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Spirituality, Religiousness, and Alcoholism Treatment Outcomes: A Comparison between Black and White Participants

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Abstract

This study addresses an unexplained finding in the alcoholism treatment field: despite the health and socioeconomic disparities that exist between blacks and whites at intake, blacks and whites achieve equivalent treatment outcomes. Using Project MATCH data, this study explores religiousness and spirituality as strengths in the African American community that may account in part for equivalent outcomes. Using binary logistic regression, this study found that as purpose in life increased, blacks were more likely to achieve sobriety than whites. This study provides evidence that purpose in life is a cultural strength and an advantage among blacks in achieving sobriety.

Keywords

Spirituality; religiousness; alcoholism; treatment outcomes; race; African Americans

This study addresses an unexplained finding in the alcoholism research field. In alcoholism treatment studies, black and white participants have health and socioeconomic disparities at intake indicating blacks may be vulnerable to poorer outcomes. For example, black alcoholics have been found to have lower education (Brower & Carey, 2003; McKay, Lynch, Pettinati, & Shepard, 2003; Morgenstern & Bux, 2003; Tonigan, 2003), more unemployment (Brower & Carey, 2003; McKay et al., 2003), lower-paying jobs (Tonigan, 2003), more drug use (Brower & Carey, 2003; McKay et al., 2003; Morgenstern & Bux, 2003), and higher drinking severity (Brower & Carey, 2003; Tonigan, 2003) than white alcoholics. However, both groups fare equally well with treatment as evidenced by equivalent levels of drinking frequency and intensity at follow up (Lowman & Le Fauve, 2003). Researchers have been perplexed by these findings, replicated in four alcoholism treatment studies funded by the National Institute of Alcohol Abuse and Alcoholism [NIAAA] (Lowman & Le Fauve, 2003). McCay, Lynch, Pettinati, and Shepard (2003) suggest blacks recover from alcoholism via different pathways than whites, but no one knows precisely how. Differences in motivation, treatment alliance, and social support are thought to offer possible explanations (Brower & Carey, 2003). This study explores a possible moderation effect. It uses a strengths-based framework to recognize spirituality and religiousness as strengths in the African American community. This study hypothesizes race is a moderator of the relationship between religiousness/spirituality and alcoholism treatment outcomes; it hypothesizes that religiousness/spirituality operate differently—more advantageously—in blacks compared to whites.

Evidence for a relationship between spirituality/religiousness and addictions has been documented in the research literature. Five categories of findings are relevant to the current study. First, it has been shown that there is an inverse relationship between spirituality/religiousness and drinking and using drugs (Kendler, Gardner, & Prescott, 1997). Second, spirituality and religiousness tend to increase with substance abuse treatment (Borman &

Dixon, 1998; Piedmont, 2004; Stewart & Koeske, 2005). Third, spiritually-oriented treatment interventions have a favorable impact on substance abuse outcomes (Margolin, Avants, & Arnold, 2005; Sterling et al., 2006). Fourth, clients in substance abuse treatment programs express concerns related to spirituality and religiousness and favor spiritual interventions (Arnold, Avants, Margolin, & Marcotte, 2002; Carroll, McGinley, & Mack, 2000; Dermatis, Guschwan, Galanter, & Bunt, 2004; McDowell, Galanter, Goldfarb, & Lifshutz, 1996).

Fifth, evidence suggests that spirituality, religiousness and recovery from alcoholism may be related. In a series of papers, Piderman, Schneekloth, Pankratz, Maloney, and Altchuler (2007) and Piderman, Schneekloth, Pankratz, Stevens, and Altchuler (2008) reported that spirituality and religiousness increased from baseline to discharge among 74 alcoholics in a three-week outpatient treatment program (2007). In the same sample, increases in private spiritual practices and existential well-being and discharge scores of existential well-being were associated with being sober for one year (2008). Sterling et al. (2007) measured spirituality and religiousness at intake, discharge, and three-month follow up in a sample of alcoholics in an inpatient treatment program. Between intake and discharge, spirituality and religiousness scores increased. At three month follow up, differences were found between those who achieved one month's abstinence and those who relapsed; those who relapsed had lower scores on the Spiritual Experience Index and the Daily Spiritual Experiences Scale than those who did not. Robinson, Cranford, Webb, and Brower (2007) surveyed alcoholics in treatment and found increases from baseline to 6-month follow-up on half of the spirituality and religiousness variables tested including Daily Spiritual Experiences, Purpose in Life, spiritual and religious practices, forgiveness, and Positive Religious Coping. Increases in Daily Spiritual Experiences and Purpose in Life were predictive of no heavy drinking at six months after controlling for AA involvement and gender. Building on this earlier work, Robinson, Krentzman, Pierce, Webb, and Brower (2010) followed a larger sample of alcoholics in and out of treatment. Of the 12 measures of spirituality and religiousness tested, 8 increased from baseline to 6 month follow-up. Furthermore, increases in baseline-to-six-month measures of practices, forgiveness of self, Negative Religious Coping, and Purpose in Life were predictive of subsequent favorable drinking outcomes at 9 months after controlling for AA involvement.

With a focus on health disparities and disadvantages, rarely are cultural strengths in the African American community highlighted. However, many authors recognize the central role of spirituality and religion in African American culture (Bridges, 2001; Lincoln & Mamiya, 1990; Murphy, Melton, & Ward, 1993; Stewart, 1997). The black church has been called the centerpiece of the economic, political, and social life of the black community (Franklin & Moss, 2000), "the womb of black culture," and the birthplace for black social institutions (Lincoln & Mamiya, 1990, p. 17). The role of the black church during the civil rights movement was central; the Southern Christian Leadership Conference was a frontrunner in the movement, and its leader was Martin Luther King, Jr. From the earliest days of Africans in North America, spirituality was a form of social action, community solidarity, and life-sustaining identity. Recent evidence comes from comparative research studies. On measures of spirituality and religiousness, blacks score significantly higher than whites (Heisel & Faulkner, 1982; Levin, Taylor, & Chatters, 1994; Taylor, Chatters, Jakody, & Levin, 1996).

Generally, spirituality has been found to be a protective factor in health and psychosocial research. It is associated with better health and well being outcomes in the general population (Kendler et al., 1997; Koenig et al., 1992; Pressman, Lyons, Larson, & Strain, 1990) and among African Americans specifically (Bowen-Reid & Harrell, 2002; Brome, Owens, Allen, & Vevaina, 2000; Christian & Barbarin, 2001).

Health disparities exist between blacks and whites in the specific area of substance abuse and alcoholism. Only recently have researchers been concerned with the drinking behavior of ethnic minorities. Although a nationwide alcohol survey has been conducted in the U.S. since 1964, it was only in 1984 that the survey emphasized the experience of blacks and Hispanics (Caetano, Clark, & Tam, 1998). The 2000 National Household Survey on Drug Abuse estimates rates of heavy drinking are higher for whites (Galvan & Caetano, 2003) and the National Comorbidity survey found blacks to have significantly lower rates of substance use disorders than whites (Galvan & Caetano, 2003). Rates of complete abstinence from alcohol are higher for blacks (Galvan & Caetano, 2003). Despite lower rates of heavy drinking, lower rates of substance abuse disorders and higher rates of abstinence, blacks suffer a disproportionate amount of the social and physical costs of alcoholism compared to whites. Whites and blacks have similar percentages of traffic deaths that were alcohol related (Galvan & Caetano, 2003; Hingson & Winter, 2003; NIAAA, 1994), despite the fact that the prevalence of drinking and driving in 2001 was lower for blacks (7% compared with 11% for whites; NIAAA, 2002). Other than car crashes, alcohol-related death rates for injuries and accidents and chronic conditions such as liver damage and cancer are higher among blacks than whites (Jones-Webb, 1998; NIAAA, n.d.). Blacks have higher rates of cirrhosis mortality than whites (Caetano, 2003; Galvan & Caetano, 2003). Blacks are more likely to have a coexisting drug dependence than either white or Hispanic alcoholics (Caetano, 2003). Black infants are approximately seven times more likely to be born with Fetal Alcohol Syndrome than white infants (NIAAA, 1994), despite higher abstinence rates among black women. There is higher co-morbidity of drinking and intimate partner violence among blacks and Hispanics than among whites (Caetano, 2003; Schmidt, Greenfield, & Mulia, 2006). Lack of insurance should not be a barrier to alcoholism treatment because alcoholism treatment is subsidized by federal government funds. However, one study found uninsured whites were three times more likely to receive alcoholism treatment than were uninsured blacks (Wu, Kouzis, & Schlenger, 2003).

In this study, spirituality and religiousness are conceptualized and operationalized as separate, but related constructs. *Religiousness* is defined nondenominationally as those public and private practices traditionally associated with institutional worship. These include attending services, prayer, meditation, reading scripture, and other similar activities. *Spirituality* is defined as non-institutionally-based sensations and experiences associated with a connection to a higher power or other force greater than one's self. This study recognizes one dimension of spirituality as the idea of purpose in life. Victor Frankl's logotherapy addresses the sustaining and motivating nature of having a higher, overarching purpose in life (Frankl, 1984). According to Frankl, experiencing purpose in life is the opposite of experiencing existential emptiness. Purpose in life is defined moment by moment and is characterized as self transcendence, self forgetting, and connection with forces outside the self, whether those forces are fulfilling one's higher purpose, or simply connecting with another human being. Therefore, religiousness and spirituality are considered separately in this study, and purpose in life is considered one dimension of spirituality.

It is timely to focus on strengths in the African American community that may account for equivalent alcoholism treatment outcomes despite disparities at intake. This is the first study to explore race as a moderator of the relationship between spirituality and religiousness and alcoholism treatment outcomes. The first hypothesis examined whether race moderated the relationship between *purpose in life* (a component of spirituality, heretofore referred to as "PIL") and sobriety. The hypothesis stated that as PIL increases, blacks would be more likely to achieve six months of sobriety than whites. The second hypothesis examined whether race moderated the relationship between *religiousness* (heretofore referred to as

“RBB”) and sobriety. This hypothesis stated that as RBB increases, blacks would be more likely to achieve six months of sobriety than whites.

Method

Design and Procedure

This investigation is a secondary analysis of public use data from the Project MATCH research study. Project MATCH was a multi-site, randomized control trial that was planned, developed, and executed in the late 1980s and early 1990s (Project MATCH Research Group, 1993). Project MATCH involved 1726 participants and 10 research sites located in diverse regions of the U.S.

Project MATCH was designed to test whether patients with certain characteristics would fare better with certain types of alcoholism treatment (Connors et al., 1994). Three types of treatment were featured in the study: cognitive behavioral coping skills therapy, motivational enhancement therapy, and twelve-step facilitation therapy. The study was conducted on two parallel populations, or arms: outpatients who came from the community and aftercare patients who had completed a recent inpatient treatment experience. Every effort was made by Project MATCH researchers to keep the two arms of the study identical in every other way (PMRG, 1997). Random assignment was achieved using a computerized urn balancing program to ensure even distribution of key variables in each of the arms of the study and in each of the three study treatments. The variables evenly distributed across arms and study treatments were age, gender, race, years of education, relationship/marital status, employment status, prior alcohol treatment, psychiatric severity, and symptoms of alcohol dependence (Tonigan, 2005).

All three treatment types proved equally effective for the population overall (PMRG, 1997) and by ethnicity specifically (Tonigan, 2003). In the subset of Project MATCH used for this study, chi square analyses determined that the three treatment types were equivalent by outcome ($\chi^2(2, N = 414) = 1.19$, n.s.) and by race ($\chi^2(2, N = 414) = 0.18$, n.s.). Therefore, in the current study, subjects assigned to the three treatment types were combined into one analysis.

The Public Use Data Set contains 15 months of data. All Project MATCH participants underwent alcoholism treatment in the first three months. Follow up data is included for a period of one year. Information about drinking was collected at baseline and monthly for 15 months (3 months of treatment followed by 12 months of follow-up). PIL and RBB data were collected at baseline, 3 months, 9 months, and 15 months.

The current study employs a stress, coping, and well being model (Lazarus & Folkman, 1984) to view spirituality and religiousness as coping mechanisms that have the potential to favorably impact drinking outcomes. This study hypothesizes that higher levels of PIL and RBB relate to better drinking outcomes, and that this relationship is stronger for blacks than whites. To answer these questions, data at baseline and months 10–15 is employed. A dichotomous outcome representing six months of continuous sobriety was created (details follow in the measurement section) in order to have an outcome consistent with complete abstinence from alcohol, rather than a measure of reduction in drinking. This approach is consistent with the disease model of alcoholism which recognizes the only solution to alcoholism is daily, 100% abstinence from all addictive substances (Betty Ford Institute Consensus Panel, 2007, 2009).

Participants

Because the present study focuses on race, Project MATCH sites were retained for this study if black participants represented at least 10% of the sample at those sites after Hispanic and Other participants were excluded. The decision to limit analyses to sites with at least 10% African American clients was based on the need to have sufficient African American representation within sites to provide more reliable estimates of the main and interactive effects of race. This inclusion criterion led to the retention of sites 1, 7, and 8 (the Public Use Data Set identified sites by number only). Percentages of black participants at the three sites were 12.8%, 25.6%, and 29.4%, respectively. The total number of participants at the three sites was 527. Cases that were missing data on any of the measures analyzed in the present study were then excluded. This reduced the sample to 414, consisting of 324 whites and 90 blacks. Comparison of the cases eliminated due to missing data and the retained cases revealed they were the same on demographic and baseline study variables.

Measures

The following variables were of primary interest to this study: PIL, RBB, race, and drinking outcomes. Project MATCH provided a wealth of variables from which to identify important control variables. Variables were included as controls if they were significantly different by race and by drinking outcomes, as indicated by t-tests or chi square tests. Variables that met this condition included education and site. A summary of each variable in the multivariate analysis follows.

Outcome

Drinking outcome—The outcome variable created for this study identified those who had achieved 6 months of continuous abstinence from those who did not. This strategy has been used in other alcoholism treatment studies to measure abstinence (see Kaskutas, Turk, Bond, & Weisner, 2003). Participants who reported having zero drinks in each and all of the last six months of the data collection period (months 10, 11, 12, 13, 14, and 15) were classified into a sober group and coded as “1” and all others were coded as “0.” A little over one-quarter of the sample, 98 participants (26.2%), achieved six-months’ continuous sobriety and 276 did not.

Predictors

Race—The Public Use Data Set provides four racial categories: black, white, Hispanic, and other. In this study, only black and white participants are included. Participants self-identified their race.

Purpose in life—This variable is used to represent the concept of “spirituality.” In Project MATCH, the variable was generated using Crumbaugh and Maholick’s (1964) Purpose in Life scale. The scale was developed based on logotherapy, the system of existential therapy developed by Viktor Frankl (Nehemkis, Macari, & Lettieri, 1978). The scale, while entitled “Purpose in Life,” is designed to measure the absence of “existential vacuum.” Existential vacuum is Frankl’s term for what one experiences when one fails to find meaning and purpose in life (Nehemkis et al., 1978).

The Purpose in Live Scale is a 20-item measure with a 7-point Likert-type response format. Each item features anchors at either end of the 7-point continuum and asks participants to “circle the number that would be most nearly true for you” (Nehemkis et al., 1978, p. 125). The middle point (4) is labeled “neutral.” A sample is item 9, for which the stem is: “My life is...” followed by the anchors “empty, filled only with despair,” scored 1, and “running over

with exciting good things,” scored 7. The scores on each item are summed to produce a total scale score with a range of 20–140. Higher scores indicate greater meaning and purpose in life.

Originally validated in the 1960s and 1970s (Crumbaugh, 1968; Crumbaugh & Maholick, 1964; Shean & Fechtmann, 1971), the scale has also been used in more recent research (Lewis, Erlen, DeVito Dabbs, Breneman, & Cook, 2006; Lantz & Gregoire, 2000; Coward, 2003). The older studies found evidence for known-groups validity. Crumbaugh (1968) found the PIL scale to meaningfully differentiate between “normal” and “psychiatric” groups. Shean and Fechtmann (1971) found marijuana users had lower PIL scores than the control group of non-marijuana users.

In more recent studies, Lewis et al. (2006) report Cronbach’s alpha of .91 for their sample of 74 adults with AIDS. Because the Project MATCH Public Use Data Set did not provide item-level data for the measures, it was not possible to calculate Cronbach’s alpha for the scale in this subset of Project MATCH.

Religiousness—This construct was measured in Project MATCH by the Religious Background and Behavior questionnaire, which was developed specifically for the study as a measure of religious behavior (Connors, Tonigan & Miller, 1996). The questionnaire features 13 items. The scale is best described by its developers:

On the 1st item, participants indicate the descriptor that best describes them: atheist, agnostic, unsure, spiritual, religious. On the next 6 items, participants are asked to indicate, on an 8-point Likert scale, the frequency with which they had engaged in the following behaviors during the past year: thought about God, prayed, meditated, attended worship services, read-studied scriptures-holy writings, and had direct experiences of God. The last 6 items tap these domains in terms of lifetime occurrence on a 3-point ordinal scale. The item content was intended to capture behaviors traditionally associated in the literature with religiosity (Connors et al., 1996, pp. 91–92).

The first item was scored 0–4 based on the respondent’s selection ranging from atheist to religious, and then summed with the remaining sections of the instrument. The remaining sections were recoded such that a score of 1=0, 2=1, etc., to establish a scale scoring floor of zero rather than 13. The scores on the items were not standardized before they were aggregated. The possible range on the measure was 0–64. Higher scores meant greater levels of religiousness.

Reliability for the scale in the full Project MATCH sample used Cronbach’s alpha and test-retest correlations (Connors, Tonigan, Miller, 2001). Cronbach’s alpha for the total scale score was (reported at the time of “test” and “retest”) .85 and .86. Test-retest correlations for the total scale score were .97. Because item-level data were not available in the Public Use Data Set, it was not possible to calculate Cronbach’s alpha for the subset used in this study. Evidence for convergent and divergent validity on this measure was reported for the full Project MATCH sample (Connors et al., 2001).

In the subset of Project MATCH employed in this study, PIL at baseline is correlated significantly with RBB at baseline at $r = .135$ ($p < .01$). At 15 months the correlation between the two variables is $r = .204$ ($p < .001$). These correlations, while significant, are low, indicating the two scales are measuring different constructs. Therefore, both PIL and RBB are included in the multivariate analysis.

Controls

Study site—As mentioned, three sites were retained in this subset of Project MATCH. This variable controls for variations that may have occurred between one site and another. One of these variations is “arm of the study.” Project MATCH featured two arms: outpatient and aftercare. In Project MATCH, aftercare participants had better drinking outcomes because they had experienced an inpatient treatment experience before Project MATCH participation. In this subset of Project MATCH, site 1 is an outpatient site, and sites 7 and 8 are aftercare sites. Therefore, it is important to control for site differences. Two dummy variables were created for inclusion in the logistic regression model: site 7 and site 8. Site 1 served as the reference group.

Education—Education was measured as a continuous variable indicating years of education completed at baseline. A “12” indicated respondent was a high school graduate or had earned a GED. The maximum possible years of education was “17” indicating 17 or more years of education. The sample ranged from having 2 to 17 years of education.

Baseline drinking—The variable measuring percent days abstinent at baseline was used as an important covariate because baseline drinking will predict future drinking. Percent days abstinent (PDA) represents drinking frequency. It is a measure of the percentage of days in the previous month when the respondent abstained from alcohol.

Data Analysis

Binary logistic regression tested the hypotheses of this study. To ensure data met the assumptions necessary for logistic regression analysis, univariate and multivariate outliers were examined. Eleven univariate outliers were discovered among individuals who drank more than three standard deviations above the mean for the sample. Multivariate outliers were discovered among 9 individuals who had exceptionally favorable drinking outcomes. It was decided these cases would be retained in the analysis for the following reasons. Project MATCH data were carefully coded and cleaned; therefore, it is unlikely these outliers existed because of keystroke or other error. Both the participants who were high volume drinkers and the participants who achieved exceptionally favorable outcomes were important to include in the sample as representative of genuine drinking behavior; therefore, all outliers were retained in the analysis. Correlations between predictors and covariates were inspected to ensure no problem of multicollinearity. Distributions of cases within and across independent variables were examined to ensure an adequate number of cases for each value and each cell. All interval-level measures were centered prior to the logistic regressions, to improve interpretability of results and to minimize multicollinearity with the interaction effect. Centered variables were used to construct the interaction terms.

Variables were included as covariates in the logistic regression if the variable yielded statistically significant differences by race (whites and blacks) and by outcome (sober and not sober). T-tests and chi square tests were used to assess these relationships.

Three logistic regressions were conducted to explore and compare predictors of the drinking outcome variable and to ascertain the odds ratios and statistical significance of each independent variable and the interaction term. In the first model, the drinking outcome was regressed on main effects of the covariates, the two focal predictors (PIL at 15 months or RBB at 15 months), and the hypothesized moderator (race). Fifteen month measures of PIL and RBB were chosen as they were the most distal measures offered by the Public Use Data Set, and therefore most proximal to the outcome variable. In the second model, the cross product (i.e., interaction term) of the moderator and PIL was entered. In the third model, the cross product of the moderator and RBB was entered. Goodness-of-fit tests of the models

included -2 Log Likelihood, the Hosmer and Lemeshow goodness of fit test, and model chi-square. Variance of the model was assessed using Cox & Snell R^2 and Nagelkerke R^2 . Percentage of occasions when the model could correctly predict the outcome was assessed using the classification table. Statistical significance of effects of predictors was tested in the logistic regression by examining their p values and odds ratios.

Moderator effects were indicated by a statistically significant interaction term (Jaccard & Turrissi, 2003). For the interaction terms that were statistically significant, a second test was run to decompose the interaction. This test, described by Jaccard and Turrissi (2003) is a graphic depiction of the slopes comparing blacks and whites on PIL or RBB. Values of ± 1 SD and ± 2 SD were used to decompose significant interactions.

Results

Sample Characteristics

Sample characteristics are described in Tables 1 and 2. In this subset of Project MATCH, 78.3% of participants are white and 21.7% are black. The mean age of participants is 40.82 ($SD = 10.34$). There is no statistically significant difference in age by race. Participants had a mean number of years of education of 13.24 ($SD = 2.16$). Whites had higher mean years of education than blacks: 13.25 compared with 12.88, and this difference is statistically significant, $t(184.55) = 2.13$, $p = .034$. Males make up 77.1% of the sample and females 22.9%. There is no statistically significant difference in gender by race.

Blacks had significantly higher mean levels of baseline RBB and baseline PIL than whites, (45.22 compared with 37.41 for RBB, $t(412) = -6.17$, $p < .001$; 99.47 compared with 90.67 for PIL, $t(412) = -3.85$, $p < .001$). The mean score of blacks is significantly higher than that of whites for RBB and PIL at 15 months as well: 33.07 compared with 25.89 for RBB, $t(412) = -6.02$, $p < .001$, and 105.32 compared with 100.30 for PIL, $t(412) = -2.07$, $p = .039$.

For the combined sample, PIL increased significantly over time (from 92.6 at baseline to 101.4 at month 15, $t(413) = -8.98$, $p < .001$), while RBB decreased significantly over time (from 39.1 at baseline to 27.4 at month 15, $t(413) = 28.08$, $p < .001$).

In terms of baseline drinking frequency, blacks reported a monthly rate of 25.47 percent days abstinent and whites reported a monthly rate of 28.58 percent days abstinent. In other words, both blacks and whites drank approximately 21 days each month and abstained approximately seven days each month before treatment began. This difference at baseline was not statistically significant. Whites reported 70.89 percent days abstinent at month 15 and blacks reported 74.61 percent days abstinent at month 15. This difference at 15 months also is not statistically significant, indicating that blacks and whites had equivalent outcomes. Chi square tests confirmed that differences between blacks and whites by the dichotomous drinking outcome also were not statistically significant: 26.7% of blacks and 27.2% of whites achieved six months of continuous sobriety.

Evidence for Main Effects (Model 1)

Table 3 displays logistic regression results for all three models. For the first model that included all the predictor variables, the -2 Log Likelihood was 408.68 (9 df , $p < .001$) meaning the model with the 9 covariates included is better fit than the null model, which is the intercept-only model. The Hosmer and Lemeshow goodness of fit test was not significant representing a good model fit and indicating that the observed and expected values are similar for this model. The Cox & Snell R^2 is .165, and the Nagelkerke R^2 is .240 suggesting about 24% of the variation in the outcome variable can be explained by the

variation in the 9 variables. The classification table (not shown) indicated the model can correctly predict the occurrence of six month's continuous sobriety 77.3% of the time.

In this first model, Wald statistics indicated that five variables (education, baseline PIL, Site 8, 15 month RBB, and 15 month PIL) significantly predict the likelihood of achieving six months of continuous sobriety, controlling for all other variables in the model. Based on the odds ratios (e^{β}), for each one-unit increase above the mean in education, participants were 1.145 times (14.5%, $p = .029$) more likely to get sober. Surprisingly, for each one-unit increase above the mean in baseline PIL, participants were .982 times (2%, $p = .017$) less likely to get sober. For each one-unit increase above the mean in 15 month RBB, participants were 1.067 times (6.7%, $p < .001$) more likely to get sober. For each one-unit increase above the mean in 15 month PIL, participants were 1.039 times (3.9%, $p < .001$) more likely to get sober. Participants at Site 8 were 3.5 times more likely to get sober than participants in Site 1, the reference group ($p < .001$).

Purpose in Life Interaction Hypothesis (Model 2)

The second model added the purpose-in-life-by-race interaction term. The -2 Log Likelihood for this model is 404.07 (10 df , $p < .001$), slightly lower than the first model indicating a slightly better model. Hosmer and Lemeshow goodness of fit test is not significant for this model, which indicates a good model fit. The classification table indicated the model can correctly predict the achievement of six month's continuous sobriety 77.1% of the time. This second model accounts for slightly more of the variance than the first model: the Cox & Snell R^2 increased to .174 (a .009 increase) and the Nagelkerke R^2 increased to .253 (a .013 increase).

In the second model, which included the interaction term, seven variables are significant predictors of sobriety: education, baseline PIL, black race, Site 8, 15 month RBB, 15 month PIL, and the interaction term for black*15 month PIL. In this model, controlling for all other variables, for every one-unit increase above the mean in education, participants are 1.147 times (14.7%, $p = .026$) more likely to get sober. For every one-unit increase above the mean in baseline PIL, participants are .981 times (2%, $p = .014$) less likely to get sober. For every one-unit increase above the mean in 15 month RBB, participants are 1.065 times (6.5%, $p < .001$) more likely to get sober. Participants who had treatment at Site 8 are 3.5 times more likely to get sober than participants at Site 1, the reference group ($p < .001$).

PIL at 15 months also is a significant predictor in Model 2. Because this measure is part of the interaction term, however, the interpretation of its relationship to sobriety is different than that of the other main effects in the model. Jaccard (2001) writes that in this instance, "the coefficient associated with [in this study, 15 month PIL] does not represent a 'main effect' but instead represents a conditional effect, i.e., the effect of [15 month PIL] when the values on the moderator variable [in this study, race] are zero" (p. 31). Therefore, the odds ratio on this variable refers to whites in the sample only: for each one-unit increase above the mean on 15 month PIL, respondents who are white are 1.032 times (3.2%, $p < .001$) more likely to get sober.

The interaction term is significant, indicating race is a statistically significant moderator for the degree to which purpose in life relates to sobriety. The odds ratio for the interaction effect, 1.044, indicates that for each 1-unit increase above mean scores in 15 month purpose in life, the odds of blacks getting sober are 4.4% more than they are for whites ($p = .049$).

The significant interaction effect was decomposed in order to better reveal the nature of the interaction (Jaccard & Turrisi, 2003). The visual depiction of the interaction effect (Figure 1) demonstrates that, although higher purpose in life is associated with higher odds of

sobriety for both races, purpose in life at 15 months has a significantly stronger effect on the odds of staying sober for the past six months for black participants than for white participants.

Religiousness Interaction Hypothesis (Model 3)

The main effects of RBB at baseline and 15 months were included in Model 1, presented earlier. RBB at 15 months was significantly related to higher odds of getting sober. The interaction effect for race by RBB at 15 months is shown in Model 3. The -2 Log Likelihood for this model is 408.45 (10 *df*, $p < .001$), slightly lower than the first model. The Hosmer & Lemeshow goodness of fit test is not significant, indicating a good model fit. The classification table indicates the model can correctly predict the achievement of six month's continuous sobriety 77.1% of the time. The Cox & Snell R^2 increased very slightly to .166 (.001 increase) and the Nagelkerke R^2 remained the same at .240 indicating the second model accounts for the same amount of variance as the first model.

Regression results for Model 3 indicate five variables (education, baseline PIL, Site 8, centered 15 month RBB, and 15 month PIL) significantly predict the likelihood of achieving six months of continuous sobriety. Controlling for all other variables in this model, for every one-unit increase in education above the mean, participants are 1.146 times (14.6%, $p = .027$) more likely to get sober. For every one-unit increase in baseline PIL above the mean, participants are .982 times (2%, $p = .015$) less likely to get sober. For every one-unit increase in 15 month PIL above the mean, participants are 1.039 times (3.9%, $p < .001$) more likely to get sober. For every one-unit increase in 15 month RBB above the mean, participants are 1.063 times (6.3%, $p = .001$) more likely to get sober. Participants who had treatment at Site 8 are 3.5 times more likely to get sober than participants at Site 1, the reference group ($p < .001$).

The interaction term was not significant in this model, indicating that race does not moderate the ways in which religiousness relates to sobriety.

Discussion

This study finds that religiousness and purpose in life are related to favorable drinking outcomes for blacks and whites. However, the study finds that race moderates the relationship between purpose in life and drinking outcomes—blacks have an advantage—for every one unit increase in purpose in life, blacks are 4.4% more likely to achieve sobriety than whites. This finding furthers understanding of the impact of religiousness and purpose in life and race on substance abuse treatment outcomes. It is interesting that purpose in life was moderated by race while religiousness was not. For approximately 87% of the sample, religiousness declined over time. This leaves a small subset of the sample (about 6%) for whom religiousness increased (Krentzman, Farkas, Townsend, 2009). This, combined with the relatively small number of African American participants in the sample, may account for the lack of differences by race for religiousness.

Although there are limitations to this study, its findings have implications for theory, practice, policy, and future research.

Study Limitations

This study used secondary data. When data are analyzed for a purpose other than that for which they were originally collected, variables of interest in the secondary study are sometimes suboptimal for the new study's purposes. Generally there is a lack of richness associated with standard racial categories: black, white, Hispanic, Asian, and other. It is

recommended future studies categorize ethnicity and race with more attention to the variations contained within the standard broad categories.

A limitation of this study is the absence of a variable measuring Alcoholics Anonymous participation. Many studies of spirituality and drinking include AA participation as an important covariate (for example, see Robinson et al., 2007 and Zemore, 2007). Indeed, it is a critical variable. AA has a spiritual component and plays a major role in helping alcoholics to stop drinking and stay stopped. Galanter (2007) describes AA as a “spiritual recovery movement” (p. 265). AA participation is a key variable in pathways that include spirituality as it predicts drinking outcomes. AA participation helped Project MATCH participants achieve favorable drinking outcomes (Owen et al., 2003; Tonigan, Connors, & Miller, 1998; Tonigan, Miller, & Schermer, 2002). However, the Project MATCH Public Use Data Set offered only baseline AA participation. AA participation over time was necessary to include the variable more meaningfully. Baseline AA was not included in the present study due to substantial missing data and no difference on this variable by race or by outcome. Future research exploring race as a moderator could analyze AA participation over time and the ways in which it affects and is affected by changes in drinking, purpose in life, and religiousness.

There are limitations in this study in terms of generalizability. First, only three of Project MATCH’s sites were included in this analysis to ensure an adequate number of black participants per site for analytic purposes. However, the subset used in this study is no longer representative of the original Project MATCH sample in terms of its original racial composition. It is important to note that out of 10 original MATCH sites, only 3 met the racial criterion for inclusion in this study, indicating other sites didn’t include many black respondents. Therefore, the subset used in this study can be generalized to all alcoholics only with caution. Finally, research has suggested that Project MATCH’s inclusion and exclusion criteria disproportionately eliminated black participants (Humphreys & Weisner, 2000). All of these considerations affect generalizability and external validity.

Another study limitation concerns reliability. Cronbach’s alphas for the purpose in life and religiousness instruments could not be calculated for this study. This was because the Project MATCH Public Use Data Set did not provide item-level data. Therefore, the reliability of these measures for this sample is unknown.

Implications for Practice

This study found that, for blacks and whites, higher 15 month religiousness and 15 month purpose in life are related to higher likelihood of getting sober. This finding suggests it might be in a patient’s best interest to encourage him or her to access spiritual or religious resources that have been helpful in the past. This finding supports Bliss’s view of spirituality as a multidimensional construct important in the recovery process (2007). Using culturally sensitive and culturally competent approaches, there may be ways at intake to encourage patients to harness religious or spiritual practices. In a study of religiousness, spirituality and health, Matthews et al. (1998) make important recommendations to the clinical community. They recommend practitioners ask patients, “Is your religion (or faith) helpful to you in handling your illness?” and “What can I do to support your faith or religious commitment?” (p. 123). They recommend practitioners encourage patients to “make use of potentially health-promoting religious resources from patients’ own religious traditions” (p. 123). And finally, they recommend referring patients to clergy to supplement treatment. Faith communities can play a major role in the prevention and treatment of alcoholism (Annie E. Casey Foundation, 2004) and the current study supports these recommendations and suggests this advice may be especially important for African American clients, especially as it relates to purpose in life.

The current study found that increases in purpose in life are related to favorable treatment outcomes for all participants, but more so for blacks. Therefore, it seems important for treatment services to help people strengthen their purpose in life. Perhaps a treatment goal can be added for alcoholics focusing on improving purpose in life. Measurable objectives can be articulated to help patients achieve this treatment goal. Purpose in life relates to finding a higher life's purpose, a greater sense of meaning beyond one's self. Purpose in life as a treatment goal has the additional advantage of being phrased in neutral, non-religious language. A number of clients will object to recommendations related to religious ideas. Clients may be more open to cultivating greater life purposes and causes. Encouraging love and nurturing for another or work for a greater good of any kind may help individuals shift focus away from self-seeking and toward these greater purposes. Paradoxically, by shifting the focus away from self, the alcoholic will more likely attain an achievement of great self interest and self preservation—sobriety.

Suggestions for Future Research

In many studies of outcomes of alcoholism treatment, descriptions of sample ethnicity and race are inadequate or missing. Often, the percentage of white participants is reported with no details provided about the non-white participants in the sample. It is important that future studies report race and ethnicity with more precision and attention. It is also important to continue to consider racial and ethnic diversity of participants in treatment studies. In a recent review of research on the effectiveness of Alcoholics Anonymous, it was found that most studies are still conducted with primarily white participants (Krentzman, 2007).

This is the first study to find evidence that race moderates the relationship between purpose in life and drinking outcomes. This idea warrants further qualitative and quantitative research. While there is an abundance of research on disparities, more studies emphasizing strengths and resilience would make welcome contributions. It would be important for future research to explore how black alcoholics uniquely create, sustain, and regain a sense of purpose in life. It would be important to examine the relationship between spirituality/religiousness and drinking outcomes in other ethnic minorities such as Native Americans and Hispanics to see if the results can be replicated with other groups. In addition, other strengths in communities of color, such as social support and social networks, should be studied in their relationship to favorable drinking outcomes. While there are many studies focusing on racially-based health disparities, more research on alcoholism and health disparities would make a strong contribution to the literature.

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References

- Annie, E. Casey Foundation. Faith Matters: Race/ethnicity, religion and substance use. 2004. Retrieved May 14, 2009 from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/ae/66.pdf
- Arnold RM, Avants SK, Margolin A, Marcotte D. Patient attitudes concerning the inclusion of spirituality into addiction treatment. *Journal of Substance Abuse Treatment*. 2002; 23:319–326. [PubMed: 12495793]

- Betty Ford Institute Consensus Panel. What is recovery? Revisiting the Betty Ford Institute Consensus Panel discussion. *International Journal of Mental Health and Addiction*. 2009; 7(4):493–496.
- Betty Ford Institute Consensus Panel. What is recovery? A working definition from the Betty Ford Institute. *Journal of Substance Abuse Treatment*. 2007; 33:221–228. [PubMed: 17889294]
- Bliss DL. Empirical research on spirituality and alcoholism: A review of the literature. *Journal of Social Work Practice in the Addictions*. 2007; 7(4):5–25.
- Borman PD, Dixon DN. Spirituality and the 12 steps of substance abuse recovery. *Journal of Psychology and Theology*. 1998; 26:287–291.
- Bowen-Reid TL, Harrell JP. Racism and health outcome: An examination of spirituality as a buffer. *The Journal of Black Psychology*. 2002; 28(1):18–36.
- Bridges, FW. *Resurrection song: African American spirituality*. Maryknoll, NY: Orbis Books; 2001.
- Brome DR, Owens MD, Allen K, Vevaina T. An examination of spirituality among African American women in recovery from substance abuse. *Journal of Black Psychology*. 2000; 26(4):470–486.
- Brower KJ, Carey TL. Racially related health disparities and alcoholism treatment outcomes. *Alcoholism: Clinical and Experimental Research*. 2003; 27:1365–1367.
- Caetano R. Alcohol-related health disparities and treatment-related epidemiological findings among whites, blacks, and Hispanics in the United States. *Alcoholism: Clinical and Experimental Research*. 2003; 27(8):1337–1339.
- Caetano R, Clark CL, Tam T. Alcohol consumption among racial/ethnic minorities: Theory and research. *Alcohol Health & Research World*. 1998; 22(4):233–242. <http://pubs.niaaa.nih.gov/publications/arh22-4/233.pdf>. [PubMed: 15706749]
- Carroll JF, McGinley JJ, Mack SE. Exploring the expressed spiritual needs and concerns of drug-dependent males in modified, therapeutic community treatment. *Alcoholism Treatment Quarterly*. 2000; 18(1):79–92.
- Christian MD, Barbarin OA. Cultural resources and psychological adjustment of African American children: Effects of spirituality and racial attribution. *Journal of Black Psychology*. 2001; 27(1):43–63.
- Connors GJ, Allen JP, Cooney NL, DiClemente CC, Tonigan JS, Anton RF. Assessment issues and strategies in alcoholism treatment matching research. *Journal of Studies on Alcohol Supplement*. 1994; 12:92–100. [PubMed: 7723004]
- Connors GJ, Tonigan JS, Miller WR. A measure of religious background and behavior for use in behavior change research. *Psychology of Addictive Behaviors*. 1996; 10(2):90–96.
- Connors, GJ.; Tonigan, JS.; Miller, WR. Religiosity and responsiveness to alcoholism treatments. In: Longabaugh, R.; Wirtz, PW., editors. *Project MATCH hypotheses: Results and causal chain analyses*. Vol. 8. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2001. p. 166–175. *Project MATCH Monograph Series*
- Coward DD. Facilitation of self-transcendence in a breast cancer support group: II. *Oncology Nursing Forum*. 2003; 30(2):291–300. [PubMed: 12692663]
- Crumbaugh JC, Maholick LT. An experimental study in existentialism: The psychometric approach to Frankl's concept of "noogenic" neurosis. *Journal of Clinical Psychology*. 1964; 20:200–207. [PubMed: 14138376]
- Crumbaugh JC. Cross-validation of purpose-in-life test based on Frankl's concepts. *Journal of Individual Psychology*. 1968; 24:74–81. [PubMed: 4385494]
- Crumbaugh, JC.; Maholick, LT. *Purpose in Life Scale*. Murfreesboro, TN: Psychometric Affiliates; 1976.
- Dermatis H, Guschwan MT, Galanter M, Bunt G. Orientation toward spirituality and self-help approaches in the therapeutic community. *Journal of Addictive Diseases*. 2004; 23(1):39–54. [PubMed: 15077839]
- Frankl, VE. *Man's search for meaning: An introduction to Logotherapy*. 3. New York: Simon and Schuster; 1984.
- Franklin, JH.; Moss, AA. *From slavery to freedom*. 8. Boston: McGraw Hill; 2000.
- Galanter M. Spirituality and recovery in 12-step programs: An empirical model. *Journal of Substance Abuse Treatment*. 2007; 33:265–272. [PubMed: 17889297]

- Galvan FH, Caetano R. Alcohol use and related problems among ethnic minorities in the United States. *Alcohol Research & Health*. 2003; 27(1):87–94. Retrieved March 30, 2007 from <http://pubs.niaaa.nih.gov/publications/arh27-1/87-94.htm>. [PubMed: 15301403]
- Heisel MA, Faulkner AO. Religiosity in an older black population. *The Gerontologist*. 1982; 22:354–358. [PubMed: 7129164]
- Hingson R, Winter M. Epidemiology and consequences of drinking and driving. *Alcohol Research & Health*. 2003; 27(1):63–78. Retrieved March 30, 2007 from <http://pubs.niaaa.nih.gov/publications/arh27-1/63-78.pdf>. [PubMed: 15301401]
- Humphreys K, Weisner C. Use of exclusion criteria in selecting research subjects and its effects on the generalizability of alcohol treatment outcome studies. *The American Journal of Psychiatry*. 2000; 157:588–594. [PubMed: 10739418]
- Jaccard. Interaction effects in multiple regression. Thousand Oaks, CA: Sage; 2001.
- Jaccard, J.; Turisi, R. Interaction effects in multiple regression. 2. Thousand Oaks, CA: Sage; 2003.
- Jones-Webb R. Drinking patterns and problems among African-Americans: Recent findings. *Alcohol Health & Research World*. 1998; 22(4):260–264. <http://pubs.niaaa.nih.gov/publications/arh22-4/260.pdf>. [PubMed: 15706752]
- Kaskutas LA, Turk N, Bond J, Weisner C. The role of religion, spirituality and Alcoholics Anonymous in sustained sobriety. *Alcoholism Treatment Quarterly*. 2003; 21(1):1–16.
- Kendler KS, Gardner CO, Prescott CA. Religion, psychopathology, and substance use and abuse; a multimeasure, genetic-epidemiologic study. *American Journal of Psychiatry*. 1997; 154(3):322–329. [PubMed: 9054778]
- Koenig HG, Cohen HJ, Blazer DG, Pieper C, Meador KG, Shelp F, Goli V, DiPasquale B. Religious coping and depression among elderly, hospitalized medically ill men. *The American Journal of Psychiatry*. 1992; 149(12):1693–1700. [PubMed: 1443246]
- Krentzman A. The evidence base for the effectiveness of Alcoholics Anonymous: Implications for social work practice. *Journal of Social Work Practice in the Addictions*. 2007; 7(4):27–48.
- Krentzman, A.; Farkas, K.; Townsend, A. Using Quantitative Visualization to Uncover Hidden Data Patterns in Social Work Research. Poster session presented at the annual meeting of the Society for Social Work and Research; New Orleans, LA. 2009 Jan.
- Lantz J, Gregoire T. Existential psychotherapy with couples facing breast cancer: A twenty year report. *Contemporary Family Therapy*. 2000; 22(3):325–327.
- Lazarus, RS.; Folkman, S. Stress, Appraisal, and Coping. New York: Springer; 1984.
- Levin JS, Taylor RJ, Chatters LM. Race and gender differences in religiosity among older adults: Findings from four national surveys. *Journal of Gerontology: Social Sciences*. 1994; 49:137–145.
- Lewis MP, Erlen JA, DeVito Dabbs A, Breneman K, Cook C. The Utility of the Purpose-in-Life Test in Persons With AIDS. *Journal of the Association of Nurses in AIDS care*. 2006; 17(1):51–59. [PubMed: 16686084]
- Lincoln, CE.; Mamiya, LH. The black church in the African American experience. Durham, NC: Duke University Press; 1990.
- Lowman C, Le Fauve CE. Health disparities and the relationship between race, ethnicity, and substance abuse treatment outcomes. *Alcoholism: Clinical and Experimental Research*. 2003; 27(8):1324–1326.
- Margolin A, Avants SK, Arnold R. Acupuncture and spirituality-focused group therapy for the treatment of HIV-positive drug uses: A preliminary study. *Journal of Psychoactive Drugs*. 2005; 37(4):385–390. [PubMed: 16480165]
- Matthews DA, McCullough ME, Larson DB, Koenig HG, Swyers JP, Milano MG. Religious commitment and health status: A review of the research and implications for family medicine. *Archives of Family Medicine*. 1998; 7:118–124. [PubMed: 9519914]
- McDowell D, Galanter M, Goldfarb L, Lifshutz H. Spirituality and the treatment of the dually diagnosed: An investigation of patient and staff attitudes. *Journal of Addictive Diseases*. 1996; 15(2):55–68. [PubMed: 8704001]
- McKay JR, Lynch K, Pettinati H, Shepard D. An examination of potential gender and race effects in a study of continuing care for alcohol and cocaine dependent patients. *Alcoholism: Clinical and Experimental Research*. 2003; 27:1321–1323.

- Morgenstern J, Bux DA. Examining the effects of gender and ethnicity on substance abuse treatment and mediational pathways. *Alcoholism - Clinical and Experimental Research*. 2003; 27(8):1330–1332.
- Murphy, LG.; Melton, JG.; Ward, GL., editors. *Religions Information Systems* (Vol. 9), *Garland Reference Library of Social Science* (Vol. 721). New York: Garland Publishing; 1993. The encyclopedia of African American religions.
- Nehemkis, A.; Macari, MA.; Lettieri, DJ., editors. NIDA DHHS Pub No (ADM) 78–394. Washington, DC: Superintendent of Documents, US Government Printing Office; 1978. *Drug Abuse Instrument Handbook: Selected Items for Psychosocial Drug Research*.
- NIAAA. Alcohol and minorities. Alcohol Alert No 23 PH 347. 1994 Jan. Retrieved March 30, 2007 from <http://pubs.niaaa.nih.gov/publications/aa23.htm>
- NIAAA. Alcohol and minorities: An update. Alcohol Alert No 55. 2002 Jan. Retrieved March 30, 2007 from <http://pubs.niaaa.nih.gov/publications/aa55.htm>
- NIAAA. Alcoholism: Natural history and background. n.d. Retrieved March 31, 2007 from <http://pubs.niaaa.nih.gov/publications/HealthDisparities/Alcoholism1.htm>
- Owen PL, Slaymaker V, Tonigan JS, McCrady BS, Epstein EE, Kaskutas LA, Humphreys K, Miller WR. Participation in Alcoholics Anonymous: Intended and unintended change mechanisms. *Alcoholism: Clinical and Experimental Research*. 2003; 27(3):524–532.
- Piderman KM, Schneekloth TD, Pankratz VS, Maloney SD, Altchuler SI. Spirituality in alcoholics during treatment. *The American Journal on Addictions*. 2007; 16(3):232–237. [PubMed: 17612829]
- Piderman KM, Schneekloth TD, Pankratz VS, Stevens SR, Altchuler SI. Spirituality during alcoholism treatment and continuous abstinence for one year. *International Journal of Psychiatry in Medicine*. 2008; 38(4):391–406. [PubMed: 19480354]
- Piedmont RL. Spiritual transcendence as a predictor of psychosocial outcome from an outpatient substance abuse program. *Psychology of Addictive Behaviors*. 2004; 18(3):213–222. [PubMed: 15482076]
- Pressman P, Lyons JS, Larson DB, Strain JJ. Religious belief, depression, and ambulation status in elderly women with broken hips. *The American Journal of Psychiatry*. 1990; 147(6):758–760. [PubMed: 2343920]
- Project MATCH Research Group. Project MATCH: Rationale and methods for a multisite clinical trial matching patients to alcoholism treatment. *Alcoholism: Clinical and Experimental Research*. 1993; 17(6):1130–1145.
- Project MATCH Research Group. Matching alcoholism treatments to clinet heterogeneity: Project MATCH post treatment drinking outcomes. *Journal of Studies on Alcohol*. 1997; 58(1):7–29. [PubMed: 8979210]
- Robinson, EAR.; Krentzman, AR.; Pierce, LS.; Webb, J.; Brower, KJ. Six-month changes in spirituality and religiousness in alcoholics predict drinking outcomes at nine months. 2010. Manuscript submitted for publication
- Robinson EAR, Cranford JA, Webb JR, Brower KJ. Six-month changes in spirituality, religiousness, and heavy drinking in a treatment-seeking sample. *Journal of Studies on Alcohol and Drugs*. 2007; 68:282–290. [PubMed: 17286347]
- Schmidt L, Greenfield T, Mulia N. Unequal treatment: Racial and ethnic disparities in alcoholism treatment services. *Alcohol Research & Health*. 2006; 29(1):49–54. Retrieved March 30, 2007 from <http://pubs.niaaa.nih.gov/publications/arh291/49-54.htm>. [PubMed: 16767854]
- Shean GD, Fechtmann F. Purpose in life scores of student marihuana users. *Journal of Clinical Psychology*. 1971; 27:112–113. [PubMed: 5539311]
- Sterling RC, Weinstein S, Hill P, Gottheil E, Gordon SM, Shorie K. Levels of spirituality and treatment outcome: A preliminary examination. *Journal of Studies on Alcohol*. 2006; 67:600–606. [PubMed: 16736080]
- Stewart C, Koeske GF. Spiritual change in treatment of substance dependence. *Social Work & Christianity*. 2005; 32(4):321–340.
- Stewart, CF. *Soul survivors: An African American spirituality*. Louisville, KY: Westminster John Knox Press; 1997.

- Taylor J, Chatters L, Jakody R, Levin J. Black and White differences in religious participation: A multisample comparison. *Journal for the Scientific Study of Religion*. 1996; 35:403–410.
- Tonigan, JS. Project MATCH: Matching alcohol treatments to client heterogeneity. Presentation to the Wisconsin Department of Health and Family Services. 2005. Retrieved June 10, 2007 from http://dhfs.wisconsin.gov/subst Abuse/Education/Teleconference/ArchivedMaterials/2005/tonigan_match_Wisconsin.pdf
- Tonigan JS. Project MATCH treatment participation and outcome by self-reported ethnicity. *Alcoholism: Clinical and Experimental Research*. 2003; 27(8):1340–1344.
- Tonigan JS, Connors GJ, Miller WR. Special populations in Alcoholics Anonymous. *Alcohol Health & Research World*. 1998; 22(4):281–285. [PubMed: 15706756]
- Tonigan JS, Miller WR, Schermer C. Athiests, agnostics and Alcoholics Anonymous. *Journal of Studies on Alcohol*. 2002; 63:534–541. [PubMed: 12380849]
- Wu LT, Kouzis AC, Schlenger WE. Substance use, dependence, and service utilization among the U.S. uninsured nonelderly population. *American Journal of Public Health*. 2003; 93:2079–2085. [PubMed: 14652338]
- Zemore SE. A role for spiritual change in the benefits of 12-step involvement. *Alcoholism: Clinical and Experimental Research*. 2007; 31(S3):76S–79S.

Figure 1.
Decomposition of the Interaction Effect of Race by Purpose in Life at Month 15 on Drinking Outcome in a Subset of Project MATCH

Table 1
Descriptive Information for Interval-Level Variables by Race of Study Participants in Subset of Project MATCH

Variables	Total sample (N = 414)			Blacks (N = 90)			Whites (N = 324)			t
	M	SD	Range	M	SD	Range	M	SD	Range	
Age	40.82	10.342	20–72	40.94	8.41	26–64	40.78	10.83	20–72	.150
Years of Education	13.24	2.159	2–17	12.88	1.71	8–17	13.35	2.26	2–17	–2.13*
PIL baseline	92.58	19.516	36–140	99.47	20.97	52–140	90.67	18.68	36–131	3.85***
PIL 15 Months	101.40	20.398	37–140	105.32	21.85	37–140	100.31	19.87	42–140	2.07*
RBB baseline	39.11	11.097	16–71	45.22	10.74	25–71	37.41	10.60	16–65	6.12***
RBB 15 Months	27.45	10.427	7–51	33.07	9.49	12–51	25.89	10.15	7–48	6.02***
PDA baseline	28%	28%	0–97%	25%	26%	0–91%	29%	28%	0–97%	–.94
PDA 15 Months	72%	36%	0–100%	75%	36%	0–100%	71%	36%	0–100%	.86

Note. PIL= Purpose in Life, RBB = religiousness, PDA=Percent days abstinent. t-tests compared black and white participants.

* $p < .05$,

**

$p < .01$,

$p < .001$

Table 2
Descriptive Information for Categorical Variables by Race of Study Participants in Subset of Project MATCH

Variables	Total sample (N = 414)		Blacks (N = 90)		Whites (N = 324)	
	N	Percent	N	Percent	N	Percent
Gender						
Male	319	77.1%	72	80.0%	247	76.2%
Female	95	22.9%	18	20.0%	77	23.8%
Drinking Outcome						
Achieved 6 mo sobriety	112	27.1%	24	26.7%	88	27.2%
Did not achieve 6 mo sobriety	302	72.9%	66	73.3%	236	72.8%

Note. Chi square tests compared black and white participants. Differences in race by gender and race by drinking outcome were not significant.

Table 3

Logistic Regression Results Predicting the Achievement of 6 Months of Continuous Sobriety or Not and Evaluating Race Moderation Hypotheses in Subset of Project MATCH (N=414)

Predictor	Model 1: Testing Main Effects Only					Model 2: Testing Race by PIL Interaction					Model 3: Testing Race by RBB Interaction				
	β	SE β	Wald's χ^2	df	p	β	SE β	Wald's χ^2	df	p	β	SE β	Wald's χ^2	df	p
Constant	-.2541	1.095	5.385	1	.020	.079	3.530	2.301	2.353	1	.125	.029	4.645	1	.000
Base RBB	-.030	.016	3.501	1	.061	.071	-.030	.016	3.528	1	.060	.070	-.030	.016	.063
Base PIL	-.018	.008	5.721	1	.017	.982	-.019	.008	6.033	1	.014	.981	-.018	.008	.015
Education	.135	.062	4.769	1	.029	1.145	.137	.062	4.960	1	.026	1.147	.137	.062	.027
Race ^a	-.475	.324	2.156	1	.142	.622	-.920	.436	4.457	1	.035	.398	-.578	.396	.144
Site 8 ^b	1.260	.307	16.868	1	.000	3.526	1.257	.306	16.825	1	.000	3.515	1.265	.307	.000
Site 7 ^c	.589	.325	3.296	1	.069	1.803	.558	.325	2.952	1	.086	1.748	.587	.325	.071
RBB 15 ^d	.064	.017	14.591	1	.000	1.067	.063	.017	13.802	1	.000	1.065	.061	.018	.001
PIL 15 ^d	.038	.008	21.840	1	.000	1.039	.032	.009	13.380	1	.000	1.032	.038	.008	.000
Base PDA	.552	.440	1.573	1	.210	1.736	.474	.442	1.148	1	.284	1.606	.541	.440	.219
Black x PIL 15						.043	.022	3.866	1	.049	1.044				
Black x RBB 15											.016	.034	.227	1	.634
Test		R ²	χ^2	df	p	R ²		χ^2	df	p	R ²		χ^2	df	p
Overall model evaluation															
Block			74.695	9	.000			4.615	1	.032			.231	1	.631
Model			74.695	9	.000			79.310	10	.000			74.926	10	.000
Hosmer & Lemeshow			9.382	8	.311			5.464	8	.707			9.714	8	.286
-2 Log Likelihood			408.68	9	.000			404.07	10	.000			408.45	10	.000
Cox & Snell R ²	.165					.174					.166				
Nagelkerke R ²	.240					.253					.240				

^a 1=black, 0=white.

^b 1=site 8, 0=else.

^c 1=site 7, 0=else.

PIL = Purpose in Life, RBB = religiousness, PDA = percent days abstinent.