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A Randomized Controlled Trial of Guided Self-Change with Minority Adolescents

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Abstract

Objective—Adolescent substance use and abuse is a pressing public health problem, and is strongly related to interpersonal aggression. Such problems disproportionately impact minority youth, who have limited access to evidence-based interventions such as ecological family therapies, brief motivational interventions (BMI), and cognitive behavioral therapies (CBT). With a predominantly minority sample, our objective was to rigorously evaluate the efficacy of a school-based BMI/CBT, Guided Self-Change (GSC), for addressing substance use and aggressive behavior.

Method—We conducted a school-based RCT with 514 high school students (mean age 16.24 years, 41% female, 80% minority) reporting using substances and perpetrating aggression. We used structural equation modeling to compare participants randomly assigned to receive GSC or standard care (SC; education/assessment/referral-only), at post-treatment, and 3- and 6-months post-treatment, on alcohol use, drug use, and interpersonal aggression outcomes as assessed by the Timeline Follow-Back.

Results—Compared with SC participants, GSC participants showed significant reductions ($p < .05$) in total number of alcohol use days (Cohen's $d = 0.45$ at post-treatment, and 0.20 at 3-months post-treatment), drug use days (Cohen's $d = 0.22$ at post-treatment, and 0.20 at 3-months post-treatment), and aggressive behavior incidents (Cohen's $d = 0.23$ at post-treatment). Moreover, treatment effects did not vary by gender or ethnicity.

Conclusions—With minority youth experiencing mild to moderate problems with substance use and aggressive behavior, GSC holds promise as an early intervention approach that can be implemented with success in schools.

Keywords

adolescent substance use; Guided Self-Change; minority adolescents; interpersonal aggression; school-based intervention

Adolescent substance use is a pressing public health and social problem in the United States. Most (62.0%) high school seniors report past year alcohol use, 36.4% report past year marijuana use, and 40.3% report past year illicit drug use (Johnston, O'Malley, Bachman, &

Schulenberg, 2013). Almost a quarter report past month binge drinking (Centers for Disease Control & Prevention, 2012), and 90.6% agree that alcohol is easy to acquire (Johnston O'Malley, Bachman, & Schulenberg, 2012). Marijuana also is quite accessible; 81.6% of 12th graders report that marijuana is easy to get (Johnston et al., 2012). Marijuana use is now at a 30-year high among high school seniors; one in fifteen high school seniors is a daily or near daily marijuana user (Johnston et al., 2013).

Adolescent alcohol and other drug (AOD) use is associated with a host of immediate and long-term negative consequences. In the short-term, the greater the AOD use, the more likely an adolescent will experience injuries and emergency room visits, suicidality, interpersonal problems with family and friends, school problems and truancy, risky sex, and risky driving (Engberg & Morral, 2006; Jacobus, Bava, Cohen-Zion, Mahmood, & Tapert, 2009; Teplin et al., 2005; Windle & Windle, 2005; Zufferey et al., 2007). Moreover, recent data suggest adolescent AOD use may cause alterations in the structure and function of the developing brain (Jacobus et al., 2009; Windle & Windle, 2005). In the long-term, the greater the AOD use, the more likely an adolescent as an adult will experience alcohol dependence and other substance abuse, antisocial behavior, legal problems, vocational problems and unemployment, comorbid disorders, and interpersonal problems with family and friends (Danielsson, Wennberg, Tengström, & Romelsjö, 2010; Hicks, Iacono, & McGue, 2010).

Adolescent Substance Use/Abuse and Aggressive Behavior

There are significant associations between (a) adolescent substance use and (b) adolescent antisocial and aggressive behavior (e.g., Brown, Coyne, Barlow, & Qualter, 2010; Felson, Teasdale, & Burchfield, 2008; Maldonado-Molina, Jennings, & Komro, 2010; van Lier, Vitaro, Barker, Koot, & Tremblay, 2009; Xue, Zimmerman, & Cunningham, 2009). Generally, the greater the AOD use, the more likely an adolescent will demonstrate interpersonal aggression, juvenile offending, or delinquency. Moreover, studies of aggressive and delinquent youth find that they are more likely to drink alcohol, use tobacco, and have substance use problems than are their non-aggressive and non-delinquent peers (Horowitz, Sung, & Foster, 2006; Lennings & Pritchard, 1999). In addition, greater substance use within delinquent populations is associated with more violent offenses and more chronic antisocial behavior (Sealock, Gottfredson, & Gallagher, 1997). Finally, alcohol use and aggression are risk factors for the three leading causes of death among teenagers—unintentional injuries, homicide, and suicide; thus, there is an urgent need for effective interventions addressing both adolescent AOD use and aggression (Centers for Disease Control and Prevention, 2010).

Adolescent AOD by Gender and Race/Ethnicity

According to data from both the 2011 Youth Risk Behavior Surveillance System (Centers for Disease Control and Prevention, 2012) and the 2012 Monitoring the Future study (Johnston et al., 2013), girls and boys in the United States are now equally likely to report alcohol use. Girls and boys also report similar rates of illicit drug use, though girls demonstrate a quicker transition period from initiation to problem use (Ridenour, Lanza,

Donny, & Clark, 2006). In regard to race/ethnicity, epidemiological studies show that AOD use, and AOD-related morbidity and mortality, vary in seemingly paradoxical ways. For decades, non-Hispanic white high school students have been more likely to report (1) drinking alcohol and (2) using illicit substances than their African-American or Hispanic counterparts. Despite lower overall rates of substance use, minority youth demonstrate higher rates of AOD-related morbidity and mortality (Gilliland, Becker, Samet, & Key, 1995; Lee, Markides, & Ray, 1997). Criminal justice problems, socioeconomic polarization, precocious substance use onset, and lack of appropriate treatment options may account for this seeming paradox.

Efficacious Intervention Models for Adolescent AOD

Becker and Curry (2008) conducted a quality of evidence review of RCT's of outpatient interventions for adolescent substance abuse; only three intervention models were deemed efficacious: 1. Ecological family therapies (EFT), 2. Brief motivational interventions (BMI), and 3. Cognitive behavioral therapies (CBT). EFT models view AOD and related teen problem behaviors in the context of multiple interrelated, nested systems, and utilize individualized intervention targets based on the client's social ecology. A large research literature supports the efficacy of EFT's (e.g., Brief Strategic Family Therapy [Robbins, Feaster, Horigan et al., 2011], Contingency Management with Family Engagement Strategies [Henggeler, McCart, Cunningham, & Chapman, 2012], Ecologically-Based Family Therapy [Slesnick, Erdem, Bartle-Haring, & Brigham, 2013], Multidimensional Family Therapy [Liddle, Rowe, Daykof, Henderson, & Greenbaum, 2009], and Multisystemic Therapy [Bourduin, Schaeffer, & Heiblum, 2009]). BMI models aim to increase an adolescent's motivation to reduce substance use, and CBT models aim to modify cognitive processes and beliefs, change specific behaviors in accordance with specific goals, and address environmental contexts that affect thinking and behavior (Becker & Curry, 2008). Both BMI and CBT models have been shown to be efficacious in reducing adolescent AOD and related problems, and appear to be generally as effective in the short to mid-term as are EFT's (Dennis, Godley, Diamond et al., 2004; Henderson, Dakof, Greenbaum, & Liddle, 2010; Slesnick, Erdem, Bartle-Haring, & Brigham, 2013).

Family involvement, a distinguishing feature of EFT's, can be a barrier to receiving intervention. Difficulties in enrollment and retention in family AOD interventions are not uncommon (Hooven, Pike, & Walsh, 2013), and become more pronounced as the at-risk status of targeted youth increases (Alexander et al., 2000; Biglan & Metzler, 1999; Hogue et al., 2002; Nock & Kazdin, 2001; Tolan & McKay, 1996). Enrollment and retention difficulties are especially apparent when intervention is delivered over multiple sessions (McCollister, Freitas, Prado, & Pantin, 2013) or is targeting racial/ethnic minorities (Hooven, Pike, & Walsh, 2013). While EFT's appear to be the better outpatient treatment model for adolescents who are court-referred (Weiss, Han, Harris, et al., 2013) or have more severe substance use and psychiatric problems (Henderson, Dakof, Greenbaum, & Liddle, 2010), EFT's are more expensive and less cost-effective than BMI's and CBT's at low to middle levels of problem severity (Dennis, Godley, Diamond et al., 2004; French, Roebuck, Dennis, et al., 2002; French, Zavala, McCollister et al., 2008). Finally, EFT's are more vulnerable to differential effectiveness from variations across therapists, clients, and settings

in therapeutic alliance (Hogue, Dauber, Stambaugh, Cecero, & Liddle, 2006; Huey, Henggeler, Brondino, & Pickrel, 2000).

Guided Self-Change

Guided Self-Change (GSC; Sobell & Sobell, 2005) is a combined BMI/CBT intervention with several published RCT's supporting its efficacy for addressing AOD problems (Breslin, Li, Sdao-Jarvie, Tupker, & Ittig-Deland, 2002; M. B. Sobell, Sobell, & Gavin, 1995; Sellers et al., 1994; Sellers, Higgins, Tomkins, Romach, & Toneatto, 1991; M. B. Sobell, Sellers, & Sobell, 1990; M. B. Sobell & Sobell, 1990, 1993). GSC employs (a) a motivational client-therapist interactional style (see Miller & Rollnick, 2013), (b) a cognitive-behavioral approach to planning, implementing, and maintaining changes in AOD behaviors (see Kaminer & Waldron, 2006; Magill & Ray, 2009), and (c) a harm-reduction perspective for the treatment of addictive behaviors (see Monti, Colby, Barnett et al., 1999; Ritter & Cameron, 2006). GSC's major treatment components include: (a) weekly self-monitoring of behaviors targeted for change; (b) treatment goal advice, with clients selecting their own goal; (c) brief readings and homework assignments exploring high-risk situations, options, and action plans; (d) motivational strategies to increase clients' commitment to change; and, (e) cognitive relapse prevention procedures.

GSC is intended to be a middle step in a stepped-care model of AOD treatment, above self-change efforts and BMI's, and beneath more intensive interventions such as EFT's or residential approaches (Sobell & Sobell, 2003). While originally developed for use with adults, a growing literature supports GSC's efficacy with English and Spanish speaking teenagers (Breslin, Li, Sdao-Jarvie, Tupker, & Ittig-Deland, 2002; Gil, Wagner, & Tubman, 2004; Martínez Martínez, Pedroza Cabrera, de los Ángeles Vacío Muro, Jiménez Pérez, & Salazar Garza, 2008; Martínez Martínez, Salazar Garza, Pedroza Cabrera, Ruiz Torres, & Ayala Velázquez, 2008). While the general format of our school-based, one-on-one, 5-weekly-session GSC remained the same as the adult version, materials were modified to: (a) make language, illustrations, and examples developmentally appropriate for adolescents, (b) applicable to both AOD use and violence, and (c) address stress, coping, and social skills in relation to high-risk situations. We also allowed GSC to be extended by up to two sessions by participant request (25% of participants requested and received additional sessions).

Current Study

Our first aim was to conduct a randomized, controlled trial (RCT) evaluating the efficacy of our school-based GSC; we hypothesized that adolescents assigned to GSC would demonstrate significantly greater reductions in (a) AOD involvement and (b) aggressive behavior, than adolescents assigned to standard care (SC; i.e., education/assessment/referral-only). Our second aim was to explore (a) gender and (b) race/ethnicity as moderators of treatment response. Our final aim was to examine participants' confidence about and importance of changing\

Method

Participants

Participants were 514 adolescents, aged 14-18-years old (mean age = 16.24 years, SD = 1.16), 41% female (n = 209) and 59% male (n = 305) (see Table 1). Our sample was 57% Hispanic (n=291), 23% African-American (n=118), 6% non-Hispanic white (n=32), and 14% “other” (n=73). Foreign-born teenagers (n=107) made up 21% of the total sample and 41% of the Hispanic subsample.

Recruitment

Participants were recruited during assembly presentations in sixteen of the 57 high schools of the Miami-Dade County Public School system (M-DCPS). M-DCPS is the fourth largest school district in the United States and stretches over 2,000 square miles. The geographical locations of the sixteen participating high schools ranged from rural to suburban to urban. Each of the schools provided secure, private, on-site offices in which the study’s one-on-one assessment and intervention sessions were conducted.

Interested students provided parental telephone contact information. Project staff contacted parents, explained the nature of the study, and requested verbal parental consent. Parents who consented were mailed a written description of the study and two consent forms, one of which was signed and returned postage-paid. Students for whom written parental consent was obtained were screened according to the following inclusion criteria: (1) 14-18 years of age; (2) at least six occasions of alcohol or other drug (AOD) use in the past 90 days, as indexed by the Personal Experience Screening Questionnaire (Winters, 1992); and, (3) at least one act of relational or predatory violence in the past 90 days, as indexed by Ellickson and colleagues adolescent violence measure (Ellickson & McGuigan, 2000; Ellickson, Saner, & McGuigan, 1997). Relational violence included hitting or threatening to hit a family member or someone outside the family; predatory violence included the use of force or strong-arm methods to obtain money or things from people, involvement in gang fights, attacking someone with the intent of seriously hurting or killing them, and carrying a hidden weapon. While participants need not have met diagnostic criteria for a substance use disorder or for conduct disorder to qualify for the study, 19.3% met DSM-IV diagnostic criteria for Alcohol Use Disorder, 17.7% for Substance Use Disorder, and 64% for Conduct Disorder.

Exclusion criteria were: (1) repeated dangerous behavior such as drinking while driving; (2) current suicidal risk as identified using the General Health Questionnaire (Goldberg et al., 1997; Werneke, Goldberg, Yalcin, & Ustun, 2000); (3) significant health problems related to drinking (e.g., withdrawal symptoms, a significant history of blackouts); (4) pregnancy in females, as determined by self-report; and, (5) cognitive impairments or developmental delays, as indicated by school evaluations and educational placement. Using a random number generator (<http://www.random.org/>), qualifying participants were assigned to receive GSC (odd number) or standard care (even number). All participants were assessed at baseline, post-intervention, and 3-and 6-month follow-up contacts, and received a \$15 gift card for each completed assessment. The study’s procedures and human subject protections

were annually reviewed and approved by both our university's Institutional Review Board (IRB) and the Miami-Dade County Public School's Research Office.

Standard Care

School personnel provided a variety of educational lessons intended to prevent the onset of AOD use and violence. With indicated students, school counselors were available to provide brief AOD and/or violence assessments, as well as referral to outside treatment providers. Thus, standard care consisted of education/brief assessment/referral-only, which is the standard of care in schools without a formal substance abuse or violence early intervention program. Standard care participants were assessed on the same schedule as GSC participants.

Treatment Implementation and Fidelity

GSC providers were five master's degree level counselors who initially received two weeks of project specific training using written session-by-session treatment manuals. Role-play exercises evaluated clinical competency in conducting GSC; once judged competent by the clinical supervisor, counselors were assigned participants. All treatment sessions were audio recorded, and weekly, two-hour, group, clinical supervision meetings were conducted in order to maintain adherence and fidelity; 10% of session audio recordings were randomly selected and rated on a 5-point, multi-item GSC adherence scale by undergraduate research assistants blind to the project goals. Ten exemplar sessions and their corresponding adherence items scores, which were derived by consensus rating by the project's investigators, were used to train adherence raters to criterion. Average adherence ratings were 4.25 (SD = 0.59).

Measures

Demographics—Participants reported gender, race/ethnicity, age, grade, and nativity.

Substance use and violent/aggressive behavior—At each assessment point, the Timeline Follow-Back (TLFB; Sobell & Sobell, 1992) yielded past month estimates of: (a) total number of alcohol use days; (b) average drinks per drinking day; (c) maximum number of drinks per drinking day; (d) total number of drug use days; and, (e) total number of aggressive behavior incidents. In regard to drug use days, participants indicated the days on which they used drugs on their own without a prescription, yielding an overall total number of drug use days estimate. While the specific kinds of drugs used were not recorded on the TLFB, 70% of the sample at baseline reported marijuana as their drug of choice. In regard to the measurement of aggressive behavior, participants were provided with a definition and examples of aggressive behavior, which included relational violence (i.e., hitting or threatening to hit a family member or someone outside the family) and predatory violence (i.e., the use of force or strong-arm methods to obtain money or things from people, involvement in gang fights, attacking someone with the intent of seriously hurting or killing them, and carrying a hidden weapon (see Ellickson & McGuigan, 2000; Ellickson, Saner, & McGuigan, 1997). Participants indicated the days on which they engaged in aggressive behavior, yielding an overall total number of aggressive behavior days estimate; the specific

types of violent behavior (e.g., relational violence vs. predatory violence) were not recorded on the TLFB.

The TLFB is a widely used, calendar-based, instrument originally developed to measure alcohol use, but since adapted to measure cigarette use, drug use, violence, gambling, sexual risk behavior, homelessness, binge eating, and mental health issues. Several studies have used the TLFB with children and adolescents and found support for its accurate measurement of teenage drinking, smoking, illicit drug use, and violence (De Sousa & De Sousa, 2008; Dennis, Funk, Godley, Godley, & Waldron, 2004; Donohue, Hill, Azrin, Cross, & Strada, 2007; Helstrom, Hutchison, & Bryan, 2007; King, Chung, & Maisto, 2009; Naar-King, Kolmodin, Parsons, Murphy, & ATN 004 Protocol Team, Adolescent Trials Network for HIV/AIDS Interventions., 2010; Robbins et al., 2008; Timmons Fritz & Smith Slep, 2009; Wagner & McGowan, 2006).

Importance of and Confidence about Changing—Enhanced readiness to reduce or end substance use is a fundamental motivational therapeutic mechanism of change at work in GSC (Sobell & Sobell, 2005). Using a readiness ruler (Sobell & Sobell, 2005), readiness for change was estimated by asking GSC participants “How important is it for you to change your substance use?” and “How confident are you that you will be able to change your substance use?” Both confidence about and importance of making changes in substance use were assessed during sessions 1 and 5 (the final session of the treatment module) on a ruler ranging from 1 (“not at all”) to 100 (“totally”).

Analytic Approach

We used structural equation modeling (SEM-MPlus version 5.1) to longitudinally compare treatment effects (GSC vs. SC participants) on substance use and aggressive behavior (Figure 1). SEM is a state-of-the-science analytic strategy that allowed us to explicitly model the nuanced longitudinal dynamics at play. We were able to examine the immediate impact of treatment at the post-treatment assessment, as well as the impact of treatment through the autoregressive effects from the post-treatment assessment to the 3- and 6-month follow-up assessments. Essentially, we examined whether and how immediate term effects contributed to longer term effects (i.e., indirect and total effects). Following the logic of Rausch, Maxwell, & Kelley (2003), baseline score for substance use and aggressive behavior measures were used as covariates in our treatment comparisons. Cross lagged effects were modeled for all outcome variables. Residual error terms across outcome variables at each assessment time point were correlated. Model fit was evaluated using global fit indices (a non-significant χ^2 , a Root Mean Square Error of Approximation [RMSEA] < .08, a Comparative Fit Index [CFI] > .95, a standardized Root Mean Square Residual [RMR] < .05), as well as more focused indices of fit based on modification indices. Cohen’s *d* values were calculated as effect size indicators (Cohen, 1988; 1992) for main effects.

Data for the covariance matrix were evaluated for multivariate outliers by examining leverage indices for each individual; no outliers were observed. Examination of univariate indices of skewness and kurtosis revealed the presence of non-normally distributed data.

Multivariate normality was evaluated using Mardia's index (86.57 [CR > 1.96]). Further examination of the data revealed that they were not consistent with the most common types of count data distribution (i.e., poisson and negative bi-nomial); we accommodated the non-normality by using robust maximum likelihood estimation methods, specifically Huber-White robust estimation (Angrist & Pischke, 2008; Muthen & Muthen, 2007). Moreover, for each model variable, we computed a dummy variable reflecting the presence or absence of missing data, and correlated it with all other study variables. Findings were consistent with data missing at random (MAR), so missing data were accommodated using the Full Information Maximum Likelihood (FIML) method. FIML has been found to be preferred method of dealing with missing data over multiple imputations (Allison, 2000). Mediation was examined using the logic of the joint significance test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Total effects were examined using the Huber-White robust estimation method (Angrist & Pischke, 2008). Finally, in order to avoid possible model misspecification, formal interaction analyses were pursued to examine possible differences in the model path coefficients as a function of race/ethnicity, gender, or baseline levels of outcome variables (i.e., alcohol, drugs and aggressive behavior). Product terms (Jaccard & Turrisi, 2003) were introduced into the Mplus SEM model for all paths shown in Figure 1. Due to sample size limitations, formal interaction tests for ethnicity were conducted between Hispanics and African-Americans.

Results

Preliminary Analyses

Preliminary analyses addressed possible differences by treatment assignment in baseline demographic and outcome variables; there were no significant differences on any demographic variables thus signifying that the randomization process was effective. With regard to outcome variables, aggressive behavior at baseline was found to be significantly higher ($p < .05$) for the SC group (Mean = 6.74, SD = 8.72) than for the GSC group (Mean = 5.08, SD = 7.54, $F(1,512) = 5.37$, $p = .02$, Cohen's $d = 0.20$, 95% CI: .03-.38). Since baseline data for all three primary outcome variables were included in the formal modeling as covariates, differences across conditions at baseline were accommodated. Additionally, the treatment group was examined for demographic differences between treatment dropouts (attended < 5 sessions) and treatment completers (attended 5 or more sessions). No significant differences between dropouts and completers were found. Overall attrition rates were as follows: 514 participants assessed at baseline, 384 (75%) at post treatment, 297 (77%) at 3-month follow-up and 232 (78%) at 6-month follow-up (see Figure 3). Table 2 presents descriptive statistics for all relevant variables in study.

Primary Analyses

We hypothesized that adolescents assigned to GSC would demonstrate significantly greater reductions in (a) AOD involvement and (b) aggressive behavior than adolescents assigned to SC (see Figure 1). This model fit the data well: non-significant $\chi^2 = 50.09$, (df 99) $p < .18$, CFI = 0.989, RMSEA = 0.019, and SRMR = 0.031. More focused analyses revealed no absolute standardized residuals greater than 1.96 and no modification indices. Table 3 presents the parameter estimates (unstandardized and standardized), SE, 95% Confidence

Intervals and p values for all paths shown in Figure 1. No evidence of cross lagged effects was found, so these effects were not included in the final modeling.

Alcohol Use Outcomes—At the post-treatment assessment, GSC participants reported drinking alcohol on average 1.08¹ days less than SC participants ($p < .05$, Cohen's $d = 0.45$, 95% CI: .24-.66). Also, over and above its immediate impact at post treatment, a delayed treatment effect was observed at the 3-month follow-up assessment—namely GSC participants reported drinking alcohol on average .41 days less than SC participants ($p < .05$, Cohen's $d = 0.20$, 95% CI: .02-.38). Additionally, taking into account both direct and indirect effects (i.e., total effects) the estimated mean difference on drinking days between GSC and SC participants at the 3-month assessment was $-.57$ ($CR = 2.50$, $p < .05$). In other words, since the GSC participants were drinking significantly less frequently than the SC group at post-treatment, this contributed to GSC participants drinking less frequently than SC participants at the 3 month follow-up. However, at the 6-month follow-up, GSC and SC participants no longer differed significantly in drinking days. Finally, GSC and SC participants did not differ on (a) past-month average drinks per drinking day or (b) past-month maximum number of drinks per drinking day at any of the post-treatment assessments.

Drug Use Outcomes—At the post-treatment assessment, GSC participants reported using drugs on average 1.58 days less than those in the SC participants ($p < .05$, Cohen's $d = 0.22$, 95% CI: $-.41$ -.85). Also, over and above its immediate impact at post treatment, a delayed treatment effect was observed at the 3-month follow-up assessment—namely GSC participants used drugs on average 1.31 days less than SC participants ($p < .05$, Cohen's $d = 0.20$, 95% CI: $-.04$ -.77). Additionally, taking into account both direct and indirect effects (i.e., total effects), the estimated mean difference on drinking days between GSC and SC participants at the 3-month assessment was -2.22 ($CR = 3.15$, $p < .05$). In other words, since GSC participants were using drugs significantly less frequently than the SC group at post-treatment, this contributed to GSC participants being less likely to be using drugs than SC participants at 3-month assessment. However, at the 6-month follow-up assessment, GSC and SC participants no longer differed significantly in drug use days.

Aggressive Behavior Outcomes—At the post-treatment assessment, GSC participants reported engaging in aggressive behavior on average 1.64 days less than SC participants condition ($p < .05$, Cohen's $d = 0.23$, 95% CI: $-.32$ -.82). Interestingly, the delayed effect pattern observed for the alcohol and drug use variables at the 3-month assessment did not hold for the aggressive behavior variable ($B = .70$, $p = .34$). Additionally, examination of the total effects indicated that there were no significant mean differences in aggressive behavior between GSC and SC participants at either the 3- or 6-month follow-up assessments.

Baseline Problem Severity as a Moderator of Treatment Effects

We examined baseline (a) total number of alcohol use days, (b) average drinks per drinking days, (c) maximum number of drinks per drinking day, (d) total number of drug use days,

¹All alcohol, drug and aggressive behavior outcome values reported are based on a 30-day time span prior to respective assessment.

and (e) total number of aggressive behavior incidents as conditioners of treatment response. The moderating effects of each baseline variable were examined both within (e.g., alcohol use days outcomes moderated by baseline alcohol use days) and across outcomes (e.g., aggressive behavior outcomes moderated by baseline alcohol use days). The only significant moderating effect was found for participants who reported greater baseline drug use frequency; for every one unit increase in baseline drug use, their post-treatment treatment drug use response decreased by .25 units ($p < .05$), and at 3-month by .27 units ($p < .05$).

Gender and Race/Ethnicity as Moderators of Treatment Effects

Product term interaction contrasts compared the effects of GSC versus SC as a function of gender and race/ethnicity separately. There was no evidence of a moderated treatment effect as a function of either gender or ethnicity; GSC effects appeared to be roughly comparable for males and females, as well as for Hispanics and African-Americans.

Putative Mechanism of Change: Importance of and Confidence About Changing

We conducted an SEM analysis (see Figure 2) to examine whether confidence and importance were associated with immediate and longer term post-treatment alcohol use, drug use, and aggressive behavior outcomes. The model fit the data well: non-significant $\chi^2 = 67.88$, (df 61) $p < .25$, CFI = 0.985, RMSEA = 0.02, SRMR = 0.04, with no absolute standardized residuals greater than 1.96 and no modification indices. Session 1 importance was significantly associated with session 5 importance (unstandardized path coefficient = .43, $p < .05$) and session 5 confidence (unstandardized path coefficient = .25, $p < .05$). Session 1 confidence was significantly associated with session 5 confidence, and session 5 confidence was significantly associated with lower drug use at post-treatment (unstandardized path coefficient = $-.06$, $p < .05$). None of the longer term paths were statistically significant.

Discussion

We tested the efficacy of Guided Self-Change (GSC) for reducing both substance use and aggressive behaviors with a large sample of minority high school students. Immediately after treatment, participants who received GSC demonstrated significantly fewer alcohol use days, drug use days, and aggressive behavior incidents than participants who received standard care (SC). Three months after treatment ended, participants who received GSC continued to demonstrate significantly fewer alcohol use days and drug use days. By six months post-treatment, GSC and SC participants no longer significantly differed on alcohol use, drug use days, or aggressive behavior outcomes. Overall, GSC treatment effects were strongest and longest-lived for alcohol (e.g., post-treatment Cohen's $d = 0.45$ for alcohol, versus 0.22 for drugs and 0.23 for aggressive behavior). With one exception, response to GSC was unaffected by putative moderators including problem severity, gender, or race/ethnicity. The notable exception was drug use problem severity; teens reporting more drug use days at baseline demonstrated less response to GSC. Finally, self-reported confidence about making substance use changes was associated with lower drug use at post-treatment.

Our participants were selected because they reported engaging in alcohol and/or drug use and aggression. Thus, despite being non-treatment-seeking high school students, our sample more resembled a clinical sample than a community sample. That said, this was not a clinical sample in the strictest sense; our study intentionally targeted adolescents in the early stages of problems with substance use and aggressive behavior. As a result, we ended up with what might be most appropriately labeled an early intervention sample. Since GSC was developed as an intervention for AOD problems, rather than for preventing AOD use or for treating AOD dependence, our application of GSC was consistent with its developers' intent. The clinical implication is that GSC can be effectively employed in public schools as a targeted intervention for alcohol, drug, and aggressive behavior problems. Our adaptation of GSC is unique among adolescent AOD interventions by offering an accessible, minimally intrusive, school-based means to mitigate problem behavior in its early stages. GSC provides a middle step in a stepped-care model of adolescent AOD intervention, above self-change efforts and BMI's, and beneath more intensive interventions such as ecological family treatments or residential approaches.

Our finding that GSC reduced the number of days of alcohol use (i.e., a drinking frequency index), but not the number of drinks when drinking (i.e., the drinking quantity indices), has important clinical implications. Among teenagers in the early stages of drinking problems, the motivational or cognitive-behavioral or situational processes associated with resisting drinking, as indexed by number of days of alcohol use, may be more amenable to intervention, than the processes associated with moderating alcohol intake once a drinking episode has begun. Consistent with this notion, underage drinkers consume, on average, more drinks on drinking days than drinkers who are 21-years-old or older (4.9 vs. 2.8 drinks; SAMHSA, 2008). Teenage drinkers seem to be developmentally limited in the extent to which they can slow or stop drinking once they start. Among teenagers already demonstrating early stage drinking problems, this suggests that reducing drinking occasions may be a more developmentally feasible intervention goal than reducing quantity consumed per occasion.

For several decades now, the development of culturally appropriate interventions has been a source of debate in the substance abuse and mental health treatment fields. Numerous studies have demonstrated that a lack of cultural sensitivity has created barriers contributing to disproportionately lower levels of treatment access for minority groups. Moreover, studies of adults receiving substance abuse treatment routinely document low treatment retention rates, particularly among minority clients (e.g., Agosti, Nunes, Stewart, & Quitkin, 1991; Bluthenthal, Jacobson, & Robinson, 2007; Fiorentine, Nakashima, & Anglin, 1999; Hser, Joshi, Maglione, Chou, & Anglin, 2001; King & Canada, 2004; Klein, di Menza, Arfken, & Schuster, 2002; McCaul, Sviki, & Moore, 2001; SAMHSA, 2000; SAMHSA, 2009). Our own results from previous RCT's with Miami-Dade County Public school students are consistent with these findings. Austin and Wagner (2006) reported non-Hispanic White adolescents had significantly higher treatment retention than ethnic minority adolescents.

Our approach to improving culturally appropriate interventions has been to make intervention better and more accessible for all groups. While we have been sensitive to and taken into account cultural differences that may affect response to GSC, we have devoted

even more effort toward making GSC developmentally appropriate for teenagers. Developmental appropriateness has been argued to be among the most important yet least researched constructs influencing the effectiveness of adolescent AOD interventions (Wagner, 2008). While our sample was large enough to examine whether the effectiveness of GSC varied between Hispanics and African-Americans, it was insufficient to examine whether therapeutic mechanisms of change varied between racial/ethnic groups. Research is sorely needed to better understand which agents of change, for which subgroups of adolescents, are most important for lasting and meaningful change.

While rigorously designed and executed, our study had limitations. First, the final assessment contact took place only 6-months post-treatment. Second, we relied entirely on self-report for measuring our target AOD behaviors. While we have no reason to believe participants were under- or over-reporting their alcohol or other drug use, there might have been some bias that might have been detected had we used biochemical verification. Third, our sample was very representative of the adolescent population in Miami-Dade County, but not very representative of other counties in the United States. Hispanics make up 65% of the 2.5 million people living in Miami-Dade County (U.S. Census Bureau, 2011), and Miami-Dade County is the only county in the United States with an immigrant majority (most of whom are Hispanic). Fourth, while we were able to retain 75% or more of the sample from one assessment contact to the next, only one out of every two baseline participants completed the 6-month follow-up. In addition to being predominantly Hispanic and largely immigrant, Miami-Dade's population also is highly transient. We did use a state of the data analytic technique –FIML– for accommodating the missing data. Fifth, we focused on specific GSC mechanisms of change rather than on general psychotherapeutic mechanisms; future research would be greatly enhanced by examining both specific and general therapeutic mechanisms.

Overall, we believe the strengths of our study far outweigh its weaknesses. We conducted a rigorous school-based RCT of GSC with a large sample of minority high school students experiencing problems with substance use and violence. We found support for the efficacy of GSC as a school-based early intervention approach for minority adolescents. Efficacy was unaffected by putative moderators including gender, race/ethnicity, alcohol problem severity, and violence problem severity. Efficacy was affected by drug use problem severity, with lower efficacy among teens reporting more drug use days. These findings contribute to the growing literature on GSC's effectiveness, support its use with heterogeneous adolescent populations reporting substance use and interpersonal violence, and show it can be successfully implemented in high schools as an early intervention approach.

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Notes: N= 514. * $p < .05$. All alcohol, drug and aggressive behavior outcome variables are based on a 30-day time span prior to respective assessment; values on paths represent unstandardized path coefficients, values in circles represent residual terms; dotted lines represent non-significant paths; baseline levels of alcohol, drug and aggressive behavior, as well as age, gender and race/ethnicity were included as covariates for all endogenous variables; residual error terms across outcome variables at each assessment time point were correlated.

Figure 1.
Final SEM Model Results

Figure 2.
Effect of Confidence and Importance of Changing on GSC Outcomes for Treatment Participants (n=279)

Figure 3.
CONSORT 2010 Flow Diagram

Table 1

Demographic Characteristics at Baseline (N=514) by Condition

Characteristics	Treatment Condition (n=279)	Standard Care Condition (n=235)
Gender (% male)	58%	61%
Age (Mean) (range 14-18)	16.14	16.36
Grade (n)		
8 th	11%	4%
9 th	22%	23%
10 th	30%	23%
11 th	20%	22%
12 th	17%	28%
Nativity (Foreign Born)	20%	22%
Race/Ethnicity		
White (non-Hispanic)	9%	3%
Hispanic	56%	58%
African-American	21%	25%
Other	15%	13%
Baseline DSM-IV Diagnoses		
Alcohol Abuse	40%	41%
Alcohol dependence	52%	20%
Drug abuse	54%	45%
Drug dependence	36%	21%
Conduct disorder	53%	46%
Oppositional defiant disorder	1.1%	3%

Table 2

Means and Standard Deviations for Outcome Variables by Condition

	Treatment Condition (n=279)	Standard Care Condition (n=235)
Baseline assessment		
Alcohol - days used	2.42 (2.77)	2.28 (2.56)
Alcohol – mean # drinks/drinking days	3.27 (3.50)	3.64 (4.05)
Alcohol – max # drinks/drinking day	4.79 (5.39)	4.95 (5.54)
Drug Use - days used	5.87 (8.43)	4.49 (7.46)
Aggressive behavior	5.08 (7.54)	6.74 (8.72)
Post-Intervention assessment		
Alcohol - days used	1.23 (2.23)	2.30 (2.48)
Drug Use - days used	3.42 (6.72)	4.30 (7.83)
Aggressive behavior	2.82 (5.36)	4.56 (7.75)
3-month follow-up assessment		
Alcohol - days used	1.01 (1.62)	1.61 (1.89)
Drug Use - days used	2.06 (5.01)	3.72 (8.08)
Aggressive behavior	3.77 (7.35)	3.69 (7.19)
6-month follow-up assessment		
Alcohol - days used	1.32 (2.45)	1.61 (1.89)
Drug Use - days used	3.03 (7.01)	3.52 (7.54)
Aggressive behavior	3.95 (8.40)	2.41 (6.05)

Notes: (a) for descriptive purposes only, and not the best estimates of the means in the context of the multivariate model; (b) all mean values are based on 30-day time span prior to respective assessment.

Table 3

Path Coefficients and Total Effects for Final SEM Model

<i>Direct Effects</i>	B(β)	SE (Std SE)	95% CI	p Value
Condition → Aggressive Behavior				
Post	−1.64 (−.12)	.64 (.05)	−2.89 to −.39	.01
3-Month	.70 (.05)	.74 (.05)	−.74 to 2.14	.34
6-Month	1.47 (.10)	.83 (.06)	−.16 to 3.10	.08
Condition → Alcohol (Days Used)				
Post	−1.08 (−.22)	.21 (.05)	−1.49 to −.68	.00
3-Month	−.41 (−.01)	.22 (.05)	−.84 to .01	.06
6-Month	−.27 (−.06)	.25 (.06)	−.78 to .23	.29
Condition → Drugs (Days Used)				
Post	−1.58 (−.11)	.59 (.04)	−2.74 to −.42	.01
3-Month	−1.32 (−.01)	.58 (.04)	−2.46 to −.17	.02
6-Month	−.02 (−.001)	.65 (.05)	−1.29 to 1.26	.98
<i>Autoregressive Effects</i>				
Aggressive Behavior				
Post → 3-Month	.36 (.33)	.09 (.08)	.20 to .53	.00
3-Month → 6-Month	.42 (.42)	.11 (.11)	.20 to .64	.00
Alcohol (Days Used)				
Post → 3-Month	.15 (.17)	.06 (.07)	.02 to .27	.02
3-Month → 6-Month	.10 (.09)	.11 (.10)	−.11 to .31	.34
Drugs (Days Used)				
Post → 3-Month	.57 (.62)	.10 (.10)	.38 to .76	.00
3-Month → 6-Month.	.67 (.63)	.11 (.10)	.44 to .89	.00
	B(β)	SE (Std SE)	95% CI	p Value
<i>Total Effects</i>				
Aggressive Behavior				
3-Month	.11(.01)	.80(.06)	−1.46 to 1.67	.90
6-Month	1.51(.11)	.90(.06)	−.25 to 3.28	.09
Alcohol (Days Used)				
3-Month	−.57(−.14)	.23(.05)	−1.02 to −.12	.01
6-Month	−.33(−.07)	.27(.06)	−.85 to .20	.22
Drugs (Days Used)				
3-Month	−2.22(−.17)	.70(.05)	−3.60 to −.84	.00
6-Month	−1.50(−.10)	.85(.06)	−3.16 to .17	.08