocial behavior is best addressed by interfacing with multiple systems, including the adolescent’s family, peers, school, teachers, neighbors, and others (Brown, Borduin, & Henggeler, 2001). Thus, the MST practitioner interfaces not just with the adolescent but also with various individuals and settings that influence the adolescent’s life.

Henggeler (1999) has summarized the MST model of service delivery. The MST practitioner typically carries a low caseload of five to six families, which allows for the delivery of more intensive services (2–15 h per week) than traditional approaches (normally 1 h per week). The practitioner is available to the client system 24 h a day, 7 days a week. Services are delivered in the client’s natural environment, such as the client’s home or a neighborhood center. Treatment is typically time limited, lasting 4–6 months. For a detailed exposition on implementing MST with high-risk youth, the reader is referred to sources that describe MST in detail (cf. Henggeler & Borduin, 1990; Henggeler et al., 1998).

Original Study Findings. Henggeler et al. (1999) examined the use of MST as compared to the usual community services in treating a sample of substance-abusing juvenile offenders, most of whom (72%) were dually diagnosed. The sample included 118 adolescents aged 12–17, recruited from a juvenile justice system. Participants were predominantly male (79%) and self-identified as Black (50%), White (47%), Hispanic (1%), or other (2%).

The authors report an extremely low treatment attrition rate of 2% in the MST group; the attrition rate for SAU was not calculated. Frequency of MST sessions was determined by client needs; families received services an average of 130 days ($SD = 32$ days), consisting of an average of 40 contact hours ($SD = 28$, range = 12–187). SAUs consisted of a variety of available substance-abuse and mental health treatment in the community, including therapeutic groups, school-based, residential, and 12-step programs. However, SAU group members received very little treatment, with over three-quarters (78%) not receiving mental health or substance-abuse treatment of any kind. Outcome measures included drug use, criminal activity, and days in out-of-home

TABLE 2. Randomized Clinical Trials of Interventions for Treating Dually Diagnosed Adolescents

Characteristics Comparison group	Intervention study					
	MST SAU	IT CBT	FBT ICPS	CBT PET	EBFT SAU	SS SAU
Sample size	118	32	56	88	124	33
Gender (%)						
Male	79	61.5	82	70	59	0
Female	21	38.5	18	30	41	100
Race/ethnicity (%)						
Hispanic	1	0	16	0	42	
Black	50	0	2	0	7	
White	47	90	79	90	37	
Others	2	10	3	10	14	
Age range	12–17	13–18	12–17	13–18	12–17	
Mean	15.7	15.9	15.4	15.4	14.9	
Diagnosis (% comorbid)	SUD (72% comorbid)	SUD and MH (100% comorbid)	SUD and MH (100% comorbid)	Psychoactive SUD; (predominantly comorbid)	SUD and MH diagnosis (SUD 74.2% comorbid)	SUD and PTSD (100% comorbid)
Attrition rate	2% tx retention in MST group	50% IT, 50% CBT	56/88 completed eight of 15 sessions	Tx completion rate: 86%, 3-month follow-up: 80%; 9-month follow-up: 65%	EBFT: 45% completed all 15 sessions and 77% completed five or more sessions	Research attrition— intake: 18 SS/15 SAU, Post: 14 SS/12 SAU, follow-up: 11 SS/9 SAU
Delivery of treatment	MST: at home, SAU outpatient	Outpatient aftercare	Outpatient	Outpatient	SAU = shelter services, EBFT = outpatient	Outpatient

TABLE 2 *continued*. Randomized Clinical Trials of Interventions for Treating Dually Diagnosed Adolescents

Characteristics Comparison group	Intervention study					
	MST SAU	IT CBT	FBT ICPS	CBT PET	EBFT SAU	SS SAU
Data collection	Pre-tx, post-tx, 6 months	Pre-tx, 3 months post-tx	Pre-tx, post-tx, 6-month follow-up	Pre-tx, post-tx, 3-month follow-up, 9-month follow-up	Pre-tx, post-tx, 6-month follow-up, 12-month follow-up	Pre-tx, post-tx, 3-month follow-up
Outcomes: substance use	MST significantly reduced alcohol and drug use	CBT better at reducing substance use than IT at 3 months; both showed improvement at 15 months	FBT and ICPS equally effective in reducing alcohol and drug problems; both groups showed significant reduction in illicit drug use pre to post and maintained at follow-up	CBT lower relapse rates than PET at 3 months; similar relapse rates between groups at 9 months	EBFT showed greater reduction in substance abuse than SAU	SS showed significantly better improvements in substance use, cognitions related to SUD than SAU but few gains maintained at follow-up
Outcomes: related problems	MST reduced number of days in out-of-home placement and criminal activity	CBT showed more improvement in family functioning than IT at 3 month; both showed equal improvement at 15 months	FBT and ICPS = effective in reducing CD; both groups significantly improved conduct; mood improved significantly in both groups		EBFT and SAU show significant and equal improvement in psychological functioning, family functioning, and HIV knowledge	SS showed significantly better improvements, PTSD cognitions, and other psychopathology subscales than SAU

Note. MST (Henggeler et al., 1999); FBT (Azrin et al., 2001); CBT (Kaminer et al., 2002); EBFT (Slesnick and Prestopnik 2005), IT (Kaminer et al., 1998, 1999); SS (Najavits et al., in press); tx = treatment.

placement. Findings indicate that MST reduced alcohol, marijuana, and drug use, as well as the number of days youth spent in out-of-home placement. However, improvement was not maintained at 6-month follow-up. Criminal activity, although decreased, was not reduced as significantly as found in other MST studies (Henggeler et al., 1999).

Computed Effect Sizes. Effect sizes between the MST experimental group and the SAU control group were calculated using Formula 1 with posttest and follow-up scores. Independent-group effect sizes for externalizing outcomes were 0.09 at posttest and 0.09 at 6-month follow-up. According to Cohen (1988), both posttest and follow-up effect sizes were considered small. Both effect sizes were near zero, indicating no significant difference between MST and SAU groups. Formula 2 for externalizing outcomes resulted in a repeated measures effect sizes for the MST group of 0.59 at posttest and 0.81 at 6-month follow-up, demonstrating that MST had a moderate effect size at posttest and a large effect size at follow-up.

For substance-use outcome, independent-group effect sizes between MST and SAU were 0.38 at posttest and 0.10 at follow-up, indicating a small treatment effect favoring the MST group. Repeated measures effect sizes for the MST group were 0.28 at posttest and 0.26 at follow-up, indicating a small treatment effect at both time measures. Computed effect sizes for this study and others included in this review are reported in Tables 3 and 4.

Findings from Henggeler et al. (1999) reveal modest results when compared with other studies of MST (Henggeler, 1999), some of which have shown stronger support of MST specifically for treating substance use in juvenile offenders (Henggeler et al., 1991). The authors report that these modest results are likely due to difficulty in transporting MST from its developers into practice. To address limitations

in adapting MST, Henggeler et al. mention studies aimed at developing ways to integrate substance-use treatment with a focus on other relationship problems (Budney & Higgins, 1998).

Interactional Group Therapy. IT focuses on the importance of the clients' interpersonal relationships with the goal of developing insights, enhancing self-esteem, and improving self-care. Developed by Yalom and later adapted for group work with adult alcoholics (Brown & Yalom, 1977), IT utilizes group dynamics and immediacy to work on interpersonal relationships, thus improving client affect. Primary goals of IT include exploring how pathology is manifested in interactions within group, enabling self-disclosure and expression of emotions, and ultimately fostering more positive interpersonal relationships outside of treatment and decreased symptoms/problem behaviors. To foster this process, IT therapists aim to help clients develop trust, openness, and cohesiveness within the group through open conversations about the group process and relationship issues in the group (Kadden, Litt, Cooney, Kabela, & Getter, 2001).

Original Study Findings. Kaminer et al. (1998) examined IT in comparison to CBT in a clinical trial with a follow-up study at 15 months post-treatment by Kaminer and Burleson (1999). The purpose of the Kaminer et al. study was to examine whether youth with externalizing versus internalizing comorbid disorders could be matched by treatment. The sample included 32 adolescents between the ages of 13 and 18 who were leaving a partial hospitalization treatment program. Participants were predominantly White (90%) and male (61.5%), and all were dually diagnosed with an SUD and either an internalizing disorder or an externalizing disorder. Treatment attrition was 50% in

TABLE 3. Independent-Group Effect Sizes Based on Formula 1

Intervention	Sample total	Outcome measures	Effect size value—between groups
Study 1, MST versus SAU (Henggeler et al., 1999)	118	Personal experiences inventory: alcohol/marijuana and other drugs; self-reported delinquency	Posttreatment Substance use = 0.38 Externalizing = 0.09 6 months Substance use = 0.10 Externalizing = 0.09
Study 2, IT versus CBT (Kaminer et al., 1998, 1999)	32	Teen addiction severity index: substance use, psychological	Posttreatment (3 months) Substance use = -0.35 Internalizing = 0.30 15 months Substance use = -0.14 Internalizing = 0.30
Study 3, FBT versus ICPS (Azrin et al., 2001)	56	Days using drugs; parent and youth happiness with parent and youth scales: drug use, illicit behavior, total scale; life satisfaction scale: drug use, total scale score; child behavior checklist: delinquency; youth self-report: delinquency; Eyberg problem behavior inventory: problem, intensity; frequency of arrest; Beck depression inventory	Posttreatment Substance use = 0.21 Externalizing = -0.02 Internalizing = 0.16 6 months Substance use = 0.15 Externalizing = -0.35 Internalizing = 0.28
Study 4, CBT versus PET (Kaminer et al., 2002)	88	Teen addiction severity index: alcohol problems, substance-abuse problems, psychological	Posttreatment (3 months) Substance use = 0.13 Internalizing = 0.03 9 months Substance use = -0.02 Internalizing = 0.20

TABLE 3 *continued*. Independent-Group Effect Sizes Based on Formula 1

Intervention	Sample total	Outcome measures	Effect size value—between groups
Study 5, EBFT versus SAU (Slesnick et al., 2005)	124	POSIT; days use of drugs and alcohol	Posttreatment
			Substance use = 0.02
			Externalizing = -0.29
			Internalizing = -0.15
			6 months
			Substance use = -0.02
			Externalizing = -0.18
			Internalizing = -0.12
			12 months
Substance use = -0.03			
Externalizing = -0.12			
Internalizing = -0.15			
Study 6, SS versus SAU (Najavits et al., in press)		Personal experiences inventory: effects from drug use, social benefits of drug use, polydrug use, psychological benefits of drug use, transitional drug use, preoccupation with drugs, loss of control, deviant behavior; adolescent psychopathology scale: substance-use disorder, somatization, major depression, self-concept; trauma symptom checklist for children's sexual concerns, sexual distress	Posttreatment
			Substance use = 0.94
			Externalizing = 0.83
			Internalizing = 0.10
			3 months
			Substance use = 0.03
			Externalizing = 0.59
			Internalizing = -0.30

the IT group and 50% in the CBT group, resulting in eight youth in each group. Both IT and CBT were provided over a 12-week period in weekly 90-min sessions. Outcome measures included objective and subjective measures of drug use as well as substance-related problems such as family functioning, academic function, peer social relationships, legal problems, and psychiatric severity.

Findings indicate that CBT was more effective at reducing substance use than IT at 3 months posttreatment; however, both groups showed significant reduction in substance use at the 15-month follow-up. Although nonsignificant,

other substance-related problems showed a trend in favor of CBT at 3-month follow-up but equal improvements at 15 months posttreatment. There were no significant effects for matching type of psychiatric disorder to treatment type.

Computed Effect Sizes. Effect sizes between the IT experimental group and the CBT control group were calculated using Formula 1 with posttest and follow-up scores. Independent-group effect sizes for internalizing outcomes were 0.30 at posttest and 0.30 at the 15-month follow-up. Both posttest and follow-up effect sizes were considered small, indicating a small

treatment effect favoring the IT group. Formula 2 for internalizing outcomes resulted in a repeated measures effect sizes for the IT group of 0.84 at posttest and 1.47 at 15-month follow-up, demonstrating that IT had a large effect size at posttest and at follow-up. The repeated measure effect size for the CBT group was 0.52 at posttest and 1.14 at follow-up, indicating CBT had an initial moderate effect but a large effect at follow-up.

For substance-use outcome, independent-group effect sizes between IT and CBT were -0.35 at posttest and 0.15 at follow-up, indicating a small treatment effect favoring the CBT group at posttest and a small treatment effect favoring IT at follow-up. Repeated measures effect sizes for the IT group were 0.72 at posttest and 0.32 at follow-up, indicating a nearly large effect at posttest but a small effect by follow-up. Repeated measures effect sizes for the CBT group were 1.1 at posttest and 0.48 at follow-up, indicating CBT had a large effect at posttest but a moderate effect at follow-up.

Findings from Kaminer et al. (1998) and Kaminer and Burleson (1999) confirm prior studies that found maintenance of treatment gains independent of therapy type in adult alcoholics (Cooney, Kadden, Litt, & Getter, 1991), and Stephens, Roffman, and Simpson (1994) found similar long-term effects for marijuana use. Limitations of the Kaminer et al. (1998) and Kaminer and Burleson (1999) studies include lack of a no-treatment control group, high attrition rates, and lack of an objective measure of substance use (such as urinalysis) at follow-up.

Family Behavior Therapy. FBT seeks to decrease drug use and behavioral problems using a behavioral approach. The behavioral perspective guiding FBT views physiological dependence and social peer pressure as reinforcers of continued substance use. Interventions in FBT employ empirically validated strategies

to target multiple variables believed to influence substance use and antisocial behaviors, including cognitive, verbal, social, and family factors (Donohue & Azrin, 2001).

FBT therapists follow standard treatment components, although maintaining some flexibility to meet the unique needs of their clients. Standard treatment components include engagement, assessment, drug analysis, sharing of assessment and analysis with youth and family, and selection from a variety of interventions. In order to address all domains of a youth's life, FBT encourages youth's siblings and peers to participate in the youth's treatment process.

Engagement is highly valued in FBT. An empirically validated protocol used to enhance engagement involves calling clients before their first session and after their first session to build rapport and increase the likelihood of retention. Food and drinks are often also a part of creating an engaging atmosphere for youth and their families (Donohue & Azrin, 2001).

Key to this treatment is allowing the youth and his/her family to choose among interventions that will meet the diverse individual, familial, and cultural needs of the client. Clients, with guidance from their therapists, can choose among several FBT interventions that fit their specific needs. For a detailed explanation of the interventions used in the study that we reviewed, including behavioral contracting, stimulus control, urge control, and communication skills training, the reader is referred to Donohue and Azrin (in 2001). Azrin et al. (2001) conducted a clinical trial comparing FBT to ICPS, which is discussed below.

Individual Cognitive Problem Solving. ICPS therapy employs empirically validated methods geared toward developing self-control and solving problems. Designed to address behavior problems and aggression in adolescents and adults, ICPS is strongly cognitive and is designed to help youth learn a general

cognitive strategy that can then be applied to a variety of problems and decision-making situations. Examples of problem-solving steps learned in ICPS include focusing attention by stopping and thinking, defining the problem clearly, acknowledging choices of response, thinking through consequences of each choice, and choosing the best option (Azrin et al., 2001). Although this treatment approach often incorporates behavioral components, for the purpose of the study below, it was provided in a purely cognitive nondirective manner.

Original Study Findings. Azrin et al. (2001) compared FBT to ICPS in a clinical study that involved 56 youth, between the ages of 12 and 17, referred for treatment by detention staff, judges, probation officers, or school officials. Participants were predominantly White (79%) and male (82%), and all were dually diagnosed with both an SUD and either CD or oppositional defiant disorder. Fifty-six out of the initial 88 adolescents who began treatment completed eight of 15 sessions and were included in the final analysis resulting in an attrition rate of 36%. Azrin et al. aimed at providing 15 sessions over a 6-month period, but due to missed appointments, both treatments involved between 8 and 15 outpatient therapy sessions of 1 h each. Outcome measures included alcohol use, illicit drug use, satisfaction with drug use, overall mood, conduct, and school and work performance. Findings indicate that there was no difference in effectiveness between FBT and ICPS in reducing alcohol and illicit drug use and in improving conduct and mood. Significant improvements in both groups were observed from pretest to posttest and were maintained at follow-up.

Computed Effect Sizes. Effect sizes between the FBT experimental group and the ICPS control group were calculated using Formula 1 with posttest and follow-up scores. Independent-

group effect sizes for externalizing outcomes were -0.02 at posttest and -0.35 at 6-month follow-up, indicating no treatment differences at posttest and a small treatment effect favoring the ICPS group at follow-up. Using Formula 2 for externalizing outcomes resulted in repeated measures effect sizes for the FBT group of 0.97 at posttest and 0.89 at 6-month follow-up, demonstrating that FBT had a large effect size at both posttest and follow-up. The repeated measure effect size for the ICPS group was 0.99 at posttest and 1.25 at follow-up, indicating ICPS also had a large effect at posttest and follow-up.

For internalizing outcomes, independent-group effect sizes between the FBT and ICPS were 0.16 at posttest and 0.28 at 6-month follow-up, indicating a small treatment effect favoring FBT at both posttest and follow-up. Repeated measures effect sizes for the FBT group internalizing outcomes were 1.0 at posttest and 1.1 at 6-month follow-up, demonstrating that FBT maintained a large effect size at posttest and at follow-up. The repeated measure effect size for the ICPS group was 0.80 at posttest and 0.82 at follow-up, indicating ICPS also maintained a large effect at posttest and follow-up.

For substance-use outcome, independent-group effect sizes between FBT and ICPS were 0.21 at posttest and 0.15 at follow-up, indicating a small treatment effect favoring the FBT group at posttest and at follow-up. Repeated measures effect sizes for the FBT group were 1.13 at both posttest and follow-up, indicating a large effect at both time measures. Repeated measures effect sizes for the ICPS group were 0.92 at posttest and 0.97 at follow-up, indicating ICPS had a large effect at posttest and maintained this large effect at follow-up.

Findings from Azrin et al. (2001) confirm prior studies that found FBT to be effective in reducing youths' behavioral problems (Bank, Marlowe, Reid, Patterson, & Weinrott, 1991) and research that finds FBT effective in

reducing drug use (Azrin, Donohue, Besalel, Kogan, & Acierno, 1994). The efficacy of ICPS in reducing youth's drug use has not been previously demonstrated in a clinical trial (Azrin et al., 2001); this study extends previous research that supports the efficacy of ICPS in treating young children's (Spivak & Shure, 1974) and preadolescents' (Kazdin, Esveldt-Dawson, French, & Unis, 1987) behavioral problems. Azrin et al.'s rigorous study had very few limitations, although a larger and more representative sample may have improved power to further detect differences in treatment.

Cognitive Behavior Therapy. CBT views client behavior, including substance-abuse and mental health symptoms, as maladaptive ways of coping with problems or of getting needs met. Cognitive therapy is founded upon the premise that behavior is adaptive and there is an interaction between a person's thoughts, feelings, and behaviors. It follows then that clients' behaviors are learned and can be modified by changing thought patterns and using behavior modification techniques. Treatment focuses on identifying antecedents to symptoms, thoughts in response to these triggers, and feelings and behaviors that result from these thoughts. Monitoring this cycle, challenging irrational thoughts, and replacing them with more productive thoughts will result in more healthy behaviors and more positive affect (for more information on the use of CBT with youth, see Reinecke, Dattilio, & Freeman, 2003).

Original Study Findings. Kaminer et al. (2002) examined the efficacy of CBT in comparison to psychoeducational therapy (PET) for 88 predominantly dually diagnosed youth in outpatient treatment. Participants were largely White (90%) and male (70%) and ranged in age from 13 to 18. Treatment attrition was 14% and did not differ between the two treatment groups. Both CBT and PET participants

attended 75- to 90-min weekly therapy sessions over the course of 8 weeks. Outcome measures included objective (urinalysis) and subjective measures of alcohol and drug use as well as substance-related problems, including academic, family, peer, legal, and psychiatric problems. Findings indicate that CBT was associated with lower substance-use relapse rates than PET at 3 months posttreatment. However, this trend toward CBT did not last at 9-month follow-up at which time differential treatment effects disappeared and CBT and PET showed similar relapse rates. Thus, this study found CBT had better short-term treatment effects, but long-term effects were equally effective for the two treatment groups.

Computed Effect Sizes. Effect sizes between the CBT experimental group and the PET control group were calculated using Formula 1 with posttest and follow-up scores. Independent-group effect sizes for internalizing outcomes were 0.03 at posttest and 0.20 at 9-month follow-up, indicating little difference between treatment modalities at posttest and a small treatment effect favoring CBT at follow-up. Using Formula 2 for internalizing outcomes resulted in repeated measures effect sizes for the CBT group of 0.30 at posttest and 0.70 at 9-month follow-up, demonstrating that CBT had a small effect size at posttest and a nearly large effect size at follow-up. The repeated measure effect size for the PET group was 0.33 at posttest and 0.55 at follow-up, indicating PET also had a small effect size at posttest and a moderate effect at follow-up.

For substance-use outcome, independent-group effect sizes between CBT and PET were 0.13 at posttest and -0.02 at follow-up, indicating a small treatment effect favoring the CBT at posttest and little difference in treatment modalities at follow-up. Repeated measures effect sizes for the CBT group were 0.77 at posttest and 0.88 at follow-up, indicating

a nearly large effect at posttest and large effect at follow-up. Repeated measures effect sizes for the PET group were 0.64 at posttest and 0.87 at follow-up, indicating PET had a moderate effect at posttest and a large effect at follow-up.

These effect sizes confirm the findings from the earlier study of Kaminer and Burleson (1999) comparing CBT and IT, which found the same pattern of early differential effects but similar positive long-term effects regardless of treatment type. This study was limited, like many others, by its largely White sample, raising concerns about generalizability.

Ecologically Based Family Therapy. EBFT is based on the Homebuilders family preservation model but is targeted at runaway adolescents. Homebuilders family preservation models, which originated in the early 1970s to prevent out-of-home placements, are based on crisis intervention theory (Kinney, Haapala, Booth, & Leavitt, 1990). This theory posits that people are most open to change during crisis, and family preservation models provide intensive and immediate brief treatment during crises. A single counselor is thus responsible for providing a range of behavioral, cognitive, and environmental interventions catered to the family's needs.

Because the target population for EBFT is runaway adolescents with numerous levels of problems, applying the family preservation model to this population has the same conceptual base as a multisystemic treatment approach. Thus, EBFT attempts to intervene in individual, individual-parent, family, and extrafamilial systems with a family preservation model of response (Slesnick, 2003).

EBFT begins with individual sessions with the adolescent and with the parents separately, preparing the two to come together to discuss factors leading up to the runaway episode. Treatment motivation and engagement are goals of these initial sessions. Next, EBFT utilizes family

intervention sessions focused on problem solving, communication, and overt plans to decrease substance use. Following family work, EBFT broadens the system by involving key people in the youth's extrafamilial network in treatment. This overlaps with termination that focuses on extending support networks to agencies and community services that may be of help once treatment has ended (Slesnick, 2003).

Original Study Findings. Slesnick and Prestopnik (2005) examined the efficacy of EBFT as compared to SAUs in a runaway shelter. Participants ($N = 124$) were predominantly male (59%) and Hispanic (42%) and ranged in age from 12 to 17 years. Forty-five percent of participants completed all 15 treatment sessions; 77% completed five or more sessions. Outcome measures included drug use, psychological functioning (internalizing and externalizing), family functioning, and HIV risk variables. Findings indicate that the EBFT group had greater reduction in overall substance use than SAU, but both groups showed significant and equal improvement in psychological functioning, family functioning, and HIV knowledge. Overall, reductions in high-risk behaviors were maintained through follow-up.

Computed Effect Sizes. Effect sizes between the EBFT experimental group and the SAU control group were calculated using Formula 1 with posttest and follow-up scores. Independent-group effect sizes for externalizing outcomes were -0.29 at posttest, -0.18 at 9-month follow-up, and -0.12 at 12-month follow-up. This indicates a small treatment effect favoring SAU at posttest and both follow-up periods. Using Formula 2 for externalizing outcomes resulted in repeated measures effect sizes for the EBFT group of 0.24 at posttest, 0.56 at 9-month follow-up, and 0.81 at 12-month follow-up, demonstrating that EBFT initially had a small effect size at posttest but had a

moderate effect at the first follow-up and a large effect at the second follow-up.

For internalizing outcomes, the independent-group effect sizes between EBFT and SAU were -0.15 at posttest, -0.12 at 9-month follow-up, and -0.15 at 12-month follow-up, indicating that there was a small treatment effect favoring SAU at all time periods. Repeated measures effect sizes for the EBFT group were 0.24 at posttest, 0.43 at 9-month follow-up, and 0.55 at 12-month follow-up, indicating EBFT had a small effect at posttest but this effect was nearly moderate and moderate at each subsequent follow-up period.

For substance-abuse outcome, independent-group effect sizes between EBFT and SAU were 0.02 at posttest, -0.02 at 9-month follow-up, and -0.03 at 12-month follow-up, indicating a little difference in treatment modalities at all time periods. Repeated measures effect sizes for the EBFT group were 0.45 at posttest, 0.56 at 9-month follow-up, and -0.03 at 12-month follow-up, indicating a nearly moderate effect at posttest, moderate effect at first follow-up, but no effect at the second follow-up.

The positive outcomes associated with EBFT confirm prior studies that support family treatment of substance-abusing adolescents (Ozechowski & Liddle, 2000), but the retention rates and engagement in the Slesnick and Prestopnik (2005) study are uncharacteristically high for treatment of runaway youth and their families that are often described as difficult to engage (Smart & Osborne, 1994). Although this is one of few studies examining the efficacy of EBFT, the findings from this study are similar to other outcome studies finding interaction between treatment group and time for substance-use outcomes but no differences by group on psychological or family functioning outcomes (Stanton & Shadish, 1997). The EBFT manual was in early development stages during this study; thus, the study lacks measures of treatment fidelity, a clear limitation.

Seeking Safety Therapy. SS is a manualized psychotherapy designed to treat co-occurring Post Traumatic Stress Disorder (PTSD) and SUD through the development of coping skills across cognitive, behavioral, and interpersonal domains. Twenty-five topics spanning these domains each present a “safe coping skill” relevant to both posttraumatic stress and SUDs (Najavits et al., in press). For example, topics include asking for help, coping with triggers, and setting relationship boundaries. Najavits (2002) describes five principles that guide SS, including (a) establishing safety as the first priority; (b) integrating treatment for PTSD and SUD; (c) focusing on ideals; (d) spanning cognitive, behavioral, interpersonal, and case management content; and (e) explicating therapist processes. SS has been modified for treating adolescents by creating optional formats (verbal material presentation vs. written), asking questions more indirectly (what if this happened to your friend?), adding flexibility for discussion topics, and involving parents if the adolescent agrees (<http://www.seekingsafety.org>).

Original Study Findings. Najavits et al. (in press), in their study of dually diagnosed adolescent girls, examined the efficacy of SS in comparison to other services clients may attend, including Alcoholics Anonymous, pharmacological intervention, and other individual or group therapies (labeled treatment as usual [TAU]). All participants were female ($N = 33$) and met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for both PTSD and SUD. Treatment attrition rates were not reported, but sample size decreased from intake ($n = 18$ for SS and 15 for TAU) to posttreatment ($n = 14$ for SS and 12 for TAU) and further decreased at 3-month follow-up ($n = 11$ for SS and 9 for TAU).

SS participants were offered 25 sessions of 50 min each over 3 months. The 18 SS participants

averaged approximately 12 sessions ($SD = 6.25$). Outcome measures included substance abuse, cognitions about substance use, and psychopathology. Findings indicate that SS participants had significantly better outcomes than participants in the TAU group, including improvements in substance use, cognitions related to SUD/PTSD, and several psychopathology subscales (anorexia, somatization). Only one measure of self-concept was more improved in TAU than SS. The authors report that only some gains were maintained at follow-up, although with attrition, the power to detect significant relationships at follow-up was very low.

Computed Effect Sizes. Effect sizes between the SS experimental group and the TAU control group were calculated using Formula 1 with posttest and follow-up scores. Independent-group effect sizes for externalizing outcomes were 0.83 at posttest and 0.59 at 3-month follow-up, indicating a large treatment effect favoring SS at posttest and a moderate effect favoring SS at follow-up. Using Formula 2 for externalizing outcomes resulted in repeated measures effect sizes for the SS group of 0.66 at posttest and 0.53 at 3-month follow-up, demonstrating that SS had a moderate effect size at posttest and at follow-up.

For the internalizing outcome, independent-group effect sizes between SS and TAU were 0.10 at posttest and -0.30 at follow-up, indicating a small effect favoring SS at posttest but a small effect favoring TAU at follow-up. Repeated measures effect sizes for the SS group were 0.46 at posttest and 0.08 at follow-up, indicating that SS had a near-moderate treatment effect at posttest with no effect remaining at follow-up.

For the substance-use outcome, independent-group effect sizes between SS and TAU were 0.94 at posttest and 0.03 at follow-up, indicating a large treatment effect favoring the SS at

posttest but little difference in treatment modalities at follow-up. Repeated measures effect sizes for the SS group were 0.72 at posttest and 0.46 at follow-up, indicating a near-large effect at posttest and near-moderate effect at follow-up.

This is the first study of its kind to utilize SS with a younger population. The positive outcomes associated with SS in this sample of adolescents confirm prior studies with positive results in adult women (Najavits, Weiss, Shaw, & Muenz, 1998). This study was limited by low sample size, especially at follow-up, and by a disproportionately high rate of psychopathology in the TAU group at intake (despite randomization).

Discussion

Analyzing the results above was a complex and difficult task. For one, the studies examined in this review were not uniform in their research methodology. They differed by type of control group, with some studies comparing the experimental group to SAUs, whereas others compared the experimental group to established treatments such as CBT or ICPS. These methodological differences made comparing between-group effect sizes (shown in Table 3) across studies challenging. Put simply, those treatments that are compared to other established treatments may have very small or negative effect sizes, thereby erroneously tempting us at first glance to assume they are less effective than those treatments that were compared to SAU. Even results for those treatment groups that were compared to SAU may be distorted as common factors may exist between treatment modalities and services regularly offered, resulting in low effect sizes between the independent groups.

Closer inspection using measures of within-group change (shown in Table 4) revealed that

several of the treatments were associated with large changes in outcome measures. Thus, the results comparing effectiveness between groups and the results examined from each group individually often revealed different stories. For example, in regard to externalizing outcomes, FBT showed little or no treatment effect when compared to ICPS (effect size = -0.02 at posttest and -0.35 at follow-up). However, when we look at the change in externalizing outcomes using repeated measures effect size estimates with the FBT group (effect size = 0.89 at follow-up) and ICPS group (effect size = 1.25 at follow-up) separately, both treatments had large effects in reducing externalizing problems. Therefore, to say that FBT was not effective as a treatment option based on the independent-group effect size estimate would be misleading because both FBT and ICPS had large treatment effects for externalizing outcomes when examining pretest and follow-up mean scores for each group.

This analysis is further complicated by the fact that results vary by outcome measure (externalizing, internalizing, and substance abuse), with some treatments showing more effectiveness for one outcome but not another. Further still, each study varies by follow-up period, making it difficult to compare an effect size at 15 months posttreatment with an effect size at 3 months posttreatment. There is value in knowing how treatment changes for one intervention compares to other treatments. However, for the reasons noted above, the authors chose to focus the synthesized discussion on repeated measures effect sizes (measures of within-group change for a given treatment approach) across outcome measures at follow-up.

Table 5 shows those treatments that had large, moderate, and small effects at follow-up on externalizing, internalizing, and substance-abuse outcomes. The table also indicates the follow-up time period, allowing the

reader to interpret the effect in the context of the time period in which it was measured.

Externalizing effect sizes were large for the MST, FBT, and ICPS groups. Of interest is that youth receiving MST and ICPS showed moderate to large improvements in externalizing outcomes at posttest, and these effects improved further to large effects at follow-up.

Internalizing effect sizes were large for the IT, CBT, FBT, and ICPS groups. The effects of all four of these interventions improved over time after treatment ended. Especially impressive among these treatments is the sustainability of internalizing outcomes for IT and CBT; youth in these groups demonstrated substantial changes even when evaluated as long as 15 months after treatment ended.

Lastly, substance-abuse effect sizes were large for the FBT, ICPS, PET, and CBT groups. Worth noting is that newer, less established treatments such as EBFT and SS also had moderate effect sizes at posttest and sustained moderate reductions in substance abuse at follow-up.

Although analysis identifying effective treatment modalities for individual outcomes is helpful, one challenge of treating dually diagnosed youth is their likely diagnosis with several or all these conditions. Reviewing these results, FBT and ICPS appeared to be the only interventions to produce large treatment effect sizes across externalizing, internalizing, and substance-abuse domains. Furthermore, the large effect sizes for these two treatments were evident at 9 months posttreatment, demonstrating sustainability of effects over time.

The effect sizes computed in this systematic review are impressive when compared with previous community-based outcome studies of adolescents, especially the repeated measures effect sizes for each of the therapy models. For example, Weisz, McCarty, and Valeri (2006) found psychotherapy's mean overall effect sizes on adolescent depression, when including

TABLE 4. Within-Group Effect Sizes by Treatment Type Based on Formula 2

Externalizing		Internalizing		Substance abuse	
Pre-post	<i>d</i>	Pre-post	<i>d</i>	Pre-post	<i>d</i>
MST	0.59	IT	0.84	MST	0.28
FBT	0.97	CBT	0.52	IT	0.72
ICPS	0.99	FBT	1.00	CBT	1.10
EBFT	0.24	ICPS	0.80	FBT	1.13
SS	0.66	CBT	0.30	ICPS	0.92
		PET	0.33	CBT	0.77
		EBFT	0.24	PET	0.64
		SS	0.46	EBFT	0.45
				SS	0.72
Pre-follow-up		Pre-follow-up		Pre-follow-up	
MST	0.81	IT	1.47	MST	0.26
FBT	0.89	CBT	1.14	IT	0.32
ICPS	1.25	FBT	1.10	CBT	0.48
EBFT	0.56	ICPS	0.82	FBT	1.13
SS	0.53	CBT	0.70	ICPS	0.97
		PET	0.50	CBT	0.88
		EBFT	0.43	PET	0.87
		SS	0.08	EBFT	0.56
				SS	0.46
Pre-follow-up 2		Pre-follow-up 2		Pre-follow-up 2	
EBFT	0.81	EBFT	0.55	EBFT	-0.03

dissertations and using more rigorous effect size calculations than previous meta-analyses on this subject, to be moderate (0.34) with a range of -0.66 to 2.02. In addition, they also found that those studies on the effectiveness of psychotherapy on adolescent depression that were conducted in real-world settings had a small overall weighted mean effect size of 0.24. Furthermore, Weisz and Jensen (1999) found average effect sizes for the four broad-based meta-analyses on adolescent psychotherapy conducted in efficacy trials ranged from 0.71 to 0.84, indicating that the treatment effects were large or nearly large. In contrast, effectiveness studies in community settings for child and adolescent disorders found an overall mean effect size of 0.01, indicating no treatment effect, with a range of -0.40 to 0.29. Therefore, the results found in this systematic review appear quite promising, especially

given the difficulty inherent in working with dually diagnosed adolescents.

Preliminary Guidelines for Treatment of Dually Diagnosed Adolescents

After thoroughly searching the literature, we found few clear treatment guidelines for effective treatment for dually diagnosed adolescents. Hills (2000) explicates four core principles in treating persons with co-occurring disorders, including (a) treatment engagement, (b) treatment continuity, (c) treatment comprehensiveness, and (d) continued treatment tailoring through reassessment. However, Hills' work focuses on adults in the justice system and does not address the specific needs of adolescents.

Riggs and Davies (2002) suggest clinical principles for integrated treatment for adolescents

TABLE 5. Treatments Organized by Effect Size and Outcome Based on Formula 2

Effect size	Dual diagnosis outcomes		Substance abuse
	Externalizing	Internalizing	
Large	MST**	IT****	FBT**
	FBT**	CBT ^a ****	ICPS**
	ICPS**	FBT**	CBT ^b ***
Moderate		ICPS**	PET***
		CBT ^b ***	EBFT**
	EBFT**	PET***	CBT ^a ****
	SS*	EBFT**	SS*
Small		SS*	MST**
			IT****

Note. Asterisks indicate period of time between pretest and follow-up: *pre to 3-month follow-up, **pre to 6-month follow-up, ***pre to 9-month follow-up, ****pre to 15-month follow-up.

^aCBT from Study 2 (Kaminer et al., 1998).

^bCBT from Study 4 (Kaminer et al., 2002).

dually diagnosed with depression and substance abuse. These principles include (a) motivation, establishing alliance and patient-generated goals, and treatment of SUD with empirically supported treatments; (b) pharmacotherapy for depression; (c) monitoring of substance use, medication compliance, and motivation; (d) if pharmacotherapy is not appropriate, then psychotherapy for depression (CBT or IT suggested) including family therapy and 12-step program; (e) if depression and SUD do not improve within 2 months, consider more intensive therapy; and (f) relapse prevention. Although making a contribution to the field, again, Riggs and Davies focus more narrowly on psychiatric treatment, and their guidelines aim treatment to those adolescents with depression and SUD only.

Due to a lack of existing clear guidelines for treatment, we addressed Aim c of our study by identifying common threads in the effective treatment modalities identified in our review, thereby creating preliminary data-driven

guidelines for the effective treatment of dually diagnosed adolescents (see Table 6). We reviewed those interventions with large effect sizes (0.80 or higher) at follow-up, culled from them commonalities in treatment characteristics, and then drawing from the data and a narrative review of the randomized studies, we developed preliminary guidelines for treatment of dually diagnosed youth. These guidelines should be reviewed as tentative. It is not possible from this review for us to pinpoint active ingredients of these interventions but merely to attempt to extrapolate commonalities among those interventions that produced large effect sizes. It is our simple hope that these guidelines might serve as a general barometer for the field, perhaps providing a general gauge of how to tailor treatment for dually diagnosed youth.

Implications for Researching Dually Diagnosed Youth

Although the above findings highlight the efficacy of several treatments in improving outcomes for dually diagnosed youth, treatment of this population is by no means straightforward or simple. Rowe et al. (2004) demonstrate the complexity of treating dually diagnosed youth in their study assessing substance-abuse outcomes for three categories of adolescents: exclusive substance abusers (SUD only), externalizers (SUD with externalizing psychiatric disorder), and mixed substance abusers (those with SUD and both externalizing and internalizing disorders). Rowe et al. found SUD-only youth increased use during treatment but showed significant improvement in substance use at 6- and 12-month follow-up. Externalizers followed a similar pattern of increased use and then posttreatment gains, although at a slower rate of improvement. The mixed group initially decreased substance use during treatment but returned to pretreatment levels at follow-up. This study underscores the fact that comorbidity,

TABLE 6. Ten Preliminary Treatment Guidelines for Dually Diagnosed Adolescents

1. Assessment is multipronged and ongoing and includes practitioner, parental, and self-monitoring so that treatment is responsive to the changing needs of the client.
2. Treatment strategically enhances engagement and retention.
3. Treatment plans are flexible and allow for client choice and voice.
4. An integrated treatment approach is used to address both mental health and substance-related disorders concurrently.
5. Treatment is developmentally and culturally sensitive to match the unique needs of the client system.
6. Treatment is ecologically grounded and systems oriented, including important individuals to the client such as family members, friends, and school personnel.
7. Treatment taps several domains of the client's functioning to enhance the client's problem-solving and decision-making skills, affect regulation, impulse control, communication skills, and peer and family relations.
8. Treatment is goal directed, here-and-now focused, and strength based.
9. Treatment requires active participation by all members involved, and includes homework assignments.
10. Interventions aim to produce sustainable changes over the course of treatment.

Note. Treatment guidelines developed by Kimberly Bender, David W. Springer, and Johnny S. Kim.

especially mixed type, is especially difficult to treat. An interaction between mental health and substance-abuse problems may render some treatments ineffective in treating those youth with complex diagnoses, especially over the long term.

In light of our own complex results and studies such as Rowe et al. (2004), it is evident that further research is clearly warranted. There is a paucity of randomized clinical trials of interventions for dually diagnosed youth, and more randomized studies are urgently needed. Future research should examine those interventions with evidence of significant change by comparing such interventions with no-treatment control groups. Furthermore, studies should more clearly identify subgroups of dually diagnosed youth. Youth with specific psychiatric diagnosis and specific substance-use disorders should be grouped, and treatments should be evaluated for their effectiveness in treating specific subgroups of dually diagnosed adolescents. Finally, prospective studies that are able to examine putative risk and protective factors for dually diagnosed adolescents are sorely needed as we need more sophisticated and accurate etiological models of dual diagnoses that can in turn inform prevention and treatment efforts. The state of

intervention research targeting dually diagnosed adolescents is in its infancy and has much room for expansion.

Limitations

Certain limitations should be noted about our systematic review. First, only those interventions evaluated through randomized studies that met our search criteria were reviewed in the current study. Potentially effective interventions that have not received rigorous empirical attention may have been excluded. As such, the current review is limited to include only six studies, a very small number from which to draw strong conclusions. Many of the original six studies themselves had their own limitations, such as predominantly White or male samples, lingering questions about treatment fidelity, small sample sizes, and high attrition rates. Additionally, most measures used in the reviewed studies involved participant's self-report. Although these standardized measures were reliable and valid, there is a possibility of measurement bias due to social desirability on the part of participants. Furthermore, because measures relied on retrospective recall,

these studies assumed accuracy in the participant memory of their behaviors, introducing another possible source of measurement error.

Second, given that the participants from the original six studies were from community-based samples, it is plausible that these findings do not generalize to more seriously impaired adolescents in clinical inpatient settings. It is possible that adolescents in clinical settings would present with a unique set of psychosocial needs and functional impairment, with treatment needing to be tailored accordingly.

Third, even though we included only randomized clinical trials in our systematic review, it is always possible that some unaccounted extraneous variables account for the proportion of variance explained. For example, in the Najavits et al. (in press) study, the authors noted a disproportionate high rate of psychopathology in the TAU group (despite randomization). Obviously, although they were minimized through using randomized clinical trials, not all threats to internal validity were controlled for in the original studies. In response to this concern that it is some third variable that explains the observed relationship, Measelle, Stice, and Springer (in press) recently recommended, for example, that future randomized prevention studies manipulate negative affect to experimentally test whether a decrease in negative affect produces a consequent reduction in substance abuse.

A fourth limitation is that in computing effect sizes for this study, we found some studies used outcome measures that did not clearly fit into our categories of externalizing, internalizing, or substance-use outcomes. We chose not to incorporate these more ambiguous outcomes into our calculations, and it is possible that by excluding these measures we deflated our effect sizes from those found in the original studies.

Finally, a fifth limitation is the possibility of overestimation of effect sizes for one group pretest–posttest designs (Lipsey & Wilson, 2001).

Effect sizes calculated for these less rigorous study designs could be misleading because they tend to be higher than the more rigorous experimental designs and therefore should be viewed with caution.

Despite these limitations, the current study provides a preliminary understanding of the effectiveness of existing modalities for treating dually diagnosed youth. Furthermore, this study begins an important dialogue by creating preliminary treatment guidelines for helping this vulnerable population. These guidelines should be explored empirically in order to create clear best practices for those working with dually diagnosed youth. Dually diagnosed adolescents compose a large percentage of adolescents seeking treatment, and they require unique and evidence-based treatment modalities that are designed to meet their complex needs.

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