

The Role of Religiousness on Substance-Use Disorder Treatment Outcomes: A Comparison of Black and White Adolescents

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This study compares 41 Black and 124 White adolescents at intake and discharge from a residential treatment program for substance-use disorders. Study data were obtained as part of a larger study ($N = 195$) that sought to assess the relationship of helping behavior and addiction recovery. This post-hoc analysis aims to identify cultural strengths that may be associated with recovery from substance-use disorders among Black adolescents. Using regression analyses and controlling for the severity of substance use and background variables that distinguish racial groups, religious practices and behaviors at intake were examined. Specifically, Black youth and White youth were compared on treatment outcomes, including alcohol or drug use during treatment, drug craving, 12-Step work, and 12-Step helping. The burden of health and socioeconomic disparities at intake did not disproportionately disfavor Black adolescents. Outcomes related to 12-Step measures were similar between Black and White youth. White adolescents reported higher craving scores at discharge, and Black adolescents were more likely to use drugs during treatment. High levels of religiousness at treatment intake were linked to greater 12-Step work and greater 12-Step helping at discharge. High levels of religiousness at intake were not related to drug use during treatment or to craving scores at discharge. The relationship between intake levels of religiousness and treatment-related outcomes did not differ by race.

Keywords: spirituality, substance-related disorders, African Americans, adolescent, treatment outcomes

In their summary of four studies funded by the National Institute on Alcohol Abuse and Alcoholism, Lowman and Le Fauve (2003) brought to light an open question in the alcoholism treatment field related to race and treatment outcomes. In the studies on which Lowman and Le Fauve reported, the health and socioeconomic disparities between the Black and White adults at intake suggested the Black clients were likely to have poorer outcomes. However, in each of the four studies, Blacks and Whites achieved equivalent outcomes. These findings led researchers to speculate whether Blacks recovered from alcohol-use disorders via different pathways than Whites.

One study, building on the idea that spirituality and religiousness have been predictive of good drinking outcomes (Robinson, Cranford, Webb, & Brower, 2007; Robinson, Krentzman, Webb, & Brower, 2011) and that spirituality and religiousness are strengths in the African American community (Bridges, 2001; Lincoln & Mamiya, 1990; Stewart, 1997), tested whether spirituality and religiousness might counter the ill effects of baseline health and

socioeconomic disparities and improve drinking outcomes more strongly for Blacks than Whites (Krentzman, Farkas, & Townsend, 2010). The study found that Blacks had higher scores than Whites on baseline measures of spirituality (Purpose in Life) and religiousness (Religious Background and Behaviors), suggesting these constructs represent a cultural strength. Further, the study found that increases in spirituality were more strongly associated with achieving 6 months of sobriety for Blacks than for Whites. Increases in religiousness were significantly associated with achieving 6 months of sobriety, but in a manner equivalent by race.

What remains unclear is whether adolescents in treatment for substance-use disorders have similar patterns to the recovery patterns of adults in treatment; that is, whether there are socioeconomic disparities at intake between Black and White adolescents but equivalent posttreatment outcomes, and whether spirituality and religiousness play a role in favorable outcomes in different ways based on race. Although this specific set of questions has not been explored

previously, adolescents in both the community setting and the treatment setting have been surveyed regarding their spirituality, religiousness, and substance use and the differences between Black and White youth on these constructs have been widely reported.

Spirituality/Religiousness: Differences Between Black and White Adolescents

Similar to what has been reported for adult samples, studies of youth have reported that Black adolescents were more religious or spiritual than their White counterparts. This finding has been replicated in both community and treatment populations, using a number of distinct dimensions of *spirituality/religiousness*, suggesting a robust association. For example, in a study of adolescent students in Northern Ohio and Kentucky, researchers found that Black youth attended religious services more often, prayed more often, rated religion as more important, and interpreted the Bible more literally than their White peers (Brown, Parks, Zimmerman, & Phillips, 2001). A more recent investigation with a national sample found that Black adolescents rated the importance of religion higher than did White adolescents (Watt & Rogers, 2007). Similarly, Farmer, Sinha, and Gill (2008) found that Black adolescents participated in religious activities with their families more days per week than White adolescents. Black adolescents in a residential drug-treatment program scored significantly higher than their White peers on a measure of spirituality, which assessed personal religious behaviors such as praying and meditating during stressful times and belief in a higher power (Hawke, Hennen, & Gallione, 2005).

Drinking and Drug Use: Differences Between Black and White Adolescents

The literature presents a pattern of evidence supporting that Black youth drink less alcohol and use drugs less often than their White counterparts. This pattern of lower alcohol drinking and drug use has been found for various measures of drug and alcohol use (e.g., frequency, abstinence, and age at first use) and has been found in research using nationally representative samples and high-risk subgroups. One study employing a large, national sample of youth found that African Americans were more likely to have had their first drink of alcohol at an older age than their peers in other racial/ethnic groups (Dooley, Prause, Ham-Rowbottom, & Emptage, 2005). Other researchers have found that Black youth not only had lower rates of daily cigarette use, binge drinking, and annual marijuana use than White youth, but that this lower-use pattern persisted from 1977 to 1999 (Wallace & Muroff, 2002). Although Watt and Rogers (2007) found that Black youth in a national sample were significantly less likely to use alcohol than their

White peers, these researchers found no differences by race on measures of heavy drinking and drug-use behaviors. Abstinence from alcohol, cigarettes, and marijuana was more common among Black students in another national sample (Wallace, Brown, Bachman, & LaVeist, 2003). In a sample of adolescent girls with histories of incarceration, African Americans were less likely to use marijuana, alcohol, or other drugs in the past 6 months than members of other racial/ethnic groups (Robertson, Xu, & Stripling, 2010). Further, White youth have been found to be more polydrug using than Black youth. White college students use more marijuana, ecstasy, and multiple classes of prescription drugs than Black or Asian college students (McCabe, Morales, et al., 2007). Further, students at historically Black colleges were found less likely to report nonmedical prescription drug abuse than their counterparts at other schools (McCabe, West, & Wechsler, 2007).

Spirituality/Religiousness as a Protective Factor for Drug and Alcohol Use

Various aspects of spirituality and religiousness have been shown to provide a protective function on a range of drug- and alcohol-use behaviors among adolescents. This protective relationship has been supported in research on national samples of youth as well as research on youth in treatment programs. For example, in a large representative sample of twins in Missouri, having a religious affiliation in childhood was associated with lower prevalence of alcohol-dependence symptoms during adolescence (Haber & Jacob, 2007). In the same sample of twins, girls with family histories of alcohol problems had significantly fewer alcoholism symptom counts if they were raised with a religious affiliation. This association was partially supported by the findings of a survey of adolescents in Franklin County, Ohio, in which researchers showed that taking part in weekly religious activities had a negative association with alcohol, marijuana, and cigarette use (Steinman, Ferketich, & Sahr, 2008). Decreases in religious activity were associated with increases in alcohol use in a sample of students in the Midwest who were followed throughout high school (Steinman & Zimmerman, 2004).

In a high-risk group of female adolescents with histories of incarceration, using religion to cope with stressful situations was associated with lower levels of alcohol, marijuana, and other drug use (Robertson et al., 2010). Frequency of religious service attendance was significantly associated with drug abstinence but not alcohol abstinence in a study of adolescents enrolled in drug and alcohol treatment programs in California (Chi, Kaskutas, Sterling, Campbell, & Weisner, 2009). In an analysis of adolescents in treatment based on the parent study employed in the cur-

rent analysis, lifetime formal religious practices predicted favorable treatment-related outcomes, and aspects of this relationship were explained by working the 12-Steps of Alcoholics Anonymous (AA) or Narcotics Anonymous (NA) and by 12-Step related helping behaviors (Kelly, Pagano, Stout, & Johnson, 2011).

Spirituality/Religiousness as a Protective Factor for Drug/Alcohol Use Among African American Adolescents

The beneficial effect of spirituality and religiousness on youths' drug- and alcohol-use behaviors has been found in studies using samples that were exclusively or predominantly African American, and in studies comparing African American adolescents with youth of other racial/ethnic backgrounds. For instance, in a sample of 1,599 African American males drawn from a national survey, spirituality and religiousness were assessed using a scale that measured frequency of attendance at religious services, the importance of religion, and frequency of prayer (Stevens-Watkins & Rostosky, 2010). When the sample participants were high-school aged, the scale was significantly and negatively associated with binge drinking; however, by the time the participants reached young adulthood, the relationship was not significant. Further, this same measure of religiousness was not significantly associated with binge drinking in a multivariable analysis in which the model included age, family connectedness, and friends' substance use.

In a sample of 114 adolescents (98.7% African American) at high risk for substance use and risky sexual behaviors, religiousness was shown to play a protective function in high-risk situations. As peers' risky behaviors increased in number, the odds of using alcohol earlier in life decreased for highly religious youth (Nasim, Belgrave, Jagers, Wilson, & Owens, 2007).

Researchers conducting survey research with national samples have studied the relationship between religiousness and substance use and how this relationship might vary between Black and White youth. For example, Harrell and Broman (2009) found that for Black youth, frequency of attendance at religious services was associated with lower rates of prescription drug misuse; this pattern was not found among White and Hispanic youth in the same study. In another national study, frequency of family religious activities was associated with increased odds of never having used substances for Black youth and for White youth (Farmer et al., 2008).

Factors that might explain the relationship between spirituality and substance use have been explored, with differences found by race. In a study that used a national sample to compare Black and White adolescents, parental monitoring was shown to

mediate the relationship between frequency of religious activities and absence of substance use (i.e., having never used marijuana, drunk alcohol, or smoked cigarettes). Among Black youth, the mediation effect was stronger than among White youth, suggesting a stronger pathway from spirituality/religiousness to parental monitoring to abstinence among Black adolescents (Farmer et al., 2008).

Although the evidence for racial differences in spirituality/religiousness among adolescents has been relatively clear and robust, some interesting findings suggest a more complex association. On average Black youth score higher than White youth on various indicators of religiousness; however, an analysis of only those youth who were highly religious showed that highly religious White youth were more likely to abstain from both marijuana and alcohol than highly religious Black youth (Wallace et al., 2003). Similarly, the odds ratios depicting the frequency of family religious activities and the odds of never having used substances were slightly higher for White adolescents (OR = 1.2 vs. OR = 1.1), but it was not reported whether this difference was statistically significant (Farmer et al., 2008).

Health and Socioeconomic Disparities Among Black and White Adolescents

A number of studies have compared Black and White adolescents on demographic variables, socioeconomic factors, and substance-use risk indicators; however, findings from these studies have been mixed. Findings from one such comparison using a national survey of 12th graders suggested the White youth were more likely than Black youth to have friends and to socialize with people at parties who drank alcohol, smoked cigarettes, and used drugs (Wallace & Muroff, 2002). In contrast to these findings, results from another national survey reported that Black adolescents had more peers who used substances (Farmer et al., 2008).

Other findings reported by Wallace and Muroff (2002) included that White adolescents not only had greater access to marijuana than Black adolescents but also were more likely to think that they would use marijuana in the future. However, these researchers found that Black adolescents were more likely than White youth to be offered drugs while at school (Wallace & Muroff, 2002). Similarly, another study found that Black adolescents reported higher prevalence of drugs and drug dealers in their neighborhoods (Watt & Rogers, 2007).

Negative relationships with parents can portend later trouble with substance use. Farmer and colleagues (2008) found that adolescents report both positive and negative aspects of their relationships with parents. The White adolescents reported a higher level of parental monitoring whereas the Black ado-

lescents reported greater maternal limit-setting (Farmer et al., 2008). Although both groups of adolescents reported conflict with parents, the Black youth reported higher rates of feeling dissatisfied with the way they got along with their parents whereas the White youth reported higher rates of arguments with their parents (Wallace & Muroff, 2002).

Several studies have examined differences in family income and neighborhood characteristics reported for Black and White adolescents. Family incomes were found to be lower for Black adolescents than for White adolescents. Black adolescents were more likely to live in the central city (Watt & Rogers, 2007) and in neighborhoods with high population density (Wallace & Muroff, 2002).

Research has shown that several aspects of education varied between Black and White adolescents, depicting clear racial disparities with Blacks faring more poorly. A comparison of parental education showed the parents of Black youth had attained lower levels of education than the parents of White youth (Wallace & Muroff, 2002). In addition, this research found that Black adolescents were more likely to report higher scores on a range of indicators that suggest negative experiences with school. On average, the Black youth had lower grades and were more likely to have had to repeat a grade or go to summer school than their White peers. As compared with their White counterparts, the Black students in the study sample were less likely to have college plans (Wallace & Muroff, 2002). However, the research showed one exception to the trend: White 12th graders reported disliking school more strongly than their Black peers (Wallace & Muroff, 2002).

Study Aims

In summary, research on adolescents has depicted racial differences for both religiousness and substance use, and such research has reported the beneficial effects of religiousness on substance-use behaviors among multiethnic samples and African American samples. Scholars have studied the question of the comparative effect of religiousness on substance use between Black and White adolescents using large national samples of healthy adolescents in the general population (Farmer et al., 2008; Harrell & Broman, 2009); however, to our knowledge, this question has not been explored among adolescents in treatment for substance-use disorders.

Although largely limited to cross-sectional research, studies on adolescents in treatment for substance use have explored questions of spirituality or religiousness and race. This body of research has explored whether adolescents favor spirituality and 12-Step content when in treatment (Aromin, Galanter, Solhkhah, Dermatis, & Bunt, 2006), has analyzed the racial/ethnic composition of various treatment modal-

ities (Rounds-Bryant, Kristiansen, & Hubbard, 1999), and has studied the role of religiousness and 12-Step attendance on treatment outcomes (Chi et al., 2009; Kelly, Pagano, et al., 2011). Such research has provided evidence that African American youth in treatment had higher levels of spirituality than other race/ethnicity peers (Hawke et al., 2005). However, two critical areas remains unexplored: the role of religiousness on substance-use disorder treatment outcomes in samples of adolescents, and the ways in which that relationship might vary by race.

Given this knowledge gap, the current study had a three-fold purpose. The first purpose was to examine the health and socioeconomic disparities among Black and White adolescents at intake into a residential treatment program for substance-use disorder treatment. The second purpose was to examine the role of religiousness as a predictor of longitudinal outcomes for adolescents in treatment. The third objective was to examine whether the role of religiousness on treatment-related outcomes varies among Black and White youth. Questions to be answered included (a) What health and socioeconomic disparities exist between Black and White adolescents at intake into a residential substance-use disorder treatment program? (b) Do Black adolescents entering substance-use treatment have higher levels of religiousness than their White peers? (c) Are treatment-related outcomes¹ equivalent between Black and White adolescents (as was found among adults with alcohol use disorders)? (d) Does a relationship exist between the participant's level of religiousness at intake and treatment-related variables at discharge (i.e., 2 months post intake)? If so, is this link stronger for Black youth? Outcomes related to treatment in this study included drug use during treatment, drug craving, 12-Step work, and 12-Step helping behavior. Twelve-step programs, such as AA, are mutual-aid groups comprised of individuals with similar addiction problems who help one another achieve and maintain sobriety. The "12 steps" relates to the 12 suggested steps that form the program of recovery central to such groups. Researchers have studied multiple dimensions of 12-step programs to understand the contributions of various aspects of participation. Two such dimensions assessed as outcomes in the current study are 12-step work and 12-step helping behavior. Twelve-step work relates to the extent to which a person has taken the actions recommended in each of the 12 suggested steps. These practices are commonly referred to as "taking" the steps or "working" the steps. Twelve-step helping behavior refers to prosocial behaviors conducted within the context of 12-step circles, at meetings, and among members or with others who are interested in stopping drinking and drug use. These behaviors can include a range of activities helpful to other members, such as listening to them describe a problem, or

helpful to the group, such as setting up chairs before a meeting.

Method

Procedures and Participants

Procedures. Study participants were recruited from 2007 to 2009 at a single site in Northeast Ohio. To be eligible for inclusion, participants had to meet all the following criteria: (a) aged 14 to 18 years, (b) English speaking, (c) stable address and telephone, (d) met *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV;* American Psychiatric Association, 1994) diagnosis of current alcohol dependence or abuse, other substance dependence or abuse, or both, and (e) medically stable. Exclusion criteria included (a) a major chronic health problem other than alcohol or drug use, (b) currently suicidal or homicidal, and (c) expected incarceration in the subsequent 12 months. Participants were referred to substance-use treatment from various sources, with some receiving referrals from more than one source. Referrals were made by juvenile court (83%), mental health professionals (65%), and nonpsychiatric physicians (2%). Each adolescent had a scheduled date for admission to treatment; in the week preceding their admission, potential participants were sent a letter inviting them to participate in the study. Following admission, potential participants received a complete description of the study. Eligible participants signed statements of informed assent and their legal guardian(s) signed statements of informed consent. An initial baseline interview lasting 90 minutes was conducted with each participant within 10 days of the youth's intake to the treatment program. Participants remained in treatment an average of 2.2 months, and 60-minute end-of-treatment interviews were conducted at discharge. Participants received \$25 for completed assessments. All procedures of this study were approved by the Institutional Review Board for human investigation at the University Hospitals Case Medical Center and the research team obtained a Certificate of Confidentiality from the National Institute of Alcohol Abuse and Alcoholism. The study was originally designed to assess helping behavior and its relationship to addiction recovery. The current study was a post-hoc analysis.

Setting. Participants were recruited from the largest adolescent residential treatment provider in a central region of the Midwestern United States. The residential program is an intensive program that is largely centered on the Minnesota Model of addiction treatment (Laudergan, 1982). The site provides a range of therapeutic modalities, including 12-Step facilitated treatment; medication assisted treatment; family, individual, and group therapy; life skills training; relapse prevention; and aftercare.

Participants. The study site admitted new patients from 8 a.m. to 8 p.m. daily. During the study enrollment period, the facility admitted 482 adolescents into treatment. However, the research staff recruited study participants from 8 a.m. to 6 p.m. on weekdays, from 5 p.m. to 8 p.m. one evening, and from 9 a.m. to 5 p.m. on one weekend day. While research staff were recruiting on site, 211 patients were admitted and all these youth were approached for participation. All 211 patients were deemed eligible for study participation; however, 16 refused to participate, yielding an enrollment sample of 195 participants. Because the current study sought to isolate a cultural strength among Blacks in comparison with Whites, nine participants who identified as Latino and 21 who identified as races other than Black or White were not included in the current analysis (one adolescent identified as American Indian, one as Middle Eastern, two as Asian, and 17 as multiracial). In addition, of 132 Whites, eight also identified as Latino, and among 42 Blacks, one youth also identified as Latino. The final sample ($N = 165$) included 124 (75.2%) Whites and 41 (24.8%) Blacks. This sample is unique in the research literature for its assessment of high-risk adolescents with substance dependencies both at intake and at discharge in a residential treatment program.

Measures

Demographic and clinical characteristics were assessed at baseline. Outcomes related to treatment in this study included drug use during treatment, drug craving, 12-Step work, 12-Step helping behavior and spiritual or religious behaviors. These measures were assessed at baseline and treatment discharge (at the end of the 2-month residential treatment period). Presence or absence of a positive drug screen while in treatment was calculated at discharge.

Demographic and clinical characteristics. Demographic and clinical characteristics included the adolescent's age, gender, grade in school, scholastic achievement, presence or absence of a learning disability, history of physical or sexual abuse, and criminal justice involvement (as measured by the Teen Treatment Services Review; Kaminer, Blitz, Burselson, & Sussman, 1998). In addition, data on the youth's parent or parents were collected, including education levels, substance dependency, and if the household was headed by a single parent. An open-ended question was used to assess racial identity, which enabled study participants to respond without the constraints of established categories. Ethnicity was asked as a separate closed-ended question, allowing participants to identify as Latino or not.

Substance-use severity. These characteristics included current number of substance dependency diagnoses (assessed using the Mini International

Neuropsychiatric Interview-Plus; Sheehan et al., 1998); past number of treatment episodes (assessed using the Health Care Data Form; Larson, Shepard, Zwick, & Stout, 1997; Zywiak et al., 1999), and readiness to change (measured using the University of Rhode Island Change Assessment scale; DiClemente, Schlundt, & Gemmell, 2004; Dunn, Neighbors, & Larimer, 2003).

Religious and spiritual behaviors. Religiousness and spirituality are related constructs largely understood to be multidimensional (Connors, Tonigan, & Miller, 1996; Hill & Hood, 1999; Johnson & Robinson, 2008). In the research literature, dimensions of spirituality and religiousness have included purpose in life; daily spiritual experiences; perceptions of the nature of God; religious or spiritual coping; forgiveness of self and others; communal religious practices, such as worship service attendance; and private religious practices, such as personal prayer, meditation, and reading holy writings (Fetzer Institute/National Institute on Aging Working Group, 1999; Robinson et al., 2007; Robinson et al., 2011). The *religiousness/spirituality* variable used in the current analysis assessed a range of religious or spiritual behaviors. Religious or spiritual behaviors have been shown to have a favorable effect on drinking outcomes in samples of adults with alcohol use disorders in studies that have explored these practices as independent of the effects of AA (Robinson et al., 2007; Robinson et al., 2011) and in studies that have explored these practices specifically as the effects of AA participation (Kelly, Stout, Magill, Tonigan, & Pagano, 2011; Krentzman, Cranford, & Robinson, 2012).

In the current study, religious and spiritual behaviors were assessed with the 14-item Religious Background and Behaviors questionnaire (RBB; Connors et al., 1996). The instrument was developed for use among adults with alcohol use disorders (Connors et al., 1996) to test the relationship between religiousness or spirituality and the Twelve-Step Facilitation intervention used in the multisite alcohol-use-disorder intervention study Project MATCH. Items for the RBB encompass a range of spiritual or religious behaviors described in the research literature. The first item inquires about the respondent's belief in the transcendent; responses use a 5-point Likert scale, ranging from *atheist - I do not believe in God* (coded 1) to *religious - I believe in God and practice a religion* (coded 5). Items 3 through 8 measure the respondent's religious behaviors in the past 3 months, such as thinking about God, prayer, meditation, attending worship services, reading holy writings, and having direct experiences of God. These items are rated on an 8-point Likert scale, whereby 1 equals *never* and 8 equals *once a day or more*. Items 9 through 14 refer to lifetime religious behaviors and are

rated on a 3-point Likert scale, whereby 1 equals *never*, 2 equals *past only*, and 3 equals *past and current*. The RBB has shown good internal consistency in samples of adults with substance-use disorders (Cronbach's alphas of .85 and .86; Connors et al., 1996). Test-retest correlations have also been reported as high in an adult sample ($r = .94$; Connors et al., 1996). The RBB measure was used in the parent study in a sample that included the participants in the current analysis along with 30 additional multiethnic participants, providing evidence that lifetime religiousness predicted some 12-Step variables and some substance-use disorder treatment-related outcomes (Kelly, Pagano, et al., 2011). In addition, the RBB was used with a subsample of the Project MATCH dataset to examine the differences in spirituality and religiousness among Black and White adults with alcohol-use disorders (Krentzman et al., 2010). Krentzman and her colleagues found the RBB scores were significantly higher for Blacks than for Whites in their study sample (Krentzman et al., 2010). Cronbach's alpha for the current sample was .87.

Treatment-Related Outcomes

The current study assessed adolescents at intake and at discharge from a residential treatment program for substance-use disorders. Given that the youth were living in a residential treatment program during the study period, traditional treatment outcomes (e.g., frequency and intensity of drug and alcohol use over time) were inappropriate for this study and, therefore, were not assessed. Consequently, we selected proximal indicators of favorable treatment-related outcomes for analysis. For example, two measures of 12-Step affiliation were selected for analysis based on research showing an association of 12-Step behaviors with improved alcohol-use outcomes, recovery, and abstinence among adolescents (Chi et al., 2009; Kelly, Brown, Abrantes, Kahler, & Myers, 2008). In the current study, variables representing two types of 12-Step participation were assessed at discharge to measure (a) 12-Step helping behaviors and (b) the extent to which the respondent practiced the 12-Steps. Two substance-related outcomes were selected as those which would be relevant at discharge from a residential treatment program: (a) a measure of the physiological and psychological phenomenon of craving for drugs, alcohol, or both, and (b) a measure of substance use (i.e., drug or alcohol) during treatment.

12-Step participation. Twelve-step helping was assessed using the 12-item Service to Others in Sobriety (SOS) measure (Pagano et al., 2010; Pagano et al., 2009). SOS items were derived from the AA literature, the research literature on altruism, and focus groups conducted with AA members. The helping behaviors assessed by the instrument were congruent

with altruism theories and represented behaviors indicative of kindness and consideration; and the situation in which the help given is voluntary, beneficial to others, intentional, and provided without expectation of reward (Pagano et al., 2010). Specifically, SOS items reflect acts of good citizenship as a member of a 12-Step program (e.g., putting away chairs at meetings), formal service positions in 12-Step programs (e.g., donating money, public outreach), and 12-Step activities involving the transmission of a member's personal experiences to another (e.g., a member sharing his or her personal story with another alcoholic, sharing his or her progress with step work). SOS items referred to helping experiences within the past month and responses were rated on a 5-point Likert-type scale, ranging from *rarely* (1) to *always* (5). A single item measured the respondent's subjective rating of helpfulness of AA: "Overall in the past month, how much did helping other alcoholics help you to not drink or use drugs?" This single-item rating has been used in samples of substance-dependent individuals (Pagano et al., 2009; Tonigan, Connors, & Miller, 2003). In a sample of adults with alcohol-use disorders, Cronbach's alpha for the SOS measure was reported as .92 and test-retest correlations as .94. The SOS scale correlated positively with a measure of other-oriented empathy and a measure of duration of sobriety; the SOS correlated negatively with a measure of narcissism, providing evidence for convergent validity (Pagano et al., 2010). In an analysis using the full sample derived from the parent study, SOS was found to mediate the relationship between lifetime religiousness and reduced substance craving (Kelly, Pagano, et al., 2011) and to mediate the relationship between lifetime religiousness and entitlement, as measured by a subscale of the Narcissistic Personality Inventory (Kelly, Pagano, et al., 2011). The Cronbach's alpha reported for that study was .88. Cronbach's alpha for the current analysis was .90.

The General AA Tools of Recovery scale (GAATOR) was used to measure 12-Step program involvement (Tonigan, Miller, & Vick, 2000); specifically, the extent to which the respondent practiced the 12 steps. Each item on the questionnaire assesses experience with each of the 12 steps of recovery. Although the 12 suggested steps were originally articulated by AA, the questionnaire can be applied to any 12-Step program such as NA or Cocaine Anonymous. Items referred to experiences during the previous 90 days. Responses used a 4-point Likert scale ranging from *definitely false* (1) to *definitely true* (4). Items included, "I have taken a daily inventory of my behavior" and "I have shared my personal inventory with another person." Research with a sample of 66 adults entering inpatient treatment

for substance-use disorders (73% male) reported a Cronbach's alpha of .92 (Montgomery, Miller, & Tonigan, 1995). At baseline and at end-of-treatment in that study, Montgomery and colleagues found significant positive correlations between 12-Step helping and step work ($r = .52$ and $.50$, respectively, $p < .001$). Cronbach's alpha for the current sample was .93.

Alcohol- or drug-related outcomes. Craving severity was assessed using the 14-item Adolescent Obsessive Compulsive Drinking Scale (A-OCDS; Deas, Roberts, Randall, & Anton, 2002). A-OCDS is a self-report questionnaire that detects obsessive thoughts about alcohol or drugs, compulsive drinking or compulsive drug using behaviors, and the extent to which the respondent experiences distress caused by these thoughts (Deas et al., 2002). A-OCDS items referred to experiences of the past week. Twelve items (i.e., Items 1 to 4, 6 to 11, 13, 14) use a 5-point Likert scale, ranging from *none/never* (0) to *always/extreme* (4). Responses for the two remaining items (Items 5, 12) are rated on a 6-point Likert scale, ranging from *never/no thoughts* (0) to *always* (5). In previous research, the A-OCDS was used in samples of adolescents and was shown to correlate significantly and strongly with other measures of craving (e.g., subjective ratings of alcohol craving in response to an alcohol cue), providing support for the measure's construct validity (Thomas & Deas, 2005). Cronbach's alpha for the current sample was .90.

A dichotomous measure of drug use during treatment (i.e., *drug use during treatment* or *not*) was derived from urine toxicology screens, which were part of established clinical procedures and routinely assessed for all participants over the course of the 60-day residential treatment period. Urine screens tested for the presence of amphetamines, opiates, cannabinoids (THC), cocaine, and phencyclidine (PCP). Cutoff concentrations are listed as nanograms per milliliter for the following drugs: THC (50 ng/ml), opiates (300 ng/ml), PCP (25 ng/ml), and amphetamine (1000 ng/ml). Youth were considered to have had a positive substance use screen if any of the five drugs were detected in urine samples. At the end of treatment, craving and positive drug screens were not significantly correlated ($r = -.06$, $p = .51$).

Statistical Analysis

Demographic and clinical differences among participants were evaluated using the student's *t* test, the Wilcoxon-Mann-Whitney test, or the chi-square test depending on the type of variable (continuous, ordinal, or categorical) under consideration. Fisher's exact test was used when cell counts were less than five, and the Wilcoxon-Mann-Whitney test was used when continuous outcomes were not normally

distributed (e.g., in the case of the variables calculating the number of arrests and number of felonies).

Two types of regression analyses were used to test a differential benefit of religiousness on outcomes: (a) hierarchical multiple regression or (b) logistic regression. In both cases, covariates and main effects were entered first and followed by the interaction term. Baseline covariates included substance-use severity variables (readiness to change, number of baseline substance use dependency diagnoses and number of previous treatment episodes), gender, and history of sexual abuse. The covariate for history of sexual abuse was statistically different by race and by outcome. Statistical analyses were performed using SPSS, version 17.0.

Results

Sample Description

Table 1 shows the sample profile at intake. Approximately half of participants were female (52.1%), 24.9% were African American, and participants' average age was 16.2 years. Approximately half of the adolescents were from households headed by a single parent (48.5%), and about half had parents with a history of substance dependency (58.2%). The majority of the sampled youth entered treatment with a substance dependency (99%) and 60% had comorbid alcohol dependency. Most in the sample identified as spiritual (38.8%) or religious (32.7%).

Health and Socioeconomic Disparities Between Black and White Adolescents at Intake

As compared with White participants at intake, Black study participants were more likely to live in a household headed by a single parent (65.9% vs. 42.7%), and were more likely to have a parent who had dropped out of high school (21.1% vs. 6.7%). Criminal justice involvement was similar by race with the exception of assault cases, which were more often a part of the criminal justice histories of Blacks than Whites (34.2% vs. 17.7%, respectively). Whites were more likely to be stimulant dependent (34.2% vs. 0%), cocaine dependent (37.5% vs. 0%), narcotic dependent (41.7% vs. 0%), hallucinogen dependent (34.2% vs. 15.0%), and tranquilizer dependent (27.5% vs. 0%); therefore, Whites reported more total substance-use diagnoses (4.4 vs. 2.5) and prior treatments (1.3 vs. 0.5). White youth were more likely to report histories of sexual (12.2% vs. 28.2%) and physical (7.3% vs. 25.0%) abuse.

Comparison of Religiousness by Race

As shown in Table 1, Blacks were more likely than Whites to identify as spiritual and religious and no Blacks identified as atheist or agnostic. Black adolescents scored significantly higher than Whites on the religiousness score at intake [$t(163) = 4.42, p < .001$].

Treatment-Related Outcomes by Race

Table 2 displays treatment outcomes of the sample. While in treatment, a majority of Black adolescents (73.2%) had a positive urine screen as compared with 42.7% of Whites. This difference was statistically significant [$\chi^2(1) = 11.41, p < .01$]. To investigate if this finding was a function of Blacks being tested more often while in treatment, a t test was computed to determine whether the number of drug tests administered differed by participants' race. We found Whites received more drug tests on average over the 6 months of treatment (average of 75 drug tests per White participant as compared with an average of 64 drug tests per Black participant [$t(163) = -2.07, p < .05$]). Therefore, although tested less frequently, Black participants were more likely to test positive for drug use during treatment.

At discharge, Whites had higher craving scores than Blacks [$t(146) = -2.88, p < .01$]. Twelve-step program involvement and 12-Step helping scores at discharge did not differ by race.

Religiousness and Treatment-Related Outcomes by Race

Table 3 shows the main effects of religiousness and racial group in relation to treatment-related outcomes. Controlling for baseline covariates, results showed that baseline religiousness was not a significant predictor of drug use during treatment or of drug-craving intensity. However, religiousness was a significant predictor of both 12-Step helping and step work. For every one unit increase in baseline religiousness, degree of 12-Step work at discharge increased by .182, controlling for all other variables in the model. For every one unit increase in baseline religiousness, 12-Step helping increased by .101, controlling for all other variables in the model. The interaction terms in all models—religiousness as a function of Black race—were not statistically significant for any of the four outcome variables; therefore, the table displays main effects only.

RELIGIOUSNESS & SUBSTANCE-USE OUTCOMES OF BLACK & WHITE YOUTH

Table 1
Demographic, Clinical, & Religious Characteristics at Admission by Race

Demographic Variable	Categorical Level	Total (N, %) 165 (100%)	Race	
			White 124 (75.2%)	Black 41 (24.9%)
Age	<i>M (SD)</i>	16.2 (1.1)	16.2 (1.0)	16.1 (1.2)
Gender	Female	86 (52.1%)	69 (55.6%)	17 (41.5%)
Grade in School	7th – 8th	9 (5.6%)	4 (3.3%)	5 (12.8%) ***
	9th – 10th	89 (55.3%)	61 (50.0%)	28 (71.8%)
	11th +	63 (39.1%)	57 (46.7%)	6 (15.4%)
Scholastic				
Achievement	Poor	108 (67.1%)	81 (66.4%)	27 (69.2%)
	Average	37 (23.0%)	25 (20.5%)	12 (30.8%)
	Above Average	16 (9.9%)	16 (13.1%)	0 (0.0%)
Learning Disability	Yes	22 (13.3%)	17 (13.7%)	5 (12.2%)
History of Abuse	Sexual	40 (24.2%)	35 (28.2%)	5 (12.2%)*
	Physical	34 (20.6%)	31 (25.0%)	3 (7.3%)*
Legal History	Number of Arrests	2.7 (2.5)	2.8 (2.7)	2.2 (1.4)
	Number of Felonies	0.4 (1.0)	0.4 (1.0)	0.3 (0.9)
	History of Assault	36 (21.8%)	22 (17.7%)	14 (34.2%)*
	History of Robbery	12 (7.3%)	7 (5.7%)	5 (12.2%)
Single Parent Household				
Yes	80 (48.5%)	53 (42.7%)	27 (65.9%)*	
Parental Substance Dependency				
Yes	96 (58.2%)	75 (60.5%)	21 (51.2%)	
Parental Education				
Some High School, or Less	HS Diploma / GED	16 (10.1%)	8 (6.7%)	8 (21.1%)*
	Associates' / Trade School	47 (29.7%)	35 (29.2%)	12 (31.6%)
	Bachelors' / Graduate School	49 (31.0%)	38 (31.7%)	11 (28.9%)
		46 (29.1%)	39 (32.5%)	7 (18.4%)
Clinical Variable				
Substance Dependency				
Yes	Stimulants	158 (98.8%)	118 (98.3%)	40 (100%)
	Cocaine	41 (25.6%)	41 (34.2%)	0 (0.0%)* **
	Narcotics	45 (28.1%)	45 (37.5%)	0 (0.0%)* **
	Hallucinogens	50 (31.3%)	50 (41.7%)	0 (0.0%)* **
	Inhalants	47 (29.4)	41 (34.2%)	6 (15.0%)*
	Marijuana	9 (5.6%)	9 (7.5%)	0 (0.0%)
	Tranquilizers	149 (90.3%)	109 (87.9%)	40 (97.6%)
	Total Number of Substance Dependencies (<i>M, SD</i>)	33 (20.6%)	33 (27.5%)	0 (0.0%)* **
	3.9 (1.8)	4.4 (2.1)	2.5 (0.6)* **	
Number of Past TX Episodes				
<i>M (SD)</i>	1.1 (1.1)	1.3 (1.1)	0.5 (0.8)* **	
Alcohol Dependency	Yes	99 (60.0%)	86 (69.4%)	13 (31.7)* **
Religious Variable				
Religion	Atheist	16 (9.7%)	16 (12.9%)	0 (0.0%) ***
	Agnostic	12 (7.3%)	12 (9.7%)	0 (0.0%)
	Unsure	19 (11.5%)	18 (14.5%)	1 (2.4%)
	Spiritual	64 (38.8%)	45 (36.3%)	19 (46.3%)
	Religious	54 (32.7%)	33 (26.6%)	21 (51.2%)
RBB Score	<i>M (SD)</i>	28.6 (14.4)	26.1 (14.4)	36.0 (11.7) ***

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 2
Alcohol or Drug Outcomes at Treatment Discharge by Race

Variable		Total 165 (100%)	White 124 (75.2%)	Black 41 (24.9%)
Drug Use During Treatment	% Yes	83 (50.3%)	53 (42.7%)	30 (73.2%) **
Craving	A-OCDS (<i>M, SD</i>)	9.0 (8.7)	9.8 (9.2)*	5.9 (5.9)
AA Affiliation	GAATOR (<i>M, SD</i>)	72.6 (11.2)	72.2 (10.7)	74.2 (13.0)
AA Helping	SOS (<i>M, SD</i>)	36.0 (8.2)	36.5 (8.1)	34.1 (8.4)

Notes. A-OCDS = Adolescent Obsessive Compulsive Drinking Scale; GAATOR = The General AA Tools of Recovery scale; SOS = Service to Others in Sobriety; **p* < .05 ***p* < .01 ****p* < .001

Table 3
Main Effects of Race and Baseline Religiousness on Drug Craving, 12-Step Work, 12-Step Helping, and Drug Use at Treatment Discharge^{ab}

Continuous Outcome DV		β	SE	<i>b</i>	<i>p</i>
Craving	Black Race	-.901	.911	-.078	.324
	Religiousness	-.048	.050	-.080	.332
12-Step Work	Black Race	1.014	.958	.069	.291
	Religiousness	.182	.061	.232	.003**
12-Step Helping	Black Race	.681	.803	.063	.397
	Religiousness	.101	.046	.174	.029*
Dichotomous Outcome DV		OR	CI (Lower)	CI (Upper)	<i>p</i>
Drug Use During Treatment	Black Race	1.643	1.081	2.499	.020*
	Religiousness	.993	.970	1.015	.518

^a Covariates included in the models, but not shown in the table, include readiness for change, total number of substance use diagnoses, total number of prior chemical dependency treatment episodes, gender, history of sexual abuse and the baseline level of the outcome variables

^b Interaction term, Black x baseline religiousness score, was subsequently added to the main effect models but is not shown in the table due to lack of significance

* *p* < .05 ***p* < .01 ****p* < .001

Other main effects were significant. The variable for Black race was the only significant predictor of having a positive drug test. The odds for Black participants to test positive for drugs was 1.6 times higher than those of White participants (*p* < .05). Gender significantly predicted both 12-Step outcomes. On average at treatment discharge, girls scored 5 points higher than boys on step work ($\beta = 5.0, p < .01$), and girls scored nearly 3 points higher than boys on the 12-Step helping score ($\beta = 2.8, p < .05$), controlling for all other variables in the model.

Attrition Analysis

Of the 165 youth in the study sample at baseline, 17 did not complete the final assessment at treatment discharge. An attrition analysis was conducted to compare participants who were and were not assessed

at discharge. This analysis showed no differences between the two groups in terms of grade in school, learning disability status, history of abuse, legal history, single-parent household status, number of previous treatment episodes, baseline readiness to change, baseline craving scores, baseline scores on steps worked, or baseline scores on 12-Step helping. Participants missing the discharge assessment were more likely to be Black, to be male, to be older, and to have fewer diagnoses of substance dependency. Of the 17 missing cases, nine Blacks (22%) were absent versus eight Whites (6.5%; *p* < .01), and 12 males (15.2%) were absent versus five females (5.8%; *p* < .05). In addition, participants absent from the discharge assessment tended to be older in age (16.7 years vs. 16.1 years; *p* < .05), and to have had fewer diagnoses of substance dependency (2.8 diagnoses vs. 3.9 diagnoses; *p* < .01). Logistic regression was

used to examine a dichotomous variable representing *present/absent* at the final assessment. When this variable was regressed on race, gender, age, and number of diagnoses for substance dependency; older age was the only significant predictor of missing the assessment (OR 1.9, $p < .05$).

Discussion

This study yielded four main findings. First, health and socioeconomic differences existed by race among this sample of adolescents, and the burden of the disparities were shared (in some ways) among Blacks and Whites. Second, Black adolescents in this study had higher scores on the measure of religious behaviors at baseline and were more likely to rate themselves as religious or spiritual than were their White counterparts. Third, no differences were found between races on the 12-Step-related treatment outcomes, but Whites had higher craving scores and Blacks were more likely to use drugs while in treatment. Fourth, participants' religiousness at intake was a significant predictor of 12-Step behaviors, including step work and helping others; however, baseline religiousness was not a significant predictor of either drug use during treatment or substance craving at discharge. Moreover, the relationship between intake religiousness and treatment-related outcomes did not vary among Black and White adolescents.

Unlike the research with adult samples, in which baseline health and socioeconomic disparities consistently disfavored Blacks (Lowman & Le Fauve, 2003), the current study showed that the burdens related to various disparities were divided between Blacks and Whites. Our findings that Blacks participants were more likely to come from single-parent households, and were more likely to have parents with lower levels of education were consistent with previous research (Wallace & Muroff, 2002). As compared with Black participants, Whites in our sample were more likely to have a greater number of previous treatment episodes for substance dependency. In addition, Whites in this study were more likely to have histories of physical or sexual abuse. Whites were more likely to have histories of polysubstance use than Blacks, which is also consistent with earlier research (McCabe, Morales, et al., 2007; McCabe, West, et al., 2007). Possible explanations for these differences between adult and adolescent samples may be the result of alcohol versus drug dependency, developmental differences between adults and adolescents, or cultural differences in drug-use behavior. Drug-use behavior might have accounted for racial differences in treatment-related outcomes. For example, it is possible that more frequent polydrug dependencies among White adolescents were related to our finding

of significantly higher drug craving scores at discharge among Whites than Blacks. Further research could clarify these relationships.

In the current study sample, Blacks had higher rates of religious behaviors and beliefs than the White study participants, which is consistent with previous research on adolescents (Brown et al., 2001; Farmer et al., 2008; Watt & Rogers, 2007) and adults (Krentzman, Farkas, & Townsend, 2010). Previous research on adults in treatment for alcohol-use disorders had reported equivalent treatment outcomes by race (Lowman & Le Fauve, 2003). However, our findings showed that although 12-Step outcomes were equivalent by race, substance-use outcomes were not: Black adolescents used drugs more often during treatment and White adolescents had higher craving scores at discharge.

Religiousness was found to predict 12-Step behaviors, as has been found in previous research on adolescent samples (Chi et al., 2009; Kelly, Pagano, et al., 2011), but did not predict drug-use related outcomes. The way in which religiousness at intake was associated with treatment-related variables at discharge did not vary between Black and White adolescents. In a study of adults with alcohol dependence, Krentzman et al. (2010) found that the ways in which purpose in life changed between baseline and 15-month follow-up predicted abstinence more strongly for Black adults than for White adults. Future research on adolescents should explore how *changes* in religiousness or spirituality predict outcomes, and whether such differences vary by race.

This study found that for both races, high levels of prayer, meditation, attending worship services, reading scripture, and other religious behaviors and beliefs at an earlier period in time seemed to prime individuals for deeper levels of involvement in 12-Step programs at a later point. The instruments used in this study to measure 12-Step behaviors measured depth of involvement in 12-Step programs beyond mere attendance. This involvement translates as a substantial advantage in sobriety outcomes because involvement in the program, such as step work, has been shown to predict better drinking outcomes than 12-Step attendance alone (e.g., Montgomery et al., 1995). Even though adolescents with substance-use disorders may be reluctant to participate in 12-Step groups given differences such as their ages and the average age of adult participants, recent research has shown that 12-Step participation can be helpful for adolescents (Kelly, Dow, Yeterian, & Kahler, 2010; Kelly, Myers, & Brown, 2000). Further, research has indicated that adolescents who are more severely addicted, such as those included in the current study, were more likely to attend and participate in 12-Step programs (Kelly, Myers, & Brown, 2002).

The current study found that at treatment intake, Black youth had higher scores on measures of religiousness than their White counterparts; however, both Black and White youth with higher levels of religiousness had better 12-Step outcomes in an equivalent manner. Some previous studies have shown that religiousness has a strong association with substance use behaviors particularly for White youth (Farmer et al., 2008; Wallace et al., 2003). Even so, higher religiousness among Black youth represents a cultural strength that should not be overlooked in culturally competent counseling and treatment planning. Higher religiousness among Black youth may be associated with other resilient or protective factors, such as the support and structure of family, community, or neighborhood; exposure to role models and community leaders; social and psychological support; political mobilization; and a strong faith base (Amey, Albrecht, & Miller, 1996; Battle & Idler, 2003). To further understand the role of religiousness as a protective factor, counselors should endeavor to gather a greater quantity of specific information about a client's spirituality and religiousness. To that end, counselors should assess spirituality and religiousness using measures such as spiritual genograms (Hodge, 2001), spiritual lifemaps (Hodge, 2005b), and other spiritual assessment tools (Hodge, 2005a). Such instruments can aid in better understanding the nature of religiousness and its accompanying strengths that can be drawn upon for successful treatment and as a foundation for recovery.

Although not a primary study aim, we found one of the control variables to be significant, with a surprising level of magnitude. Girls at discharge had step-work scores that were 5 points higher than the scores of boys ($p < .01$) and girls' 12-Step helping scores were almost 3 points higher than the boys' scores ($p < .05$). These findings are especially important when considered alongside the findings of Kelly et al.'s (2008) study of a sample of 166 adolescents with an alcohol or other drug use disorder, of which 40% was female. Across 8 years of follow-up data, Kelly et al. found that although girls and boys did not differ in AA or NA attendance, the girls in the sample achieved an average of 9 more days of abstinence per year than boys ($p < .001$). The current study in combination with the findings of Kelly et al. suggest that for 12-Step activities and other outcomes adolescent girls achieve more optimal outcomes than boys, indicating that boys in treatment may be at greater risk. Further research is needed to replicate these findings and to tease apart the relationship between 12-Step program involvement, 12-Step program attendance, and abstinence by gender among adolescents. In addition, it would be profitable for future research to explore the

interaction of gender and race to determine if subgroups may be more at risk or more likely to succeed.

This longitudinal study is unique in its assessment of adolescents at highest risk. These are young people who became severely addicted early in life. This demographic group has the highest risk of poor long-term outcomes. Therefore, it is noteworthy to isolate a strength operative within this population. Despite these contributions, the current study has limitations that are important to note. Although this is a longitudinal study, outcomes were assessed at treatment discharge, constituting only one follow-up wave. Until further waves are assessed, outcomes such as drinking and drug use after treatment will not be available for examination. In addition, approximately 30 adolescents in the parent study identified as races other than Black or White, and were excluded from this analysis. As we have reported, Black adolescents were more likely than White adolescents to miss the discharge assessment. However, multivariable analyses of the factors predictive of absence at the discharge interview revealed that race was not a significant predictor of missingness; when other variables were included in the model, only the variable for older age remained a significant predictor.

In summary, at intake to residential treatment for substance-use disorders, Black and White adolescents shared some of the burden of health and socio-economic disparities. This shared burden was in marked contrast to studies of adults in treatment for alcohol-use disorders, in which disparities tended to disfavor Black participants. Similarly, our study diverged from the research on adult samples in that we found that outcomes were not equivalent by race. Although we found outcomes related to 12-Step programs were similar by race, the current study also showed that White adolescents had higher craving scores at discharge, and Black adolescents were more likely to use drugs during treatment. A baseline measure of religious behavior assessed at treatment intake significantly predicted greater 12-Step behaviors at discharge 2 months later, but did not predict craving scores or drug use during treatment. The relationships between baseline religiousness and treatment-related outcomes did not differ by race. The results of this study will be strengthened with replication. Future research should explore the reasons for the differences found between adult and adolescent samples in analyses of the protective role that spirituality and religiousness may play in helping individuals overcome substance-use disorders.

Endnote

1. Outcomes related to treatment in this study include drug use during treatment, drug craving, 12-step work, and 12-step helping behavior.

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