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Culturally sensitive substance use treatment for racial/ethnic minority youth: A meta-analytic review

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ABSTRACT

This systematic review and meta-analysis synthesized findings from studies examining culturally sensitive substance use treatment for racial/ethnic minority youth. An extensive literature search located eight eligible studies using experimental or quasi-experimental designs. The meta-analysis quantitatively synthesized findings comparing seven culturally sensitive treatment conditions to seven alternative conditions on samples composed of at least 90% racial/ethnic minority youth.

The results from the meta-analysis indicated that culturally sensitive treatments were associated with significantly larger reductions in post-treatment substance use levels relative to their comparison conditions ($g = 0.37$, 95% CI [0.12, 0.62], $k = 7$, total number participants = 723). The average time between pretest and posttest was 21 weeks ($SD = 11.79$). There was a statistically significant amount of heterogeneity across the seven studies ($Q = 26.5$, $p = 0.00$, $\tau^2 = 0.08$, $I^2 = 77.4\%$). Differential effects were not statistically significant when contrasts were active generic counterparts of treatment conditions (direct "bona fide" comparisons; $g = -0.08$, 95% CI [−0.51, 0.35]) and 'treatment as usual' conditions ($g = 0.39$, 95% CI [−0.14, 0.91]).

Strong conclusions from the review were hindered by the small number of available studies for synthesis, variability in comparison conditions across studies, and lack of diversity in the adolescent clients served in the studies. Nonetheless, this review suggests that culturally sensitive treatments offer promise as an effective way to address substance use among racial/ethnic minority youth.

1. Introduction

Substance use treatment providers work with adolescents from increasingly diverse cultural backgrounds. Adolescents of diverse racial, ethnic, and cultural backgrounds vary in risk factors, patterns, rates, and consequences of substance use (Iguchi, Bell, Ramchand, & Fain, 2005; National Center for Health Statistics, 2011; Prado, Szapocznik, Maldonado-Molina, Schwartz, & Pantin, 2008; Resnicow, Soler, Braithwaite, Ahluwalia, & Butler, 2000; Shih, Miles, Tucker, Zhou, & D'Amico, 2010; Shillington & Clapp, 2003; Substance Abuse and Mental Health Services Administration (SAMHSA), 2014), and may also vary in how they respond to substance use treatment (Becker, Stein, Curry, & Hersh, 2012; Burlew, Copeland, Ahuama-Jonas, & Calsyn, 2013; Campbell, Weisner, & Sterling, 2006; Huey, Tilley, Jones, & Smith, 2014; Shillington & Clapp, 2003). However, most treatment programs for individuals with substance use disorders have been designed for and validated with homogenous, predominantly White U.S. samples (Gil, Wagner, & Tubman, 2004; Griner & Smith, 2006; Hall, 2001; Hodge, Jackson, & Vaughn, 2012). Despite growing scholarly interest in culturally sensitive substance use treatment programs, little is known about their effects on substance use outcomes, especially among racial and ethnic minority youth (Burlew et al., 2013; Huey et al., 2014; SAMHSA, 2014). This meta-analytic review therefore aims to address this gap in the literature by synthesizing the current available research evidence on the effects of culturally sensitive substance use treatment for racial/ethnic minority adolescents.

1.1. Defining cultural sensitivity

For the purposes of this review, we define culturally sensitive treatment programs as those that incorporate "ethnic/cultural characteristics, experiences, norms, values, behavioral patterns, and beliefs of a target population" into the design and delivery of the treatment program (Resnicow et al., 2000, p. 272). Although researchers and practitioners have adopted a wide range of synonyms for cultural sensitivity (including for instance, culturally accommodated, adapted, appropriate,

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centered, competent, informed, responsive, and/or tailored treatment; Bernal & Sáez-Santiago, 2006; Bernal, Jiménez-Chafey, & Domenech Rodríguez, 2009; Burlew et al., 2013; Burrow-Sanchez, Martinez, Hops, & Wrona, 2011; Ferrer-Wreder, Sundell, & Mansoory, 2012; Huey & Polo, 2008; SAMHSA, 2014; Smith, Domenech Rodríguez, & Bernal, 2011; Sue, Zane, Hall, & Berger, 2009), here we simply define culturally sensitive treatments as those that incorporate culture into the design and delivery of a substance use treatment program.

Researchers have developed various frameworks and distinguished multiple dimensions of cultural sensitivity in mental health treatment. For example, a deep structural dimension of cultural sensitivity has been differentiated from surface structure (Resnicow et al., 2000). Whereas surface structural elements focus on acceptable and relevant presentation of treatment activities and may involve use of clients' preferred language, clothing, setting, examples, or matching treatment provider based on race/ethnicity (Hodge et al., 2012; Resnicow et al., 2000), deep structural elements target core cultural or contextual factors, such as cultural explanatory models of the problem, treatment expectations, or other ethnospecific mediators of treatment outcomes (e.g., inclusion of family or spirituality) (Huey et al., 2014; Resnicow et al., 2000). Another framework for culturally sensitive interventions, based on research with Latinos and Latinas, recommends inclusion of specific elements: use of culturally appropriate and syntonic native language and culturally meaningful metaphors; cultural match between client and provider; treatment content based on cultural knowledge about values, customs, and traditions; culturally consonant presentation of treatment concepts; culturally congruent treatment goals and methods; and consideration of clients' broader socio-economic context (Bernal, Bonilla, & Bellido, 1995; Bernal & Sáez-Santiago, 2006). More recently, Hays (2009) suggested a number of steps to help integrate a multicultural perspective into psychotherapy, including identifying culture related personal strengths and supports, using those supports to develop coping resources, discriminating between internal and external influences, avoiding excessive focus on individual factors, and helping clients address external stressors. Apart from these broad frameworks, culturally sensitive aspects of treatment have also been distinguished based on their focus: on the qualities or identity of providers, on treatment process, or treatment content (Benish, Quintana, & Wampold, 2011; Huey & Polo, 2008; Huey et al., 2014; Sue et al., 2009). Other frequently mentioned culturally sensitive components of treatment involve cooperation with important members of the target community, accessible location of services, and provision of cultural sensitivity training for treatment providers (Burrow-Sanchez et al., 2011; Griner & Smith, 2006; Pan, Huey, & Hernandez, 2011).

Along with conceptual frameworks and distinctions, extant literature points to various group specific issues to consider when designing and delivering effective culturally sensitive substance use treatments. Themes relevant for African Americans, for instance, include the stressors of racial discrimination, racial identity development, values of spirituality, storytelling, familial interdependence, or gender-role obligations (Boyd-Franklin & Lockwood, 2009; Castro & Garfinkle, 2003; Hall, 2001; Hodge et al., 2012; Jackson, Hodge, & Vaughn, 2010; Jackson-Gilfort & Liddle, 1999; Jackson-Gilfort, Liddle, Tejeda, & Dakof, 2001). Latina/o clients may benefit if treatment addresses language barriers, acculturation, family structure and conflicts, or issues of ethnic identity (Castro & Garfinkle, 2003; Szapocznik, Lopez, Prado, Schwartz, & Pantin, 2006; Wagner, 2003). Treatment for Native American clients could address alienation, perceived discrimination and provider insensitivity, feelings of historical loss, resistance to disclose personal feelings, or indigenous problem solving (Hall, 2001; Whitbeck, Adams, Hoyt, & Chen, 2004). Broader constructs to take into account when working with specific racial and ethnic groups may also include interdependence, spirituality, and discrimination (Hall, 2001). Future research is yet to determine which of the various culturally sensitive frameworks, dimensions, or group specific themes are most relevant in substance use treatment for racial/ethnic minority adolescents.

1.2. Theoretical potential of culturally sensitive treatment

Although some scholars have questioned the need for cultural adaptations to treatments given increasingly "blended" and "post-ethnic" youth culture (Elliot & Mihalic, 2004; Patterson, 2004), prior research suggests a number of benefits of incorporating ethnospecific cultural considerations into mental health and substance use treatment. Cultural congruence may increase treatment utilization, reduce dropout, and produce better outcomes for racial/ethnic minorities who are typically underserved in treatment services (Chen & Rizzo, 2010; Copeland, 2006; Cummings, Wen, & Druss, 2011; Huey & Polo, 2008; Lau, 2006; Wrona, 2013). Lack of cultural consonance has been linked to a host of negative consequences such as client mistrust and discomfort, lack of understanding of or resistance to treatment activity, client-provider incompatibility and miscommunication, or failed client-treatment expectations (Castro & Garfinkle, 2003; Griner & Smith, 2006; Huey & Polo, 2008). In addition, limited research about the effects of many generic substance use treatments among particular racial/ethnic minorities has raised questions about their generalizability to racial/ethnic minority groups and concerns about their potentially diminished effects with non-White American samples (Burlew et al., 2013; Santisteban et al., 2003; Szapocznik et al., 2006). For example, a meta-analysis of psychosocial interventions for predominantly racial/ethnic minority youth (Huey & Polo, 2008) found no well-established substance use treatments for racial/ethnic minority youth and reported only one probably efficacious (MDFT; Liddle, Rowe, Dakof, Ungaro, & Henderson, 2004) and one possibly efficacious treatment (MST; Henggeler, Pickrel, & Brondino, 1999; Henggeler, Clingempeel, Brondino, & Pickrel, 2002) for youth. Another meta-analytic review of treatments for adolescent substance use reported smaller effects for group CBT interventions in studies with higher proportions of Hispanic adolescents (Waldron & Turner, 2008). On the other hand, results from a recent meta-analysis of treatment for adolescent substance use showed no evidence of differences in treatment effects related to the racial/ethnic composition of the sample (Tanner-Smith, Steinka-Fry, Kettrey, & Lipsey, 2016). This meta-analysis, based on 95 treatment-comparison group pairs, found that assertive continuing care, behavioral therapy, cognitive behavioral therapy (CBT), motivational enhancement therapy (MET), and family therapy were some of the most effective treatment types for addressing adolescent substance use, and these treatment effects did not systematically vary for samples with different racial/ethnic compositions. Given the accumulating but still inconclusive body of evidence about the effects of various generic substance use interventions for ethnic or racial minority clients, culturally sensitive treatments have been under consideration as one promising choice to address possible diminished effects of some established treatment programs or to avoid the one-size-fits-all approach to substance use treatment by accounting for client cultural context (Burlew et al., 2013).

Although many researchers and practitioners advocate culturally sensitive treatment based on its intuitive, ethical, and/or conceptual appeal, the limited empirical evidence for effects of culturally sensitive treatments on clinical outcomes is notable, especially in the field of adolescent substance use treatment (Burlew et al., 2013; Hall, 2001; Huey & Polo, 2008; Huey et al., 2014). The use of culturally sensitive approaches has also been associated with several challenges. For example, developing new treatments for specific ethnocultural groups may be costly, time consuming, and may implicate provider training difficulties if the new treatments are based on distinct or unfamiliar paradigms (Hwang, 2006). Culturally sensitive treatments focused on broad ethnocultural groups may also fail to capture within-group differences and differential needs within target minority groups, for example those related to their socioeconomic status or acculturation level (Burlew et al., 2013; Resnicow et al., 2000; Wrona, 2013); however, targeting each minority subgroup in treatment programs may be difficult to implement (Burlew et al., 2013; Lau, 2006; Wagner, 2003). Another concern is that providers may adopt prejudiced or stereotyped

racial/ethnic minority treatments (Hayes & Toarmino, 1995). Culturally adapted models of already existing evidence-based treatments have received increasing scholarly attention (Huey et al., 2014), but debate still exists about the potential of cultural modifications to threaten implementation fidelity or attenuate active ingredients of evidence-based treatments that are intended to transcend cultural divergences (as noted by Castro, Barrera, & Martinez, 2004; Falicov, 2009; Huey & Polo, 2008). For example, Lau (2006) warns against substituting core intervention components for untested, "haphazard," or "improvised" cultural adaptations (p. 297); rather, the modification of generic interventions might instead be limited to situations when the target group cannot be effectively engaged, is characterized by unique risk or resilience factors, has unique symptoms of a disorder, or the effectiveness of treatment among the specific group is limited. Indeed, despite the importance of implementation fidelity, adaptation of standardized treatment and implementation fidelity need not be mutually exclusive but, instead, both are essential for successful therapeutic outcomes (Backer, 2002; Castro et al., 2004; Schulte, 1996; Whaley & Davis, 2007).

1.3. Prior research on effects of culturally sensitive interventions

Several prior meta-analyses have quantified the effects of culturally sensitive interventions across various minority groups and mental health areas, but few have focused specifically on culturally sensitive substance use treatment (Benish et al., 2011; Griner & Smith, 2006; Hodge, Jackson, & Vaughn, 2010a, 2010b; Hodge et al., 2012; Huey et al., 2014; Jackson et al., 2010; Smith et al., 2011; Yuen, 2004). One of the largest meta-analyses to date included prevention and treatment programs that explicitly adapted content, format, and/or delivery based on race, culture, or ethnicity (ethnic- and language-matching only studies were excluded) (Griner & Smith, 2006). Results from this meta-analysis indicated a strong overall benefit of culturally adapted interventions for a wide range of disorders ($d = 0.45$; $k = 76$). Effects were stronger for interventions targeting one racial/ethnic group relative to diverse groups, for interventions conducted in clients' native language, and among participants characterized by low levels of acculturation. However, treatment effects were lower in studies in which clients were matched with provider based on race/ethnicity. Another recent meta-analysis synthesized findings from studies of interventions explicitly considering culture, ethnicity, or race for various disorders (excluding interventions for substance use and studies with ethnic- or language-matching only) (Smith et al., 2011). The results indicated that culturally adapted interventions were more effective than standard interventions ($d = 0.46$; $k = 65$). Adapted interventions targeting a specific cultural group (versus diverse group) and older participants were more effective; the number of adaptations involved also correlated positively with effect sizes. A different meta-analysis compared culturally adapted treatments (excluding prevention programs) for a wide spectrum of mental health issues directly to "bona fide" comparison treatments (Benish et al., 2011). Results from this meta-analysis also showed that culturally adapted psychotherapy was more efficacious than established interventions for racial/ethnic minority clients on a wide range of measures ($d = 0.21$; $k = 21$). Despite these findings that culturally sensitive interventions hold promise for addressing various mental health disorders (Benish et al., 2011; Griner & Smith, 2006; Smith et al., 2011), a more recent summary of evidence provided mixed results for effects of these programs among racial/ethnic minorities depending on comparison type and culturally sensitive elements involved (Huey et al., 2014). Another series of meta-analyses conducted by Hodge and colleagues focused on racial/ethnic minority youths and also found small beneficial effects of culturally sensitive programs on several health related behaviors (Hodge et al., 2010a, 2010b, 2012; Jackson et al., 2010). One of the meta-analyses focused specifically on substance use outcomes (Hodge et al., 2012). The results from 10 culturally sensitive interventions revealed small positive effects for recent alcohol and marijuana use ($g = 0.12$, $k = 10$), which the authors interpreted as "promising but inconclusive" (p. 16). This meta-analysis, however, aggregated results from both prevention and treatment programs, combined children and adolescent samples, and included studies with single group (pre-experimental) research designs.

1.4. Research objectives and contribution of the review

This systematic review and meta-analysis sought to quantitatively synthesize findings from the most current evidence base of effectiveness research on culturally sensitive treatment for substance use among racial/ethnic minority adolescents. Specifically, this meta-analysis examined the comparative effectiveness of culturally sensitive treatments relative to other existing treatment modalities, no-treatment, or treatment as usual conditions on adolescents' substance use.

The present meta-analytic review contributes to the extant literature on the effectiveness of culturally sensitive treatments in several important ways. First, it focuses solely on substance use treatment programs and substance use outcomes. In contrast, most meta-analyses of culturally sensitive interventions to date combine results for diverse intervention fields and outcomes, despite the fact that role of cultural sensitivity may vary widely across different social and behavioral programs. The present study also concentrates on treatment for youth with diagnosed substance use disorders, while many existing reviews report results combined for prevention and treatment studies or for prevention programs only. Further, our meta-analysis focuses on adolescents as a distinct developmental group among which cultural considerations in treatment are largely understudied, and also restricts inclusion to rigorous controlled research designs. This focus on adolescents with substance use disorders, as well as this exclusion of pre-experimental research designs, is intended to limit the potentially misleading heterogeneity in results from broader reviews of culturally sensitive interventions. Finally, in contrast to prior reviews focusing broadly on the effectiveness of all types of substance use treatments for all types of adolescents (e.g., Tanner-Smith et al., 2016), the current review focuses solely on culturally sensitive treatments for racial/ethnic minority youth. This review thus uniquely contributes to the literature by providing extensive information about the culturally sensitive elements included in the treatments, such as the focus of cultural centering, provider cultural competency, or cultural considerations in baseline assessments.

2. Methods

2.1. Inclusion criteria

This meta-analysis included a subset of studies that were collected for a larger meta-analysis on adolescent substance use treatment effectiveness (Tanner-Smith et al., 2016). The population of eligible studies for the larger parent meta-analysis was experimental and controlled quasi-experimental evaluations of substance use treatment for adolescents. To be eligible for inclusion in the review, studies had to (1) evaluate a substance use treatment program, defined as any program with the explicit aim of reducing, remediating, or eliminating alcohol or illicit substance use among youth (early interventions or prevention programs were excluded, tobacco/caffeine focused programs were excluded); (2) include a comparison condition that could receive no treatment or an alternative treatment; (3) measure substance use at least once after the completion of the treatment program; (4) report findings on a study sample of youth ages 12–18 (68% or more of the subjects had to fall within this range and none could be older than 20 years of age) with current or recent substance use disorder diagnoses (at-risk or pre-clinical samples were excluded); (5) be published during or after 1980; (6) be conducted in the United States or Canada; and (7) use an appropriate research design, as described below.

Appropriate research designs included those in which youth were randomly assigned to conditions, controlled quasi-experiments that

matched participants on at least one baseline measure of substance use, controlled quasi-experiments that used statistical controls to adjust for baseline differences in participants' substance use, or controlled quasi-experiments that provided enough information to permit calculation of effect sizes indexing baseline differences in participants' substance use (which we could then use to adjust the posttest effect sizes). We excluded studies that had fewer than 10 adolescents in each condition at the time of assignment to study conditions. Studies were not excluded on the basis of their publication status.

The meta-analysis reported here included only those studies that met all above eligibility criteria and, in addition, compared at least one culturally sensitive treatment condition to an alternative condition without the same culturally sensitive components on a sample that was composed of at least 90% racial/ethnic minority participants. Culturally sensitive treatments were defined as those that incorporated culture into the design and delivery of the treatment. Cultural considerations had to relate to ethnicity or race; interventions addressing other contextual or client characteristics (i.e., socioeconomic status, gender, sexual orientation, religion, or geographic location) without attention to ethnicity or race did not qualify for inclusion unless they also explicitly dealt with race/ethnicity. Selection of racial/ethnic minority samples, racial/ethnic matching of providers and adolescents, or provision of treatment in adolescent's native language alone did not qualify for inclusion in the review.

2.2. Search strategy

A comprehensive search strategy was used to identify studies that met the aforementioned inclusion criteria, current through December 2015. The following electronic database were searched using ProQuest: ERIC, International Bibliography of Social Sciences, ProQuest Criminal Justice, ProQuest Education, ProQuest Family Health, ProQuest Health & Medical Complete, ProQuest Health Management, ProQuest Nursing & Allied Health, ProQuest Psychology, ProQuest Science, ProQuest Social Science, ProQuest Sociology, ProQuest Dissertations & Theses (US, UK, & Ireland), PsycARTICLES, PsycINFO, and Sociological Abstracts; we also searched PubMed. We conducted extensive supplementary searches of the following research registers and websites: Campbell Collaboration Library, Cochrane Collaboration Library, CrimeSolutions.gov, International Clinical Trials Registry, National Criminal Justice Reference Services, National Registry of Evidence-based Programs and Practices, Chestnut Health Systems, RAND Drug Policy Research Center, and the Substance Abuse and Mental Health Services Administration. We checked the bibliographies of all screened and eligible studies, as well as the bibliographies of prior narrative reviews and meta-analyses. We also conducted hand-searches of conference proceedings from the American Society of Criminology, College on Problems of Drug Dependence, and Joint Meeting on Adolescent Treatment Effectiveness. Finally, we conducted hand-searches of manuscripts published in the *Journal of Consulting & Clinical Psychology* and the *Journal of Substance Abuse Treatment*.

2.3. Screening and coding procedures

Under the supervision of the second author, a team of master's level research assistants conducted all eligibility screening and coding. First, all abstracts and titles were screened independently by two researchers; we retrieved the full text for any report deemed potentially eligible by at least one researcher. Next, all retrieved full text reports were screened for eligibility independently by two researchers; the second author resolved any disagreements about eligibility. Finally, studies deemed eligible for inclusion were independently coded by two researchers, and the first or second author resolved any coding disagreements.

All data extraction followed a standardized coding protocol (Tanner-Smith, Wilson, & Lipsey, 2013; Tanner-Smith et al., 2016), which provided detailed instructions for extracting data related to general study characteristics, participant groups, the treatment conditions, outcome measures, and statistical data needed for effect size calculations (coding protocol available upon request). Data were entered directly into a FileMaker Pro database.

2.4. Statistical procedures

2.4.1. Effect size metric

Most included studies reported continuous measures for substance use outcomes (e.g., number of days used) at both pretest and posttest, so we used a standardized mean difference-in-differences effect size to measure differences in pretest-posttest change between the intervention and comparison conditions. These effect sizes were calculated as the difference in standardized mean gain scores for the intervention and comparison conditions, which assumed an average pretest-posttest correlation of 0.70 (Lipsey & Wilson, 2001). All effect sizes were coded such that positive values (greater than zero) indicated greater improvements in substance use for the culturally sensitive treatment condition. For two studies that measured substance use on a binary scale, we calculated odds ratio effect sizes separately at pretest and posttest, and used the Cox transformation to convert those to standardized mean difference effect sizes (Sánchez-Meca, Marín-Martínez, & Chacón-Moscoso, 2003). We then estimated the difference-in-difference effect size as the difference between the pretest and posttest effect sizes. We examined the distribution of effect sizes and sample sizes for outliers, but no outliers were identified.

2.4.2. Missing data

There were a small number of missing values on method, participant, and treatment variables. We did not impute missing data.

2.4.3. Analytic strategies

Standard meta-analysis methods were used to synthesize effect sizes across studies (Lipsey & Wilson, 2001). Given the presumed heterogeneity in the studies, all analyses were conducted using inverse-variance weighted random effects models. Heterogeneity was estimated using the Q, I^2, and τ^2 statistics which test for the presence of variability, the proportion of variability due to true heterogeneity, and the amount of variance in the distribution of the true effect sizes, respectively (DerSimonian & Laird, 1986; Huedo-Medina, Sánchez-Meca, Marin-Martinez, & Botella, 2006). All analyses were performed using Stata SE version 13 (64-bit).

To satisfy the assumption of statistical independence of effect sizes in our meta-analysis model (Lipsey & Wilson, 2001), when studies reported data for multiple outcome measures and/or multiple measurement time-points, we chose one effect size per study to include in the meta-analysis (Lipsey & Wilson, 2001). Six of the seven studies provided at least one effect size indexing differences on measures of mixed substance use (i.e., any combination of alcohol, marijuana, tobacco, or other unspecified mix of substances) immediately after program termination. One study did not report data from immediate posttreatment assessment so data collected 4 months after treatment were used instead (Santisteban, Mena, & McCabe, 2011). Sensitivity analyses were used to assess the impact of analytic selections on the stability of meta-analysis results, and the results were robust to effect size inclusion decisions. We also examined contour-enhanced funnel plots (Peters, Sutton, Jones, Abrams, & Rushton, 2008) and conducted regression tests for funnel plot asymmetry (Egger, Smith, Schneider, & Minder, 1997) to assess the possibility of publication bias. Although we originally planned to examine whether any characteristics of participants, interventions, or study methods moderated intervention effects, the small number of included studies precluded any complex moderator analyses.

3. Results

3.1. Literature search

We identified 7883 non-duplicated candidate reports in the literature search; 6641 were screened as ineligible at the abstract level (see Fig. 1). Of the 1242 articles retrieved in full text, 1218 were deemed ineligible. The review included findings from 8 independent study samples (reported in 24 documents). Although eight studies were deemed eligible for inclusion in our review, one study compared two culturally sensitive conditions to each other and was excluded from the meta-analysis. This study was excluded from the quantitative synthesis because we could not calculate an effect size from that study indexing the difference between culturally sensitive and non-culturally sensitive conditions (Szapocznik, Kurtines, Foote, Perez-Vidal, & Hervis, 1983). In addition, one study compared two culturally sensitive conditions to the same comparison group. To ensure the statistical independence of effect sizes, we therefore retained the focal comprehensive culturally sensitive treatment (SET) in the main meta-analysis (Robbins et al., 2008). Consequently, group comparison effect sizes for our main meta-analysis were available for seven different studies (reported in 23 documents) with seven unique treatment-comparison group pairs. During eligibility screening, four additional studies were considered for inclusion in the review because they involved culturally sensitive treatments, but they were excluded due to insufficient proportion of racial/ethnic minority participants. Also, four other studies composed of primarily racial/ethnic minority samples were excluded because they did not involve any or sufficient culturally sensitive elements in treatment design and delivery. One study evaluated culturally sensitive treatment with a racial/ethnic minority sample but did not report results for substance use after treatment completion (see Appendix A for more details).

3.2. Descriptions of included studies

Tables 1–3 provide details about the characteristics of each included study and Appendix B lists treatment outcomes reported in each study. Here we briefly summarize treatment and comparison programs and culturally sensitive components employed in each of the studies.

Using a randomized trial design, Burrow-Sanchez and Wrona (2012) examined the effectiveness of Culturally Accommodated Cognitive-Behavioral Therapy (A-CBT) compared to standard group CBT (S-CBT). S-CBT consisted of weekly 90-minute group sessions completed over a 12-week period; sessions focused on problem-solving, decision-making, and coping skills. A-CBT followed a similar format as S-CBT but

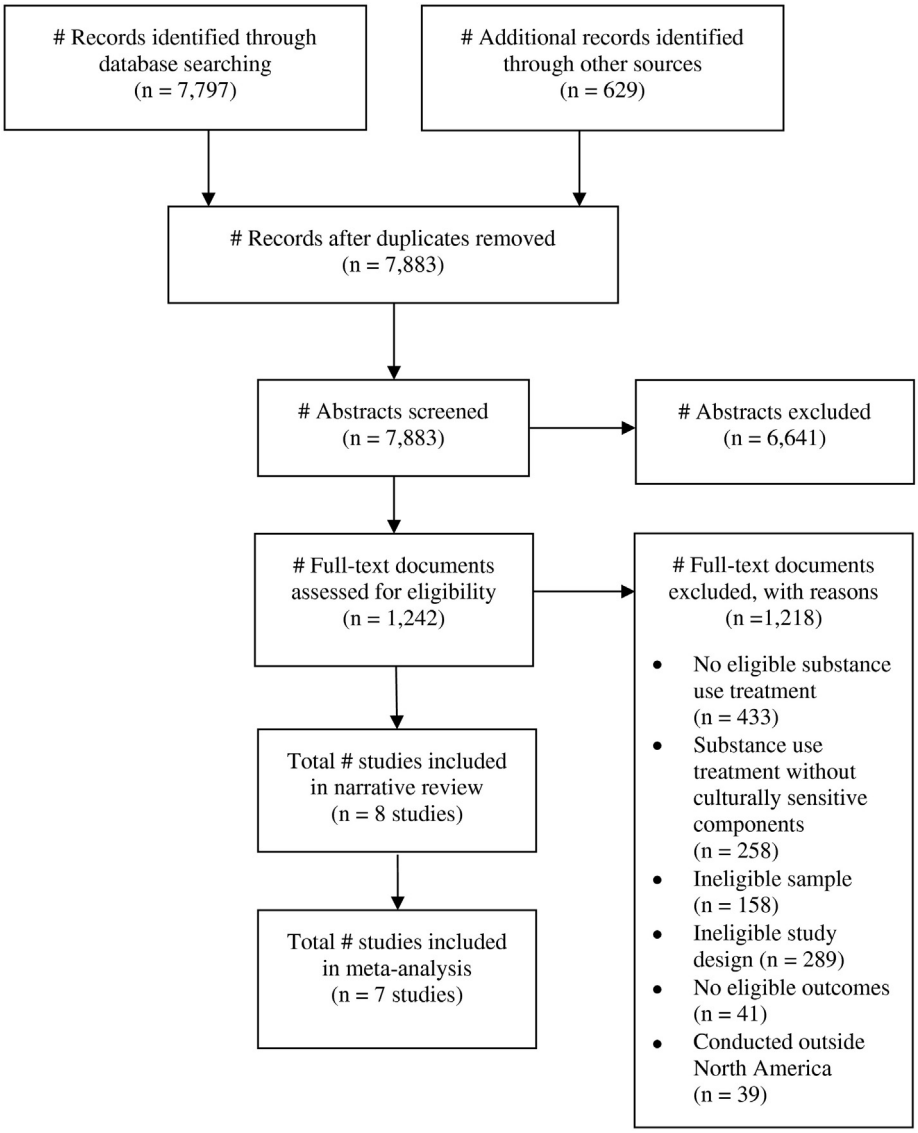

Fig. 1. Study identification flow diagram.

Table 1
Characteristics of the included study samples and method quality.

Study	Design	Mean age[c]	% male[c]	% minority[c]	Details about sample	Weeks post intake	Tx N	Ct N	Overall attrition	Differential attrition	Baseline differences			
											Pretest[a]	Age[a]	Risk level[a]	Gender[b]
Burrow-Sanchez and Wrona (2012)	RCT	15.1	94	Hispanic 100%	Parents of all adolescents were born outside the U.S. (78% of parents born in Mexico); 67% of teens were born in the U.S. and 28% in Mexico. All teens were legally involved. Spanish only speaking teens were excluded.	12.9	14	15	0.17	0.17	0.01	0.16	0.54	
Henderson et al. (2009)	RCT	13.7	73	African-American 38%; Hispanic 42%; Haitian or Jamaican 11%	Urban, low-income, ethnically diverse early adolescents (age 11–15), nearly half (45%) referred from juvenile justice institutions.	14	40	43	0.00	0.00	0.00	0.22		0.75
Lowe et al. (2012)	QED	16.5	64	Keetoowah-Cherokee 100%	High school students within the tribal jurisdictional area referred for substance abuse counseling.	10	92	83	0.02	0.02	0.05	−0.06	−0.12	1.43
Nissen (2005)	RCT	16	76	African-American 58%; Hispanic 39%	Juvenile offenders voluntarily enrolled in treatment.	38.7	130	128	0.48	0.48	0.00	−0.40		
Robbins et al. (2008)	RCT	15.8	84	African-American 39%; Hispanic 61%	Most adolescents (86%) had co-occurring psychiatric disorder and 80% were referred from the juvenile justice system.	26	44	50	0.24	0.24	0.01	0.12	−0.33	
SET vs CS						26	44	51	0.23	0.23	0.01	0.11	−0.09	
SET vs FAM														
Santisteban et al. (2011)	RCT	NR	NR	Hispanic 100%	Teens with parent/guardian born in a Spanish-speaking country. Referred by juvenile justice diversion programs and juvenile addictions receiving facility.	34.4	12	13	0.11	0.11	0.07	−0.67		
Szapocznik et al. (1983)	RCT	17	78	Hispanic 100%	84% Cuban American adolescents, some referred from court.	12	19	18	0.00	0.00	0.00	0.57		
Wrona (2013)	RCT	15.1	91	Hispanic 100%	Most parents (75%) born in Mexico; 99% of teens involved in juvenile justice system. Teens had to speak both English and Spanish and self-identify as Latino for inclusion in the study.	12	29	30	0.16	0.16	0.02	0.11	0.18	0.65

Notes. RCT - randomized controlled trial; QED - quasi-experimental design; Tx = treatment; Ct = control; N = sample size; sample size, attrition and pretest data presented for mixed substance use outcomes included in the meta-analyses. Attrition refers to the difference between number of participants who were originally assigned to the group involved in this effect size and the number of adolescents who were observed at the follow-up measurement.

[a] Hedges' *g*.

[b] Odds ratio.

[c] Data reported for culturally sensitive focal treatment group.

included culturally relevant themes and examples for Latino adolescents and emphasized parental involvement through regular mailings and phone calls to parents. Cultural modifications were developed using the Cultural Accommodation Model for Substance Abuse Treatment (CAM-SAT; Burrow-Sanchez et al., 2011) and focused on issues of acculturation, ethnic identity, and familism. Specifically, content in A-CBT intended to normalize the experiences of acculturative stress, challenge negative internalized messages based on experiences of racism and discrimination, increase awareness of personal strengths associated with ethnic identity, and develop skills to manage the stress. Treatment materials were provided in English and Spanish; providers in both conditions were bilingual and trained in cultural aspects of working with Latino adolescents and their families. Location and schedule were adjusted to make treatment more accessible for the participants in both conditions.

In another randomized trial, Burrow-Sanchez, Minami, and Hops (2015) (also reported in Wrona, 2013) examined the effectiveness of A-CBT compared to S-CBT with a larger sample of Latino adolescents. Adolescents in both groups completed 12 weekly 90-minute CBT sessions. The S-CBT group targeted problem-solving skills, decision making, and coping skills, and included homework assignments, functional analysis, and dealing with cravings and urges. In the A-CBT group, CBT content and delivery were modified to be culturally relevant to Latino adolescents; this included developing ways participants could address negative appraisals of their ethnic identities, discussion of acculturation and acculturative stress, and stress related to discrimination or translating for a parent. A-CBT integrated Spanish names and culturally relevant examples and role plays. A-CBT also emphasized expanded parent involvement through a family introductory meeting and regular phone and mail contact.

Table 2
Characteristics of treatment conditions in included studies.

Study	Focal treatment group					Comparison group				
	Name	Modalities	Format(s)	Duration (in days)	Avg hrs/week	Name	Modalities	Format(s)	Duration (in days)	Avg hrs/week
Burrow-Sanchez and Wrona (2012)	A-CBT	CBT	Group	84	1.5	S-CBT	CBT	Group	84	1.5
Henderson et al. (2009)	MDFT	Family (focal) & multiservice	One-on-one, family, other	98	1.7	Peer Group	CBT	Group	98	1.7
Lowe et al. (2012)	CTC	Counseling	Group	70	0.75	Standard education	PET	Group	70	0.75
Nissen (2005)	APT	Multiservice with CBT and family	One-on-one, family, other	273	NR	No drug treatment	NA	NA	NA	NA
Robbins et al. (2008)	SET	Family (BSFT)	Family, other	105	3	(1) Family Process (2) Community Services	(1) Family (BSFT) (2) NR	(1) Family (2) NR	(1) 105 (2) NR	(1) 2 (2) NR
Santisteban et al. (2011)	CIFFTA	Family/multiservice (with counseling, MET/CBT & skills training)	Teen alone, one-on-one, family, other	112	2	Traditional Conjoint Family	Family	Teen alone, one-on-one, family	112	1
Szapocznik et al. (1983)	CFT	Family (BSFT)	One-on-one, family	84	1	OPFT	Family (BSFT)	One-on-one, family	84	1
Wrona (2013)	A-CBT	CBT	Group	84	1.5	S-CBT	CBT	Group	84	1.5

Notes. NR - not reported in primary study; NA - not applicable (no treatment received); APT = Adolescent Portable Therapy; BSFT = Brief Strategic Family Therapy; CBT = Cognitive Behavioral Therapy; A-CBT = Culturally Accommodated CBT; S-CBT = Standard CBT; CFT = Conjoint Family Therapy; CIFFTA = Culturally Informed and Flexible Family-Based Treatment for Adolescents; CTC = Cherokee Talking Circle; MDFT = Multidimensional Family Therapy; OPFT = One Person Family Therapy; PET = Psychoeducational Treatment; SET = Structural Ecosystems Therapy.

Lowe, Liang, Riggs, and Henson (2012) examined the effectiveness of the Cherokee Talking Circle (CTC) intervention compared to standard substance abuse education. This study used a quasi-experimental design in which Keetoowah-Cherokee adolescents were referred for substance abuse counseling and were non-randomly allocated to either the CTC condition or substance abuse education comparison condition. Students in the CTC condition completed ten weekly 45-minute group talking sessions designed for Keetoowah-Cherokee youth and led by a counselor and cultural expert. CTC was based on the Cherokee self-reliance model which was comprised of three categories: responsibility, discipline, and confidence. The model emphasized connectedness with one's community, goal-orientation, active decision making, and a strong sense of identity and cultural heritage. The CTC manual used English and Cherokee languages. Adolescents in the standard substance abuse

Table 3
Characteristics of culturally sensitive treatment components.

Reference	Focal treatment group Culturally sensitive components	Comparison group Culturally sensitive components	Targeted racial/ethnic minority group
Burrow-Sanchez and Wrona (2012)	CS components in content and delivery, bilingual providers who received cultural competency training, accessible location, convenient schedule, materials for parents in native language.	Bilingual providers who received cultural competency training, convenient location and schedule.	Single minority: Latino.
Henderson et al. (2009)	Culturally responsive delivery and content, mostly racial/ethnic minority providers (but not matched with adolescents on race/ethnicity), delivery in Spanish when appropriate, accessible location.	None/NR.	Diverse sample: African American and Hispanic.
Lowe et al. (2012)	CS content and delivery, provider was a cultural expert, manual in English and native language.	None.	Single minority: Keetoowah-Cherokee.
Nissen (2005)	Culturally responsive delivery, similarity of client and provider cultural background, accessible location.	None.	Diverse sample: Black and Hispanic.
Robbins et al. (2008)	Culturally responsive delivery, racial/ethnic matching of provider and client, delivery in Spanish when appropriate, convenient location.	(1) Family Process– culturally responsive delivery, racial/ethnic matching of provider and client, delivery in Spanish when appropriate, convenient location. (2) Community Services – none/NR	Diverse sample: African American and Hispanic.
Santisteban et al. (2011)	CS content, culture-informed assessment, treatment planning, and delivery.	None.	Single minority: Hispanics.
Szapocznik et al. (1983)	CS treatment planning and delivery.	CS treatment planning and delivery. Adjusted for families difficult to engage in therapy.	All teens were Hispanic but focus on this ethnic group was not explicitly stated. Authors reported that both treatments were developed for use with "this population" (p. 896).
Wrona (2013)	CS components in content and delivery, bilingual providers who received cultural competency training, accessible location.	Bilingual providers who received cultural competency training, accessible location.	Single minority: Latino.

Notes. CS = culturally sensitive; NR = not reported.

education group were assigned to complete ten 45-minute sessions of a revised Drug Abuse Resistance Education (DARE) program implemented by police officers in schools.

In a randomized trial, Nissen (2005) examined the effectiveness of Adolescent Portable Therapy (APT) compared to a no-treatment control group. APT was an outpatient, family-based strength and competency treatment for juvenile justice-involved youth (Elkin, 2006a, 2006b). APT combined family centered therapy with cognitive-behavioral therapy and community engagement to target four life areas of the youth: family, peers, school, and community. The APT manual emphasized a culturally sensitive approach to family therapy, which recognizes "culturally specific aspects of family structure and functioning such as parenting roles and practices, behavioral expectations and issues of acculturation with immigrant families" and "adapts treatment themes across cultures and across individual families" (Elkin, 2005, p. 4). The APT manual provided culture-specific suggestions for structuring client-provider interactions to accommodate families' cultural values. Provider recruitment targeted African-American and Latino therapists to ensure compatibility of client and provider cultural backgrounds, provider familiarity with client specific issues in accessing treatment services, and overall cultural sensitivity of the providers. Youth in the APT group completed an average of 16 one-on-one and 7 family sessions across an average of nine months (Geisz, 2006).

In another randomized trial, Robbins et al. (2008) examined the effectiveness of Structural Ecosystems Therapy (SET), a Family-Process Intervention (FAM), and Community Services (CS). Adolescents in the SET group were assigned to complete 12–16 family sessions targeting family relationships and 12 ecosystemic sessions targeting relationships with peer groups, school, and the juvenile justice system. Participants in the FAM group were assigned to complete 12–16 family sessions. Participants receiving community services were referred to community agencies (Robbins et al., 2007). The key components of family sessions in SET and FAM were based on Brief Strategic Family Therapy (BSFT), a culturally informed structural family therapy targeting dysfunctional family interactions which contribute to behavior problems. Family sessions in the FAM condition were modified to exclude ecological components (i.e., providers did not initiate ecological contacts and restricted discussions of ecological issues). Providers were matched with adolescents based on race or ethnicity. SET and FAM were delivered at locations convenient to family members (home, clinic, school, court) and in Spanish when appropriate.

Santisteban et al. (2011) conducted a randomized trial to evaluate the effectiveness of Culturally Informed and Flexible Family-Based Treatment for Adolescents (CIFFTA) compared to traditional family therapy (TFT). CIFFTA integrated themes relevant to Hispanic families into structural family therapy, and also included individual sessions and psycho-educational modules (Santisteban & Mena, 2009). Individual treatment incorporated motivational interviewing, goal setting, relapse prevention strategies, interpersonal and crisis management skills, exploration of youths' ethnic and race identity, and management of discrimination and alienation- related stress. Structured psycho-educational sessions covered such topics as parenting practices, drug education, risky sexual behavior, interpersonal skills, working with juvenile justice system, co-occurring disorders, acculturation and immigration stressors, and immigration related parent-child separations. CIFFTA providers employed systematic decision-making for tailoring manualized treatment options to the needs of each family. During a semi-structured initial interview families were asked about their immigration history and were assessed for immigration-related separations, alienation from their new community, divergent family acculturation levels, parental knowledge of substance use, comorbidity, and associated risky behaviors. The treatment package was then tailored based on these variables. Adolescents in the CIFFTA group completed bi-weekly sessions over a 16-week period. Half of the sessions were with the adolescent alone and half were conjoint family treatment and/or work with parents alone. TFT consisted of weekly sessions of structural family therapy delivered over a 16-week period. TFT did not include the individual sessions or culture specific content, and it was not tailored based on cultural variables.

Szapocznik et al. (1983) conducted a randomized trial to examine the effectiveness of Conjoint Family Therapy (CFT) compared to One-Person Family Therapy (OPFT). CFT was implemented in a manner that reflected usual practice for Brief Strategic Family Therapy (BSFT), which is a problem-focused, planned structural family systems intervention (Szapocznik et al., 1983; Szapocznik, Hervis, & Schwartz, 2003). Engagement, assessment and treatment planning in BFST recognize culturally appropriate goals based on families' racial or ethnicity cultural heritage. The therapy is tailored to each family and its culture, particularly when targeting the culture-specific emotional and psychological accessibility and distance between family members, or tasks and roles of children and extended family members. CFT was conducted with the whole family or major family subsystem present at most therapy sessions. OPFT was developed to tackle the inaccessibility of family members for therapy, a challenge characteristic to the clients targeted in this study. While OPFT followed the BSFT framework, it was implemented with only the adolescent, based on the premise that, if one family member changes his or her behavior, the remaining family members would change their behavior as well. Both therapies were completed within a maximum of 12 sessions.

Finally, Henderson, Rowe, Dakof, Hawes, and Liddle (2009) conducted a randomized trial to examine the effectiveness of multidimensional family therapy (MDFT) compared to a peer group intervention (also reported in Liddle, Rowe, Dakof, Henderson, & Greenbaum, 2009). MDFT employed a multiple systems treatment approach and focused on four domains: adolescent, parent, family interaction, and extrafamilial (Rowe, Liddle, McClintic & Quille, 2002; Rowe, Parker-Sloat, Schwartz & Liddle, 2003). Cultural sensitivity was one of the key concepts of MDFT; treatment included "discussion of salient cultural themes" (Liddle, 2002, p. 53, 93). MDFT providers systematically assessed and targeted adolescent functioning with regards to racial and cultural issues (Liddle, 2002). Providers delivering MDFT were trained to accommodate to the culture of the family with respect to ethnicity, race, community, personalities, and history based on the assumption that child rearing and family life is embedded in culture. MDFT training materials also included information on working with Hispanic families, and treatment sessions were conducted in Spanish when appropriate. Providers were 57% Hispanic and 29% Black, but they were not matched with adolescents based on race or ethnicity. The peer group intervention integrated social learning principles with cognitive-behavioral therapy and combined relationship skills training with drug education. Most MDFT sessions were delivered at home while peer group participants received treatment primarily in provider offices. Both treatments consisted of 90-minute sessions twice a week for 12 to 16 weeks. Participants in both conditions were offered transportation assistance.

3.3. Characteristics of included studies

Table 4 provides an overall summary of the seven studies included in the meta-analysis. All studies were conducted in the United States and all but one reported results in at least one journal publication. The reports that provided effect size data were published between 2005 and 2013. The methodological quality of the studies was generally high; all but one study randomly allocated participants to conditions, the average overall attrition rate at posttest immediately after program termination was 0.17 ($SD = 0.16$), the average differential attrition between groups was 0.02 ($SD = 0.03$). Four of the seven studies included in the meta-analysis used modern analytic strategies to handle missing data (e.g., FIML). There were no explicitly reported implementation problems. All baseline difference effect sizes were coded such that positive values ($g > 0$, $OR > 1$) indicated the participants in the focal treatment conditions were at lower risk of substance use (i.e., had lower levels of baseline substance use or other risk factors, were younger, or

Table 4
Features of the studies, outcomes, participants, and treatment conditions included in meta-analysis ($k = 7$; $n = 7$).

	Frequency (%)	Mean (SD)	Range
Method quality characteristics			
Randomized experiment	6 (86)		
Overall attrition		0.17 (0.16)	0–0.48
Differential attrition		0.02 (0.03)	0–0.07
Implementation problems	0 (0)		
Baseline differences in pretest (Hedges *g*)		−0.07 (0.33)	−0.67–0.22
Baseline differences in age (Hedges *g*)[a]		0.07 (0.38)	−0.33–0.54
Baseline differences in sex (odds ratio)[a]		1.56 (1.56)	0.57–3.88
Baseline differences in risk level (Hedges *g*)[b]		0.94 (0.43)	0.65–1.43
Active comparison group (other than TAU)	4 (57)		
Bona fide comparison group	2 (29)		
No treatment comparison	1 (14)		
Outcome characteristics			
Time span of outcome measure (days)		53 (29.15)	30–90
Pretest-posttest interval (weeks)		21.14 (11.79)	10–38.7
Participant characteristics (focal treatments)			
Percent male[c]		0.80 (0.11)	0.64–0.94
Percent Black		0.19 (0.25)	0–0.58
Percent Hispanic		0.63 (0.39)	0–1
Average age[c]		15.37 (0.97)	13.7–16.5
Psychiatric comorbidity	3 (43)		
Focal treatment characteristics			
Outpatient level of care	7 (100)		
Manualized treatment	7 (100)		
Delivered in group format	3 (43)		
Strong family component	4 (57)		
Family present for most sessions	1 (14)		
Strong CBT component	3 (43)		
Duration (days)		118 (69.82)	70–273
Hours of contact per week[c]		1.74 (0.74)	0.75–3
Culturally sensitive content	5 (71)		
Focus on single ethnocultural group	4 (57)		
Ecological elements emphasized	3 (43)		
Culture-based assessment	1 (14)		
Ethnic matching	1 (14)		
Cultural competence training for providers	2 (29)		
Developed for target group (not an adaptation)	1 (14)		

Notes. Data presented for seven studies and seven effect sizes included in the main meta-analyses. Means and standard deviations shown for continuous measures; frequencies and percentages shown for dichotomous measures. k = number of studies providing data; n = number of effect sizes; TAU = treatment as usual; CBT = cognitive-behavioral therapy.
[a] $n = 4$.
[b] $n = 3$.
[c] $n = 6$.

were female). Although the treatment and comparison groups were generally equivalent on pretest measures of substance use (mean Hedges' $g = -0.07$) and baseline measures of age (mean Hedges' $g = 0.07$), the adolescents in the culturally sensitive treatment conditions were more likely to be female ($OR = 1.56$) and tended to be at lower risk than those in their respective comparison conditions (mean Hedges' $g = 0.94$) based on risk indicators including level of involvement in criminal justice system, poverty, family problems, and school behavior problems. Over half of the focal treatments were compared to control groups that involved alternative treatment other than services as usual. Two studies involved bona fide comparison groups that received the same type of treatment and dosage but focal treatments included additional content that was culturally sensitive. The effect sizes included in the meta-analysis indexed differences on measures of mixed substance use. In all included studies, outcome data were collected with standardized instruments, primarily Timeline Followback (Sobell & Sobell, 1992). The average time span covered by outcomes was 53 days ($SD = 29.15$), and the average time between pretest and posttest was 21 weeks ($SD = 11.79$).

Study samples were predominantly male ($M = 80\%$); over half of the adolescents were Hispanic ($M = 63\%$), and averaged 15.37 ($SD = 0.97$) years of age. The majority of studies included youth with some prior police contact or official delinquency, and three studies included adolescents with explicitly diagnosed psychiatric comorbidities. All treatments were manualized and delivered at an outpatient level of care. On average, the treatments were delivered over the span of 118 days ($SD = 70$), with approximately 1.74 contact hours per week ($SD = 0.74$), and all were delivered in 1–2 sessions per week. Over half of the focal treatments involved family therapy, but only one entailed family participation in most treatment sessions. Three focal treatments included services delivered in a group setting.

3.4. Overall effects on substance use

As noted in Table 1, adolescents in treatment and comparison conditions varied in their baseline substance use levels. To ensure that pretest differences between groups did not bias the findings, we therefore conducted a random-effects meta-analysis using difference-in-difference effect sizes to compare average changes in substance use from pretest to immediate posttest for participants in the culturally sensitive treatments vs. comparison groups. The seven effect sizes from the seven studies including 361 adolescents in the treatment groups and 362 adolescents in the comparison groups ranged from −0.35 to 1.09 (see Fig. 2). The pooled results from the meta-analysis indicated that, on average, culturally sensitive treatments were associated with significantly greater reductions in substance use relative to the comparison conditions[1] ($g = 0.37$, 95% CI [0.12, 0.62]). This mean effect size of 0.37 indicates that culturally sensitive substance use treatment programs for racial/ethnic minority adolescents yielded over a one-third standard deviation improvement in substance use, relative to their comparison conditions. However, there was a statistically significant amount of heterogeneity in the effect sizes ($Q = 26.5$, $p \leq 0.001$, $\tau^2 = 0.08$, $I^2 = 77.4\%$), and as shown in Fig. 2, the mean effect sizes were not statistically significant when restricting to those studies where the control groups were comprised of bona fide comparisons (i.e., differed only on the culturally sensitive elements; $g = -0.08$) or treatment as usual comparisons ($g = 0.39$).

3.5. Sensitivity analyses

A number of sensitivity analyses were conducted to explore the robustness of the meta-analysis findings. Four studies reported substance use outcome data 3–4 months after treatment, three reported outcome data at 6 months post-treatment, one reported outcome data at 9 nine months post-treatment, and one at 12 months post-treatment. Pooled results from the four studies reporting 3–4 month post-treatment data indicated that participation in culturally sensitive treatment was associated with greater reductions in substance use but this mean effect size was not statistically significant ($g = 0.39$, 95% CI [−0.17, 0.94], $Q = 25.73$, $p = 0.00$, $\tau^2 = 0.27$, $I^2 = 88.3\%$). Culturally sensitive treatments were associated with significantly greater reductions in substance use at 6–9 month follow-up ($g = 0.34$, 95% CI [0.05, 0.63], $Q = 6.08$, $p = 0.05$, $\tau^2 = 0.04$, $I^2 = 67.1\%$). Overall, meta-analyses pooling effect sizes from later post-treatment time-points yielded substantively similar results as the main meta-analysis but these results must be

[1] Only one study provided results for alcohol use after treatment, which did not allow us to conduct a meta-analysis for this outcome. Three studies provided results for treatment effects on marijuana use, and when pooled, indicated that assignment to culturally sensitive conditions was associated with significantly greater reductions in marijuana use ($g = 0.79$, 95% CI [0.33, 1.26], $Q = 10.40$, $p = 0.01$, $\tau^2 = 0.13$, $I^2 = 80.8\%$).

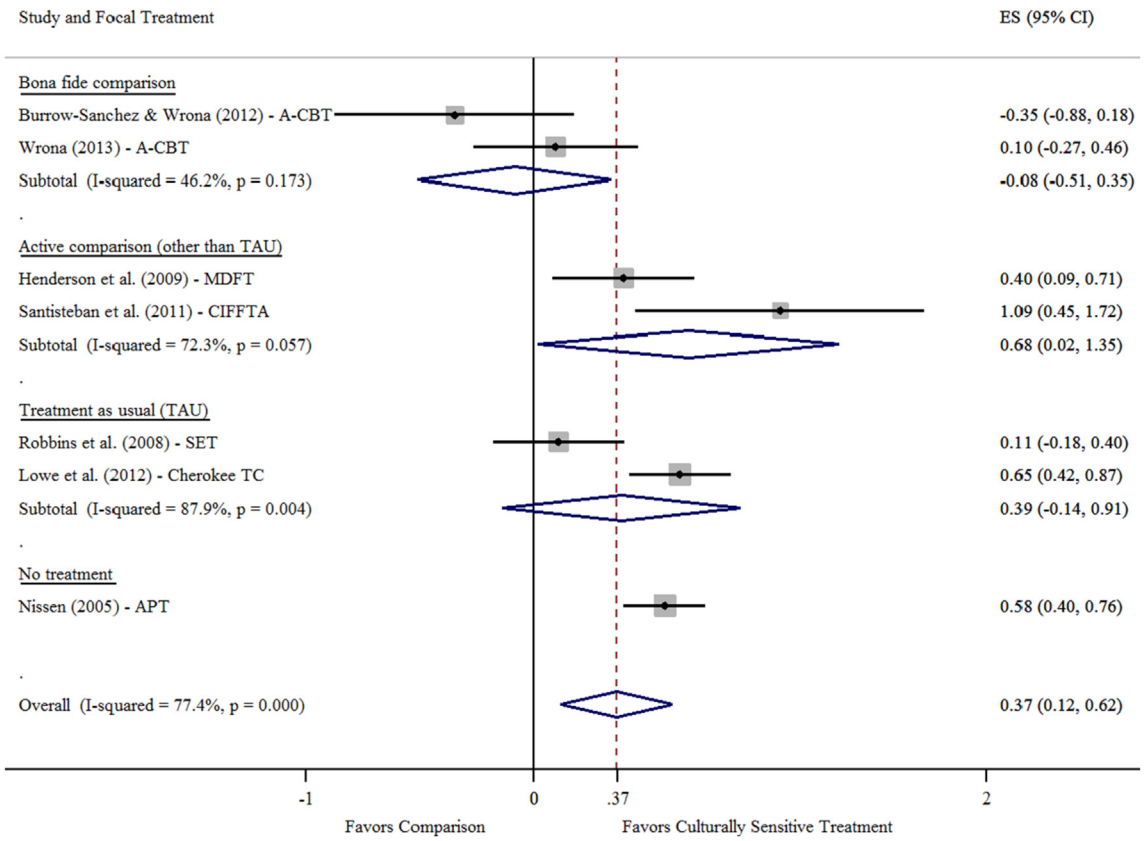

Fig. 2. Forest plot of culturally sensitive treatment effects (relative to comparison) on mixed substance use at immediate posttest. Note that each effect size was estimated on a unique participant sample. Weights are from random effects analysis. Results are stratified by type of comparison group.

interpreted with caution given the smaller number of studies contributing data.

3.5.1. Publication bias

To assess the risk of publication bias we visually inspected a contour-enhanced funnel plot for the effect sizes included in the main meta-analysis shown in Fig. 2. No asymmetry was observed and the results from the Egger's regression test ($b = 0.74$; $p = 0.36$) provided no evidence of small study bias (i.e., no clear tendency for smaller studies to show greater effects than larger studies). These results, again, should be interpreted with caution given the small number of effect sizes ($n < 10$) included in the analyses.

4. Discussion

4.1. Summary of the main results

This systematic review summarized findings from eight studies examining culturally sensitive substance use treatment for racial/ethnic minority youth. The meta-analysis quantitatively synthesized findings from seven of those studies, and indicated that participation in culturally sensitive treatments was associated with significantly greater reductions in substance use ($g = 0.37$). That is, substance use treatments in which culture-based considerations were incorporated into the design and delivery yielded over a one-third standard deviation improvement in substance use, relative to comparison conditions. There was a statistically significant amount of heterogeneity, however, and outcomes varied depending on the type of comparison conditions used in the studies. The results were generally consistent with those observed in other meta-analyses that have examined the effects of culturally sensitive interventions (Benish et al., 2011; Griner & Smith, 2006; Hodge et al., 2012; Smith et al., 2011). Prior meta-analyses have established that culturally sensitive interventions can be effective in addressing diverse mental and behavioral health outcomes among various racial/ethnic minority groups. The current study expanded on these prior meta-analyses by focusing specifically on substance use treatments for racial/ethnic minority youth. Our results suggest that these culturally informed treatments constitute a promising approach to reduce substance use among racial/ethnic minority youth relative to most comparison conditions. However, there is not enough evidence to suggest whether cognitive behavioral therapy with culturally accommodated content and delivery may be more or less effective relative to standard cognitive behavioral therapy delivered by culturally competent providers.

4.2. Limitations

The results of the meta-analysis should be interpreted with caution as they involve several important limitations. The primary constraint is the small sample with only eight eligible studies included in the review and results from only seven studies quantitatively pooled in the meta-analysis. Given the growing racial/ethnic minority population in the United States, underutilization of substance use services among diverse ethnocultural groups, and increasing scholarly interest in culturally sensitive interventions, the small body of research that has attempted to evaluate the effects of culturally sensitive treatments on adolescent substance use is surprising. We concur with authors of other reviews who call for more empirical studies on this topic, which will permit further examination of the potentials and promise of culturally sensitive substance use treatment for racial/ethnic minority youth (Huey & Polo, 2008; Szapocznik et al., 2006).

Interpretation of the meta-analysis results is not only hindered by the small number of eligible studies, but also due to variability in the comparison conditions. The studies included in the meta-analysis compared culturally sensitive treatments to no-treatment, treatment as

usual, and other active treatment conditions. In the one study reporting the largest differential effects (Santisteban et al., 2011), the treatment group received twice as many sessions as the comparison group. Two other studies with large effect sizes (Henderson et al., 2009; Lowe et al., 2012) compared two focal interventions to theoretically distinct treatments. Therefore, it is plausible that differences in outcomes between compared conditions may have stemmed from differential intervention dosage, modality, or accessibility of treatment, rather than difference in culturally sensitive components embedded in treatment design and delivery. Indeed, differential effects of culturally sensitive treatment programs were smaller when these treatments were directly compared to their generic counterparts receiving equal intervention dose and the same treatment modality. As others have noted previously (Huey & Polo, 2008), to determine the effectiveness of culturally sensitive treatments, the optimal comparison condition should be nearly identical to the focal treatment condition, with the only difference being the use of culturally sensitive elements. Such a contrast would permit isolation of the unique effects of culturally sensitive components without the potential confounding of other treatment characteristics. However, such direct comparisons may not be feasible for culturally sensitive interventions that involve new distinct paradigms specially developed for particular ethnocultural groups.

Another limitation relates to the variability in the types of culturally sensitive components included in the focal treatments and inconsistent reporting of information about these components, a problem also described in prior reviews of culturally sensitive interventions (Griner & Smith, 2006; Hodge et al., 2010a, 2012; Huey & Polo, 2008). Several studies provided few details about the ways culturally sensitive components were incorporated into design or delivery, which impedes assessment or replication of most effective culture-based approaches. We also acknowledge the potential underreporting of culturally sensitive elements in the comparison groups, a recognized confound in research with racial/ethnic minority populations (Benish et al., 2011; Huey & Polo, 2008; Rossello, Bernal, & Rivera-Medina, 2008; Sue et al., 2009). Such underreporting could result in underestimated differences in the effects between conditions.

Several prior reviews signaled a potential for publication bias in the literature focused on the effects of culturally sensitive interventions (Huey et al., 2014; Smith et al., 2011). For example, results from one review of the effects of culturally adapted compared to generic treatments for mental health problems indicated that published studies had greater effects than unpublished studies (Huey et al., 2014). Results from our analyses did not provide evidence of publication bias. However, the small number of effect sizes included in the analyses necessitates caution in interpretation.

4.3. Recommendations for future research

Our review highlights several areas of importance for future research. One direction is to identify which types of culturally sensitive interventions and culturally sensitive components are associated with better substance use outcomes among specific ethnocultural groups of adolescents (Burlew, Feaster, Brecht, & Hubbard, 2009; Griner & Smith, 2006; Sue et al., 2009). Although we could not test the differential responses depending on treatment modality, as noted, the differential effects of culturally sensitive treatments in our meta-analysis were no longer significant when they were compared to their active, generic counterparts ("bona fide" comparisons). Although previous meta-analyses have documented smaller effects for contrasts with bona fide comparisons (Benish et al., 2011; Huey et al., 2014; Smith et al., 2011), the mean effect size across the two studies with bona fide comparisons in our meta-analysis ($g = -0.08$) was notably lower than those previously reported. Both of these studies, however, involved treatments based on cognitive-behavioral therapy, a treatment modality with strong evidence of effectiveness among youth with substance use disorders (Tanner-Smith et al., 2016).

Indeed, a number of CBT tenets converge with those in multicultural therapy, including the need to tailor interventions to each individual, emphasis on empowerment, integration of assessment throughout therapy, and recognition of ecological influences (Guo & Hanley, 2015; Hays, 2009). However, CBT's emphasis on personal independence, rationality, individualistic orientation, and low attention to personal history may be incongruent with cultures of some racial/ethnic minority groups (Hays, 2009). Prior research suggests that group CBT may produce smaller effects among Hispanic adolescents (Waldron & Turner, 2008). Nonetheless, Hispanic adolescents in the two studies included in our review received CBT in a group format in both conditions, and substance use outcomes improved from pretest to posttest for all treatment arms.

Whereas some suggest that deep structural cultural elements may yield better outcomes than surface adaptations (Hodge et al., 2012; Resnicow et al., 2000), others encourage a "flexible core approach", which assumes that causes of clinical problems and effective treatment models are similar across various cultural subgroups and surface adjustments can successfully increase engagement in and effectiveness of treatment (Wagner, 2003). Some research suggests that personalization of an intervention may yield superior outcomes to some extent due to expectancy effects. Participants may perceive intervention as superior when they believe it has been tailored to their individual characteristics (Webb Hooper, Rodríguez, & Baker, 2013). According to Huey et al. (2014), some culture-based approaches may potentially weaken otherwise effective treatments by, for instance, eliciting negative reactance in some racial/ethnic minority clients. Wrona (2013) noted that the culturally informed changes to CBT content and delivery in the two studies of A-CBT included in this review were not theoretically or structurally fundamental and therefore may have been insufficient to produce significantly different outcomes as they did not transform the deep structure of the intervention. However, results from several studies of culturally sensitive CBT on outcomes other than substance use have suggested that inclusion of culturally sensitive content or delivery components can be associated with improved outcomes relative to non-adapted CBT among racial/ethnic minorities (Kohn, Oden, Muñoz, Robinson, & Leavitt, 2002; Miranda, Azocar, Organista, Dwyer, & Areane, 2003). Notably, comparison groups in the two included studies also involved culturally sensitive components (for example, providers in these comparison groups were bilingual, experienced in working with Latino families, and received cultural competency training). Thus it is plausible that the standard CBT with basic cultural adjustments to treatment delivery may be sufficient to produce substance use reductions and culture-based additions to intervention content may not be necessary for better outcomes. This topic merits further exploration.

Another important research direction is to isolate the causal mechanisms of substance use reductions in culturally sensitive treatments (Griner & Smith, 2006; Szapocznik et al., 2006). Some researchers link better outcomes of culturally sensitive interventions to providers' respect for and acceptance of the client's initial explanatory model of the problem (Benish et al., 2011). Others attribute improved outcomes to better relationships between clients and their providers and higher levels of client trust more so than to specific cultural components (Griner & Smith, 2006). And for adolescents in particular, improved family functioning may be a critical intervening mechanism (Huey & Polo, 2008; Santisteban et al., 2003; Schmidt, Liddle, & Dakof, 1996). Some therefore suggest that family-based interventions may produce better outcomes especially for Hispanic adolescents (Szapocznik et al., 2006; Waldron & Turner, 2008) because they target the unique culture-related factors such as acculturation stress, parent-adolescent acculturation discrepancies, inverted balance of power, and cultural isolation from parents which have been recognized to contribute to the development of drug use behavior among Hispanic youth (Gil et al., 2004; Santisteban, Muir-Malcolm, Mitrani, & Szapocznik, 2002). Mediators of substance use change may differ for distinct ethnocultural groups or substance targeted in treatment, and depend on contextual conditions, however (e.g., Robbins et al., 2008). Along with the use of

alternative definitions of treatment success (for example, social and emotional adjustment), this is another important area for future research.

The results from this review of the existing literature also highlighted the need for more research on whether the effects of culturally sensitive treatments differ by any culture-based moderators. A number of key culture-based variables have been identified in the mental health literature, but they are yet to be tested in studies evaluating substance use treatments for specific groups of racial/ethnic minority youth. These variables include but are not limited to acculturation, Afrocentricity, cultural mistrust, ethnic identity, familism, modernism/traditionalism, perceived discrimination, socioeconomic status, and spirituality (Castro & Alarcon, 2002; Castro & Garfinkle, 2003; Gil et al., 2004; Griner & Smith, 2006; Huey & Polo, 2008; Wagner, 2003; Warner et al., 2006). Indeed, results from moderator analyses in two studies included in our review (Burrow-Sanchez & Wrona, 2012; Burrow-Sanchez et al., 2015) suggested that adolescents may benefit from treatment that is culturally congruent with their levels of ethnic identity and familism. Given the potential differential effects of substance use treatments for subgroups of adolescents, relevant variables that allow tailoring treatment to ensure cultural fit should be further explored. Future research in this area would also benefit from greater attention to comorbidity given the frequent co-occurrence of substance use problems and other mental health issues.

Finally, results from the current review need to be replicated in future studies with more diverse samples. Studies included in our review were conducted in the United States and consisted primarily of racial/ethnic minority adolescent males. This homogeneity in participant characteristics limits the generalizability of the results. Further research is needed to determine if culturally sensitive approaches may be differentially efficacious among female racial/ethnic minority youth with substance use problems (Szapocznik et al., 2006) and if the results replicate among ethnocultural groups not represented in the primary studies included in our review. For example, no eligible studies focused on Asian American youth. Although substance use rates are generally lower in this group, Asian American clients may benefit more from culturally sensitive interventions compared to clients of other racial/ethnic groups (Smith et al., 2011). Based on research with Chinese American clients, Hwang (2006) suggested the following domains essential for culturally adapted therapy: dynamic issues and cultural complexities (such as clients' multiple identities and group memberships); orientation to therapy; cultural beliefs about the problem, its causes, and proper treatment; therapeutic relationship; cultural differences in expression and communication; and culture specific issues. Specific treatment considerations with this group may therefore need to take into account the discomfort associated with self- disclosure and acknowledgement of problematic behaviors, loss of face and stigma, mind-body integration, targeting somatic symptoms, reduction of ambiguity, or emphasis on hierarchical therapeutic relationship (Hwang, 2006; Hall, 2001; Pan et al., 2011).

5. Conclusions

Substance use treatment providers work with adolescents from increasingly diverse cultural backgrounds, and different ethnocultural groups of adolescents may vary in how they respond to substance use treatment. This review synthesized the current and best available research evidence on the effects of culturally sensitive substance use treatment, and found that these treatments are associated with higher reductions in post-treatment substance use among racial/ethnic minority adolescents. Strong conclusions from the review are hindered by the small number of available studies for synthesis, variability in comparison conditions across studies, and lack of diversity in the adolescent clients served in the studies. Nonetheless, this review suggests that culturally sensitive treatments offer promise as an effective way to address substance use among racial/ethnic minority youth.

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Appendix A. Characteristics of selected excluded studies

Reason for exclusion study	Exclusion rationale
Insufficient proportion of racial/ethnic minority participants	
Liddle, H. A., Dakof, G. A., Henderson, C., & Rowe, C. (2011). Implementation outcomes of multidimensional family therapy-detention to community: A reintegration program for drug-using juvenile detainees. *International Journal of Offender Therapy and Comparative Criminology*, *55*(4), 587–604.	Evaluated MDFT- Detention to Community to Enhanced Services as Usual but racial/ethnic minority participants constituted 84% of the sample.
Liddle, H. A., Dakof, G. A., Turner, R. M., Henderson, C. E., & Greenbaum, P. E. (2008). Treating adolescent drug abuse: A randomized trial comparing multidimensional family therapy and cognitive behavior therapy. *Addiction*, *103*(10), 1660–1670.	Compared MDFT to CBT but racial/ethnic minority participants constituted 82% of the sample.
Robbins, M. S., Feaster, D. J., Horigian, V. E., Rohrbaugh, M., Shoham, V., Bachrach, K., et al. (2011). Brief Strategic Family Therapy versus treatment as usual: Results of a multisite randomized trial for substance using adolescents. *Journal of Consulting and Clinical Psychology*, *79*(6), 713–727.	Compared BSFT to treatment as usual condition but the sample was 69% racial/ethnic minority.
Slesnick, N. & Prestopnik, J. L. (2009). Comparison of family therapy outcome with alcohol-abusing, runaway adolescents. *Journal of Marital and Family Therapy*, *35*(3), 255–277.	Compared two family therapies and services as usual with alcohol-abusing runaway adolescents. One condition involved 84% racial/ethnic minority, and two other conditions were only 65% racial/ethnic minority samples.
No or insufficient culturally sensitive elements in design and delivery of treatment	
Heinzerling, K. G., Gadzhyan, J., van Oudheusden, H., Rodriguez, F., McCracken, J., & Shoptaw, S. (2013). Pilot randomized trial of bupropion for adolescent methamphetamine abuse/dependence. *Journal of Adolescent Health*, *52*(4), 502–505.	Sample composed entirely of racial/ethnic minority participants but there was no indication that treatment entailed culturally sensitive components.
Killeen, T. K., McRae-Clark, A. L., Waldrop, A. E., Upadhyaya, H., & Brady, K. T. (2012). Contingency management in community programs treating adolescent substance abuse: A feasibility study. *Journal of Child and Adolescent Psychiatric Nursing*, *25*(1),	Evaluated contingency management in community programs. The evaluation involved 94% racial/ethnic minority sample but there was no indication that treatment condition contained culturally sensitive elements.

(continued on next page)

Appendix A (*continued*)

Reason for exclusion study	Exclusion rationale
33–41.	
Santisteban, D. A., Mena, M. P., Muir, J., McCabe, B. E., Abalo, C., & Cummings, A. M. (2015). The efficacy of two adolescent substance abuse treatments and the impact of comorbid depression: Results of a small randomized controlled trial. *Psychiatric Rehabilitation Journal*, *38*(1), 55–64.	Included a majority Hispanic sample but the only explicitly reported culturally sensitive component was availability of treatment in Spanish, which alone was not sufficient for inclusion in our review.
Zhang, S. X. (2001). Evaluation of the Los Angeles County juvenile drug treatment boot camp. Executive Summary (Research Rep. No. 187678). Rockville, MD: National Criminal Justice Reference Service.	Evaluated the Los Angeles County juvenile drug treatment boot camp with 84% racial/ethnic minority participants. There was no indication that treatment condition involved culturally sensitive elements.
No results reported for substance use measure after treatment completion	
Szapocznik, J., Kurtines, W. M., Foote, F., Perez-Vidal, A., & Hervis, O. (1986). Conjoint versus one-person family therapy: Further evidence for the effectiveness of conducting family therapy through one person with drug-abusing adolescents. *Journal of Consulting and Clinical Psychology*, *54*(3), 395.	Entirely racial/ethnic minority sample; evaluated culturally sensitive treatment and was a replication of another study included in our review (Szapocznik et al., 1983) but did not report results for substance use measure after treatment completion.

Appendix B. Treatment outcomes in included studies

Study	Substance type	Outcome type	Instrument and outcome	Days measured	Weeks post intake	Months post tx	Tx N	Ct N	DID ES	95% CI	
Burrow-Sanchez & Wrona (2012)	Mixed	Use frequency	TLFB: substance use	90	12.9	0	14	15	−0.35	−0.88	0.18
	Mixed	Use frequency	TLFB: substance use	90	25.8	3	14	14	−0.36	−0.89	0.18
Henderson et al. (2009)	Mixed	Use frequency	TLFB: substance use	30	14	0	40	43	0.40	0.09	0.71
	Mixed	Use frequency	TLFB: substance use	30	25.8	3	40	43	0.07	−0.24	0.38
	Mixed	Use frequency	TLFB: substance use	30	51.6	9	40	43	0.23	−0.08	0.54
	Mixed	Yes/no use	TLFB: abstinent	30	14	0	40	43	0.60	0.28	0.92
	Mixed	Yes/no use	TLFB: abstinent	30	25.8	3	40	43	0.50	0.18	0.81
	Mixed	Yes/no use	TLFB: abstinent	30	51.6	9	40	43	0.49	0.18	0.81
	Mixed	Yes/no use	TLFB: any use (reported in Liddle et al., 2009)	30	14	0	40	43	0.60	0.28	0.92
	Mixed	Yes/no use	TLFB: any use (reported in Liddle et al., 2009)	30	25.8	3	40	43	0.55	0.23	0.87
	Mixed	Yes/no use	TLFB: any use (reported in Liddle et al., 2009)	30	51.6	9	40	43	0.56	0.24	0.88
	Marijuana	Use frequency	TLFB: marijuana use (reported in Liddle et al., 2004)	30	14	0	37	41	1.07	0.71	1.43
Lowe et al. (2012)	Mixed	Other	GAIN-Q: Substance Problem Scale	70	10	0	92	83	0.65	0.43	0.87
	Mixed	Other	GAIN-Q: Substance Problem Scale	90	22.9	3	92	83	0.77	0.54	1.00
Nissen (2005)	Mixed	Yes/no use	GAIN: any drug use	30	38.7	0	130	128	0.58	0.40	0.76
	Mixed	Yes/no use	GAIN: any drug use	30	64.5	6	76	74	0.60	0.36	0.84
	Mixed	Yes/no use	GAIN: substance abuse	NA	38.7	0	130	128	0.55	0.37	0.73
	Mixed	Yes/no use	GAIN: substance abuse	NA	64.5	6	76	74	0.82	0.57	1.06
	Mixed	Yes/no use	GAIN: substance dependence	NA	38.7	0	130	128	1.29	1.08	1.50
	Mixed	Yes/no use	GAIN: substance dependence	NA	64.5	6	76	74	3.40	2.96	3.85
	Marijuana	Yes/no use	GAIN: marijuana use	30	38.7	0	130	128	0.46	0.28	0.64
	Marijuana	Yes/no use	GAIN: marijuana use	30	64.5	6	76	74	0.55	0.32	0.79
	Alcohol	Yes/no use	GAIN: alcohol use (reported in Latif, 2005)	30	38.7	0	130	128	0.08[a]	−0.25	0.41
Robbins et al. (2008)	Mixed	Use frequency	TLFB: drug use (SET vs CS)	30	26	0	44	50	0.11	−0.18	0.40
	Mixed	Use frequency	TLFB: drug use (SET vs FAM)	30	26	0	44	51	0.02	−0.27	0.31
	Mixed	Use frequency	TLFB: drug use (SET vs CS)	30	52	6	35	43	0.15	−0.17	0.47
	Mixed	Use frequency	TLFB: drug use (SET vs FAM)	30	52	6	35	45	0.30	−0.02	0.62
	Mixed	Use frequency	TLFB: drug use (SET vs CS)	30	78	12	36	35	−0.14	−0.48	0.19
	Mixed	Use frequency	TLFB: drug use (SET vs FAM)	30	78	12	36	38	−0.02	−0.35	0.31
Santisteban et al. (2011)	Mixed	Use frequency	TLFB: marijuana and cocaine	31	34.4	4	12	13	1.09[b]	0.45	1.72
	Marijuana	Use frequency	TLFB: marijuana	31	34.4	4	12	13	0.97[b]	0.35	1.59
	Other	Use frequency	TLFB: cocaine	31	34.4	4	12	13	0.22[b]	−0.34	0.79
Szapocznik et al. (1983)	Mixed	Use frequency	Psychiatric Status Schedule: drug abuse	NA	12	0	19	18	−0.47	−0.95	0.00
	Mixed	Use	Psychiatric Status Schedule: drug abuse	NA	39	6	12	12	−0.49	−1.07	0.10

Appendix B (*continued*)

Study	Substance type	Outcome type	Instrument and outcome	Days measured	Weeks post intake	Months post tx	Tx N	Ct N	DID ES	95% CI
Wrona (2013)	Mixed	frequency Use frequency	TLFB: substance use	90	12	0	29	30	0.10	−0.27 0.46

Notes. Tx = treatment; Ct = control; N = sample size; DID ES = difference in differences effect size; CI = confidence interval; NA-not applicable; TLFB = Timeline Followback; GAIN = Global Appraisal of Individual Needs; GAIN-Q = Global Appraisal of Individual Needs – Quick.

[a] Cox transformed Hedges' *g* standardized mean difference effect size is presented for this outcome because no pretest data were available to calculate a difference in differences effect size.

[b] Posttest effect size adjusted for other variables.

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