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Do race/ethnicity and religious affiliation moderate treatment outcomes among individuals with co-occurring PTSD and substance use disorders?

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Abstract

The effect of race/ethnicity and religious affiliation on treatment outcomes among 107 individuals with co-occurring substance use disorder (SUD) and full or subthreshold posttraumatic stress disorder (PTSD) was examined in a secondary analysis. Participants were randomly assigned to one of three treatment conditions: dual-disorder treatment of PTSD and SUD using prolonged exposure; single-disorder relapse prevention treatment for SUD; or an active monitoring control group. Results revealed no significant interaction between race/ethnicity and treatment on PTSD and substance use frequency. However, compared to Whites, African Americans had significantly lower levels of PTSD over the course of treatment. Religious affiliation moderated the impact of treatment on substance use frequency and was a significant predictor of PTSD scores during treatment. Results highlight the need to explore factors associated with social identity variables such as race and religion that may enhance or attenuate the mechanisms of treatments for PTSD and SUD.

Epidemiological studies show that among those with substance use disorders (SUD), 80% have had exposure to a traumatic event, and 30–60% have a lifetime diagnosis of PTSD (Dore, Mills, Murray, Teesson, & Farrugia, 2012; Torchalla, Nosen, Rostam, & Allen, 2012). Compared to individuals with SUD or PTSD alone, individuals with comorbid SUD and PTSD have a more severe clinical profile marked by polysubstance use, poorer mental, physical, and psychosocial health, greater propensity to relapse, and poorer treatment outcomes (e.g., Back, Waldrop, & Brady, 2009). Over the years, researchers have examined the link between various social identities and trauma/PTSD and SUDs, in order to understand and reduce health disparities in health and mental health outcomes among various subgroups (McCabe, Bostwick, Hughes, West, & Boyd, 2010; Wu, Zhu, & Swartz, 2016). In this paper we focus on two particularly relevant identities for substance use: race/ethnicity and religion.

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Race/Ethnicity, Substance Use, and PTSD

Research suggests racial/ethnic variations in substance use, with more Blacks using illicit drugs than Whites and Hispanics; and more Whites using alcohol than Blacks and Hispanics in 2013 (Substance Abuse and Mental Health Services Administration (SAMHSA), 2014). However, rates of past-year SUDs are similar across all three racial/ethnic groups (SAMSHA, 2014). In regard to PTSD, some studies indicate similar rates of trauma exposure and PTSD among African Americans, Hispanics, and White Americans (e.g., Ghafoori, Barragan, Tohidian, & Palinkas, 2012); yet other studies indicate African-Americans have higher rates of lifetime PTSD than Whites and Hispanics (Hatch, Dohrenwend, & Dohrenwend, 2007; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011). Despite mixed findings on the prevalence rates of PTSD and SUDs, studies indicate that racial/ethnic minorities may experience a greater disability burden from their co-occurring psychiatric conditions due to underutilization and lack of adequate treatment (McGuire & Miranda, 2008).

Religious Identity, Substance Use, and PTSD

Research has shown that religious affiliation is negatively associated with substance use, and those who identify as “non-religious” often report more smoking, drinking, and marijuana use (e.g., Gmel et al., 2013; Shepperd, Miller, Smith, & Algina, 2014). Belonging to religious groups that have the strictest prohibitions against alcohol and drug use is often a protective factor (e.g. Ghandour, Karam, & Maalouf, 2009). However, there are some notable exceptions. For example, several studies show that alcohol use is highest among Roman Catholics compared to others (e.g., Michalak, Trocki, & Bond, 2007).

After exposure to a traumatic event, one’s identity as a religious person may confer beneficial coping strategies that provide comfort, support, and meaning in life, which in turn can alleviate PTSD symptoms (cf., Park, 2005). However, exposure to negative life events can also challenge one’s religious/spiritual (R/S) beliefs (cf., Janoff-Bulman, 2002) and lead to R/S struggles or strains, which are associated with depression, suicidality, and other negative emotions (e.g., Exline, Yali, & Sanderson, 2000; Exline, Pargament, Grubbs, & Yali, 2014), and exacerbation of PTSD symptoms (e.g., Wortmann, Park, & Edmondson, 2011). A literature review on religion and trauma showed mixed effects (Bryant-Davis & Wong, Eunice, 2013), highlighting the importance of being aware of the potential positive and negative impact religious variables can have on mental health outcomes.

Race/Ethnicity and Treatment Outcomes

Although empirically supported treatments exist for SUD, PTSD, and co-occurring PTSD +SUD, few studies have examined racial/ethnic differences in treatment process and outcomes. A meta-analysis of cognitive behavioral therapy (CBT) for SUD found that although standard CBT was as effective in samples that were predominantly African Americans or Hispanics, the effect was stronger among predominantly Caucasian samples when examining pre-post substance use outcomes (Windsor, Jemal, & Alessi, 2015). A review of the PTSD treatment outcome literature for adults concluded that racial/ethnic

minority groups benefitted equally to Caucasians (Carter, Mitchell, & Sbrocco, 2012). Both reviews indicated lower treatment attendance for racial/ethnic minorities than Whites. Research has emerged demonstrating the efficacy of integrated (i.e., treating both disorders simultaneously) treatments for co-occurring PTSD and SUD (e.g., Hien et al., 2015; Mills, 2013; Ruglass et al., 2017). Only two studies, however, have examined the moderating effect of race/ethnicity on treatment outcomes for individuals with co-occurring PTSD and SUD with mixed findings (Ruglass, Pedersen, Cheref, Hu, & Hien, 2016; Zandberg et al., 2016).

Religious Identity and Treatment Outcomes

Religion and religious affiliation may confer treatment benefits through specific beliefs and principles (e.g., Connors, Tonigan, & Miller, 1996), as well as by providing meaning, integrity, and a moral compass (Shepperd et al 2014). In addition, many religious groups encourage specific practices such as prayer and service attendance that may provide social support during substance abuse recovery. For example, regular religious practice was associated with achieving abstinence 3 months post-treatment (Stewart, Koeske, & Pringle, 2008), less post-treatment cocaine and opiate use, as well as treatment program retention rates (Heinz, Epstein, & Preston, 2007) and program completion (Wolf-Branigin & Duke, 2007). Although at least one study showed that religious affiliation did not distinguish between newcomers, chronic relapsers, and endurers in an AA program (Kearns & Brown, 2016), many other studies have not included or analyzed affiliation as a religious predictor variable.

In the PTSD treatment literature, religiosity and spirituality have been shown to predict treatment success (e.g., Currier, Holland, & Drescher, 2015) and religious/spiritual components of treatment programs have been shown to be effective for reducing PTSD symptoms (cf., Bormann, Liu, Thorp, & Lang, 2012; Bowland, Edmond, & Fallot, 2012). Similar to the literature on treatment for SUD, religious affiliation information is often provided only as sample description, if at all, and thus rates of treatment success by this religious identity variable is largely unknown.

The current study aimed to extend previous research by assessing the degree to which the social identities of race/ethnicity and religious affiliation affect treatment outcomes among those receiving treatment for co-occurring PTSD and SUD. We predicted that race/ethnicity and religious identity would be significant moderators of treatment attendance and SUD and PTSD outcomes. However, due to the lack of consistent empirical studies testing the effects of race and religious affiliation in dual-diagnosis populations we do not have specific hypotheses about directionality and consider these exploratory analyses.

Methods

Data for these analyses were derived from a clinical trial that examined the efficacy of an integrated cognitive-behavioral treatment for co-occurring PTSD and SUD (COPE) in comparison to an SUD-alone treatment, Relapse Prevention Therapy (RPT), and to an active monitoring control group (AMCG). For complete details on methods and design, see (Ruglass et al., 2017).

Participants

Inclusion criteria for participation were: 1. *Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision* (DSM-IV-TR) (American Psychiatric Association, 2000) criteria for full PTSD, or subthreshold PTSD defined as meeting Criterion A, B, either C or D, and E and F (Grubaugh et al., 2005); and 2. DSM-IV-TR criteria for either past or current alcohol or substance dependence and alcohol/substance use in the prior 90 days. Exclusion criteria were: 1. Psychotic, schizoaffective or bipolar disorder; 2. Current severe depression or suicide risk; 3. Currently in an abusive relationship; 4. Concurrent participation in PTSD-specific treatment; 5. Start or regimen change of any psychotropic medication 8 weeks before study participation; 6. Organic mental syndrome.

Of the 110 participants that were randomized into the trial, 107 participants were included in this secondary analysis. The sample was majority male ($n=68$, 63.5%), with approximately 61% identifying as African American/Black, 19% White, and 20% Hispanic/Latino. Three participants who self-identified as “Native American” or “Other” were excluded from the analyses as these numbers were too small for meaningful group comparisons. The breakdown of age, gender, employment status, and education by race appears in Table 1.

In terms of religious affiliation, participants identified as Catholic ($n=18$), Protestant ($n=15$), Jewish ($n=1$), and Muslim ($n=1$). An additional 30 said they had no religious preference and 28 identified as “other”. Given the small sample sizes, Protestants and Catholics were combined into one group called Christian; a second group called Non-Christian consisted of those who identified as Jewish, Islamic, and Other; and a third group called Non-Affiliated consisted of those who selected the category of None. Due to missing outcome data, 89 participants were included in the analyses: thirty one Christian, 29 Non-Christian, and 29 Non-Affiliated.

Procedures

After informed consent, participants were randomly assigned to one of three treatment conditions: 1) *Concurrent Treatment with Prolonged Exposure* (COPE) is a 12-week intervention that integrates the empirically supported models of prolonged exposure for PTSD (Foa, Hembree, & Rothbaum, 2007) and RPT for SUD (Carroll, 1998; Marlatt & Donovan, 2007). 2) *Relapse Prevention Therapy* (Marlatt & Donovan, 2007) is a cognitive-behavioral SUD intervention that focuses on coping strategies to effectively manage situations that increase risk of relapse. 3) *Active Monitoring Control Group (AMCG)* participants met weekly with research assistants to complete self-report measures, urine toxicology, alcohol breathalyzer, and confirm general health and safety.

Measures

Demographics: Age, sex, race/ethnicity, education, marital status, employment pattern, and income were collected during the baseline interview. Religious Identity: Measured as religious affiliation, and was ascertained by asking: *Do you have a religious preference?* Response options were Protestant, Catholic, Jewish, Islamic, Other, and None. Psychiatric and Alcohol/Substance Use Disorder Diagnoses: The Structured Clinical Interview for DSM-IV for Axis I Disorders (SCID-I) (First, Spitzer, Gibbon, & Williams, 2002) was

administered at baseline and follow-ups to assess current Alcohol Use Disorder (AUD) and Substance Use Disorder (SUD) diagnoses, age of AUD/SUD onset, and the presence of any other current or past anxiety, mood, or psychotic disorders. The SCID-I has demonstrated high interrater reliability (First et al., 2002). **PTSD Symptom Severity:** The modified PTSD Symptom Scale Self-Report (MPSS-SR) (Falsetti, Resnick, Resick, & Kilpatrick, 1993) was used at baseline and weekly during treatment to assess self-reported symptom severity in the previous 7 days. Psychometric studies of the MPSS-SR with similar comorbid PTSD+SUD treatment samples demonstrated its high concurrent validity with the Clinician-Administered PTSD Scale (CAPS) (Blake et al., 2000). **Substance Use:** Primary SUD diagnosis was based on number of dependence criteria from the SCID-I. The Substance Use Inventory (SUI) (Weiss, Hufford, & Najavits, 1995) was used to assess self-reported frequency of days of primary substance use in the previous 7 days at baseline and weekly during the trial.

Statistical Analyses

Baseline differences by race/ethnicity or religious affiliation were examined with χ^2 tests for categorical variables, one-way ANOVAs for continuous variables, and nonparametric Kruskal-Wallis H-tests for non-normal data. Generalized linear mixed models (GLMM) of treatment outcomes included all participants. Missing data were estimated using all available data in each model, therefore imputation was not necessary. Models were specified to the distribution that best fit each outcome (i.e., normal distribution for MPSS-SR and number of sessions attended, and Poisson-distribution for previous 7 days of substance use). Models on MPSS-SR and days of substance use included the status of outcome variable at baseline, race/ethnicity, treatment groups, week, and the interaction term among race/ethnicity, treatment, and week, and any significant three-way and two-way interaction terms at $p < .05$ were included in the final model. Similar models were applied when examining the effect of religious affiliation. Repeated individual data was controlled as random effect by a first-order autoregressive structure. SAS 9.4 were utilized for all analyses.

Results

Descriptives

There were no significant racial/ethnic differences in age, gender distributions, level of education, and level of employment between the three racial/ethnic groups (all $ps > .05$, See Table 1). At baseline, Hispanic participants had a significantly greater proportion of individuals with a history of sexual assault than African Americans and Whites ($X^2(2) = 8.37, p = .015$). African Americans had a greater proportion of individuals with a history of accidents/disaster than Hispanics and Whites ($X^2(2) = 6.35, p = .042$). There were no significant racial/ethnic differences in substance use disorder diagnosis, major depression diagnosis, PTSD symptom severity, and frequency of primary substance use at baseline (all $ps > .05$). At baseline, there were no significant differences in demographic, trauma/PTSD, and substance use frequency/diagnosis variables among the three religious identification groups (all $ps > .05$).

Impact of Race/Ethnicity on Treatment Outcomes

Substance Use—There was no significant main effect of race/ethnicity on number of days of primary substance use. At baseline, Whites reported, on average, 3.75 days of primary substance use ($SD = 2.24$), African-Americans reported, on average, 3.92 days of use ($SD = 2.35$), and Hispanics reported, on average, 4.36 days of use ($SD = 2.87$). Days of primary substance use significantly decreased over time for all racial/ethnic groups ($F(1, 655) = 18.23, p < .001$). Treatment had a significant impact on reducing days of primary substance use over time ($F(2, 655) = 5.89, p = .003$). No significant two-way or three-way interaction effects of race/ethnicity, treatment, and time were found (all $ps > .05$).

PTSD Symptoms—The analysis of PTSD symptoms over time revealed a significant main effect of race/ethnicity ($F(2, 660) = 4.65, p = .01$). At baseline, there were no significant differences in self-reported PTSD symptoms (PSS-SR scores) between the three racial/ethnic groups. Mean PSS-SR scores were 56.75 ($SD = 24.72$) for African-Americans, 50.50 ($SD = 22.42$) for Whites, and 51.41 ($SD = 25.60$) for Hispanics. By the end of the first week of treatment, the PSSR scores for African-Americans were significantly lower than Whites ($b = -14.16, se = 5.78, t = -2.45, p = .014$), and remained lower over time. The two-way interaction between race/ethnicity and treatment ($F(4, 653) = 0.55, p = .70$) and the three-way interaction between race/ethnicity, treatment, and time ($F(4, 649) = 0.35, p = .84$) on PSS-SR scores were not significant, indicating no differential effect of treatment by race/ethnicity over time.

Impact of Religious Identity on Treatment Outcomes

Substance Use—There was no main effect of religious identity on frequency of substance use. However, there was a significant three-way interaction between religious affiliation, treatment, and time on frequency of primary substance use ($F(4, 530) = 6.86, p < .001$), indicating the treatment effect on substance use differed by religious group. Among participants who identified as Christian, those who received COPE ($b = -0.27, se = 0.06, p < .001$) and RPT ($b = -0.18, se = 0.06, p = .005$) demonstrated significantly fewer days of primary substance use over time than those in the AMCG ($b = -0.02, se = 0.02, p = .411$). See Figure 1. Among non-Christians, those who received COPE demonstrated significantly greater reduction in their frequency of primary substance use over time ($b = -0.23, se = 0.06, p < .001$) compared to their counterparts who received RPT ($b = -0.03, se = 0.05, p = .603$) or were in the AMCG ($b = -0.02, se = 0.03, p = .570$). See Figure 2. Among non-Affiliated participants those who received RPT had significantly lower frequency of substance use over time ($b = -0.24, se = 0.05, p < .001$) than COPE ($b = -0.03, se = 0.03, p = .374$) and AMCG ($b = -0.04, se = 0.04, p = .352$). See Figure 3.

PSTD Symptoms—There were no main effects for religious identity on PTSD symptoms; however, there was a significant interaction between religious affiliation and time on PSS-SR scores ($F(2, 538) = 3.37, p = .035$), such that the Christian religious group had significant greater weekly reductions in self-reported PTSD symptoms than non-Christians ($b = 1.40, se = .54, p = .01$). See Figure 4. The weekly change in PSS-SR scores for those who were non-Affiliated was not significantly different from those in the Christian ($b = 0.76, se = .56,$

$p > .05$) or non-Christian religious groups ($b = 0.63$, $se = .52$, $p > .05$). There was no significant three-way interaction for religious affiliation, treatment, and time on symptoms.

Discussion

This study examined the moderating effect of race/ethnicity and religious affiliation on treatment outcomes for individuals with co-occurring PTSD and SUDs who participated in a clinical trial. Overall, the racial/ethnic and religious affiliation groups were similar in terms of demographic characteristics (age, education, and employment status), PTSD symptomatology, and frequency of substance use. Race/ethnicity was not a significant predictor of substance use outcomes nor did it moderate the efficacy of the treatment conditions. All participants evidenced reductions in substance use over time, suggesting the benefits of treatment cut across race/ethnicity. These findings are consistent with recent empirical findings demonstrating the positive effect of CBT in reducing substance use over time for Whites, African-Americans, and Hispanics (Windsor et al., 2015; Zandberg et al., 2016). Both active treatments (COPE and RPT) provide coping strategies to manage high-risk situations that may trigger substance use relapse and thus was instrumental in reducing primary substance use. Alternatively, it is possible that our sample size was underpowered to detect significant interaction effects.

Race/ethnicity, however, was a significant predictor of weekly reductions in PTSD symptom. African Americans demonstrated lower PTSD symptoms compared to White participants, during the 12 week treatment phase, regardless of treatment condition. The lower PTSD symptom severity may be related to the lower rates of severe trauma exposure in the African American subsample compared to Whites, although this difference was not statistically significant. It is also possible that racial differences in underlying risk (frequency and type of trauma exposure) and protective factors (e.g., social support) may have contributed to greater weekly changes in PTSD severity in the African American subsample (Alegría et al., 2013; Ghafoori et al., 2012).

Our exploratory analysis on religious affiliation as a moderator of the effects of treatment on outcomes revealed that Christians who received COPE and RPT demonstrated significantly fewer days of primary substance use over time than those in AMCG, whereas those who identified as non-Christian and received COPE had lower substance use than their counterparts who received RPT and AMCG. Among those who were non-Affiliated, those who received RPT had significantly greater reductions in their substance use than their counterparts who received COPE or were in AMCG. Religions are well known to provide a framework for finding meaning in life, and mobilizing social support, particularly in times of stress (Pargament, 2001). Although speculative, having a religious group and religious beliefs that can help make sense of and integrate trauma may allow for a focus on trauma in treatment to be well tolerated and effective. Those with no religious affiliation may not have such a framework or trauma may have challenged their existing frameworks such that treatment which included a focus on trauma was less effective than one that focused directly on substance use.

Our expectation for a similar pattern of results for the effect of religious affiliation on treatment type and PTSD symptoms was not found. Interestingly, regardless of treatment, all groups experienced a reduction in PTSD over time, with Christians experiencing greater reductions compared to non-Christians. While these results might reflect a true difference between these groups, it could reflect social desirability (McCrae & Costa, 1983). Religiosity is associated with greater impression management (Gillings & Joseph, 1996) and at least one study showed greater social desirability ratings for Christians vs non-Christians (Gynther, Gray, & Strauss, 1970). Social desirability was not examined in this study, thus this explanation is highly speculative. In addition, while there was no difference in symptom reduction between those not affiliated and other affiliated, the results also showed no significant difference in PTSD symptom reduction between Christians and those not affiliated. We are not sure why this might be; future studies in larger samples are needed to replicate and extend these findings.

Limitations

It is important to note the study limitations. The sample size is small for moderation testing, and thus limits the power to detect significant results. With a larger sample, it would also be possible to test interactions between race/ethnicity and religious identity variables, as the literature suggests some racial/ethnic groups tend to report greater religiousness and assign greater importance to their religious life. The results are also limited by the measures used; for example, all measures were self-reported, which brings inherent biases related to recall and social desirability. We only assessed reductions in negative outcomes (substance use and PTSD) and did not assess increases in positive outcomes such as post-traumatic growth, life satisfaction, or self-efficacy. In addition, we were limited to using religious affiliation as the religious identity measure as that was what was available in this existing dataset. While this is one of the first studies to assess the impact of religious affiliation on outcomes in a clinical sample with co-occurring PTSD and SUD, other religious variables may play a more significant role. The assessment of religious salience, as well as specific religious/spiritual beliefs, practices/activities, and struggles would capture the more complex, dynamic nature of religious identity. We also only present effects for changes in outcomes during the treatment phase (from week 1 to 12). Duration of effect was not possible to test with attrition rates leaving smaller samples per group; future research on larger samples should also track clients post-treatment to assess how long the effects last and at what point a booster session may be needed.

Conclusions

This study examined the role of race/ethnicity and religious affiliation in a secondary analysis of a treatment seeking sample. To the best of our knowledge this is one of the first studies to report treatment differences by religious affiliation for clients in treatment for co-occurring PTSD and SUD. The findings for religious identity suggest that treatment for substance use and reduction in PTSD symptoms may be differentially effective depending on one's religious affiliation. Based on these results, clinician's might consider assessing clients' religious affiliation during intake, so as to tailor appropriate interventions for successful outcomes.

References

- Alegría M, Fortuna LR, Lin JY, Norris LF, Gao S, Takeuchi DT, ... Valentine A (2013). Prevalence, risk, and correlates of posttraumatic stress disorder across ethnic and racial minority groups in the US. *Medical Care*, 51(12), 1114. [PubMed: 24226308]
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev). Washington, DC: American Psychiatric Association.
- Back SE, Foa EB, Killeen TK, Mills KL, Teesson M, Cotton BD, ... Brady KT (2014). *Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE): Therapist Guide*. New York: Oxford University Press.
- Back SE, Waldrop AE, & Brady KT (2009). Treatment Challenges Associated with Comorbid Substance Use and Posttraumatic Stress Disorder: Clinicians' Perspectives. *The American Journal on Addictions / American Academy of Psychiatrists in Alcoholism and Addictions*, 18(1), 15–20. 10.1080/10550490802545141
- Blake DD, Weathers FW, Nagy LM, Kaloupek D, Klauminzer G, Charney DS, Keane TM, & B. T. (2000). *Clinician-Administered PTSD Scale (CAPS) Instructional Manual*. Boston, MA: National Center for PTSD.
- Bormann JE, Liu L, Thorp SR, & Lang AJ (2012). Spiritual wellbeing mediates PTSD change in veterans with military-related PTSD. *International Journal of Behavioral Medicine*, 19(4), 496–502. [PubMed: 21874605]
- Bowland S, Edmond T, & Fallot RD (2012). Evaluation of a spiritually focused intervention with older trauma survivors. *Social Work*, 57(1), 73–82. [PubMed: 22768630]
- Bryant-Davis T, & Wong, Eunice C (2013). Faith to Move Mountains: Religious Coping, Spirituality, and Interpersonal Trauma Recovery. *American Psychologist*, 68(8), 675–684. 10.1037/a0034380 [PubMed: 24320650]
- Carroll KM (1998). *A cognitive behavioral approach: treating cocaine addiction* (Vol. 1). Rockville, MD: National Institute on Drug Abuse.
- Carter MM, Mitchell FE, & Sbrocco T (2012). Treating ethnic minority adults with anxiety disorders: Current status and future recommendations. *Journal of Anxiety Disorders*, 26(4), 488–501. 10.1016/j.janxdis.2012.02.002 [PubMed: 22417877]
- Currier JM, Holland JM, & Drescher KD (2015). Spirituality Factors in the Prediction of Outcomes of PTSD Treatment for U.S. Military Veterans Joseph. *Journal of Traumatic Stress*, 28, 57–64. 10.1002/jts.21978 [PubMed: 25624135]
- Dore G, Mills K, Murray R, Teesson M, & Farrugia P (2012). Post-traumatic stress disorder, depression and suicidality in inpatients with substance use disorders. *Drug and Alcohol Review*, 31(3), 294–302. [PubMed: 21521385]
- Exline JJ, Pargament KI, Grubbs JB, & Yali AM (2014). The Religious and Spiritual Struggles Scale: Development and initial validation. *Psychology of Religion and Spirituality*, 6, 208–222. DOI: 10.1037/a0036465
- Exline JJ, Yali AM, & Sanderson WC (2000). Guilt, discord, and alienation: The role of religious strain in depression and suicidality. *Journal of Clinical Psychology*, 56(12), 1481–1496. [PubMed: 11132565]
- Falsetti SA, Resnick HS, Resick PA, & Kilpatrick DG (1993). The Modified PTSD Symptom Scale: A brief self-report measure of posttraumatic stress disorder. *Behaviour Therapist*, 16, 161–162.
- First MB, Spitzer RL, Gibbon M, & Williams JBW (2002). *Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition with Psychotic Screen*. New York, NY: Biometrics Research, New York State Psychiatric Institute.
- Foa E, Hembree E, & Rothbaum BO (2007). *Prolonged Exposure Therapy for PTSD: Emotional Processing of Traumatic Experiences Therapist Guide*. New York, NY: Oxford University Press.
- Gmel G, Mohler-Kuo M, Dermota P, Gaume J, Bertholet N, Daepfen J-B, & Studer J (2013). Religion is good, belief is better: religion, religiosity, and substance use among young Swiss men. *Substance Use & Misuse*, 48(12), 1085–1098. [PubMed: 24041170]

- Ghafoori B, Barragan B, Tohidian N, & Palinkas L (2012). Racial and ethnic differences in symptom severity of PTSD, GAD, and depression in trauma-exposed, urban, treatment-seeking adults. *Journal of Traumatic Stress*, 25(1), 106–110. 10.1002/jts.21663 [PubMed: 22354513]
- Gillings V, & Joseph S (1996). Religiosity and social desirability: Impression management and self-deceptive positivity. *Personality and Individual Differences*, 21(6), 1047–1050.
- Grubaugh AL, Magruder KM, Waldrop AE, Elhai JD, Knapp RG, & Frueh BC (2005). Subthreshold PTSD in primary care: Prevalence, psychiatric disorders, healthcare use, and functional status. *The Journal of Nervous and Mental Disease*, 193(10), 658–664. [PubMed: 16208161]
- Hatch SL, Dohrenwend BP, & Dohrenwend AEBP (2007). Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES and age: A review of the research. *American Journal of Community Psychology*, 40(3–4), 313–332. 10.1007/s10464-007-9134-z [PubMed: 17906927]
- Hien DA, Levin FR, Ruglass LM, Lopez-Castro T, Papini S, Hu MC, & Cohen LR (2015). Enhancing the effects of cognitive behavioral therapy for PTSD and alcohol use disorders with antidepressant medication: A randomized clinical trial. *Drug & Alcohol Dependence*, 146, e142 10.1016/j.drugalcdep.2014.09.303
- Heinz A, Epstein DH, & Preston KL (2007). Spiritual/Religious Experiences and In-Treatment Outcome in an Inner-City Program for Heroin and Cocaine Dependence. *Journal of Psychoactive Drugs*, 39(1), 41–49. 10.1080/02791072.2007.10399863 [PubMed: 17523584]
- Janoff-Bulman R (2002). *Shattered assumptions: Towards a new psychology of trauma*. New York, NY: Free Press.
- Kearns K, & Brown NW (2016). Comparisons Between Newcomers, Chronic Relapsers and Endurers Attending An AA Program. *Journal of Groups in Addiction & Recovery*, 11(3), 156–165.
- Marlatt GA, & Donovan DM (2007). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. New York, NY: Guilford Press.
- McCabe SE, Bostwick WB, Hughes TL, West BT, & Boyd CJ (2010). The relationship between discrimination and substance use disorders among lesbian, gay, and bisexual adults in the United States. *American Journal of Public Health*, 100(10), 1946–1952. [PubMed: 20075317]
- McGuire TG, & Miranda J (2008). New evidence regarding racial and ethnic disparities in mental health: Policy implications. *Health Affairs*, 27(2), 393–403. 10.1377/hlthaff.27.2.393 [PubMed: 18332495]
- Michalak L, Trocki K, & Bond J (2007). Religion and alcohol in the US National Alcohol Survey: how important is religion for abstinence and drinking? *Drug and Alcohol Dependence*, 87(2), 268–280. [PubMed: 16987610]
- Pargament KI (2001). *The psychology of religion and coping: Theory, research, practice*. Guilford Press.
- Park CL (2005). Religion as a meaning-making framework in coping with life stress. *Journal of Social Issues*, 61(4), 707–729.
- Pole N, & Marmar CR (2005). Why Are Hispanics at Greater Risk for PTSD?, 11(2), 144–161. 10.1037/1099-9809.11.2.144
- Roberts AL, Gilman SE, Breslau J, Breslau N, & Koenen KC (2011). Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychological Medicine*, 41(1), 71–83. [PubMed: 20346193]
- Ruglass LM, Lopez-Castro T, Papini S, Killeen T, Back SE, & Hien DA (2017). Concurrent treatment with prolonged exposure for co-occurring full or subthreshold posttraumatic stress disorder and substance use disorders: A randomized clinical trial. *Psychotherapy and Psychosomatics*, 86(3), 150–161. [PubMed: 28490022]
- Ruglass LM, Pedersen A, Cheref S, Hu M-C, & Hien DA (2016). Racial differences in adherence and response to combined treatment for full and subthreshold post-traumatic stress disorder and alcohol use disorders: A secondary analysis. *Journal of Ethnicity in Substance Abuse*, 15(4), 434–448. 10.1080/15332640.2015.1056927 [PubMed: 26422415]
- Shepperd JA, Miller WA, Smith CT, & Algina J (2014). Does religion offer worldviews that dissuade adolescent substance use? *Psychology of Religion and Spirituality*, 6(4), 292.

- Stewart C, Koeske G, & Pringle JL (2008). Religiosity as a predictor of successful post-treatment abstinence for African-American clients. *Journal of Social Work Practice in the Addictions*, 7(4), 75–92.
- Substance Abuse and Mental Health Services Administration. (2014). Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Torchalla I, Nosen L, Rostam H, & Allen P (2012). Integrated treatment programs for individuals with concurrent substance use disorders and trauma experiences: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment*, 42(1), 65–77. [PubMed: 22035700]
- Weiss RD, Hufford C, & Najavits LM (1995). *Weekly Substance Use Inventory* (Unpublishe). Boston, MA: Harvard Medical School.
- Windsor LC, Jemal A, & Alessi EJ (2015). Cognitive behavioral therapy: A meta-analysis of race and substance use outcomes. *Cultural Diversity and Ethnic Minority Psychology*, 21(2), 300–313. 10.1007/s12671-013-0269-8.Moving [PubMed: 25285527]
- Wolf-Branigin M, & Duke J (2007). Spiritual involvement as a predictor to completing a Salvation Army substance abuse treatment program. *Research on Social Work Practice*, 17(2), 239–245.
- Wortmann JH, Park CL, & Edmondson D (2011). Trauma and PTSD symptoms: Does spiritual struggle mediate the link? *Psychological Trauma: Theory, Research, Practice, and Policy*, 3(4), 442.
- Wu L-T, Zhu H, & Swartz MS (2016). Trends in cannabis use disorders among racial/ethnic population groups in the United States. *Drug and Alcohol Dependence*, 165, 181–190. [PubMed: 27317045]
- Zandberg LJ, Rosenfield D, McLean CP, Powers MB, Asnaani A, & Foa EB (2016). Concurrent treatment of posttraumatic stress disorder and alcohol dependence: Predictors and moderators of outcome. *Journal of Consulting and Clinical Psychology*, 84(1), 43–56. [PubMed: 26460570]

Figure 1.
Number of Days used Primary Substance in the past 7 days by Treatment among Christians
(n = 31)

Figure 2.
Number of Days Used Primary Substance in the past 7 days by Treatment among Non-Christians (n = 29)

Figure 3.
Number of Days Used Primary Substance in the past 7 Days by Treatment among Non-Affiliated

Figure 4.
Self-Reported PTSD severity (MPSS-SR scores) in the past 7 days by Religious Affiliation during treatment (n = 89)

Table 1.Demographic and baseline clinical characteristics by race/ethnicity group (N=107^a).

Mean (SD) or N(%)				
Characteristic	Black/African American (n = 65)	White/Caucasian (n = 20)	Hispanic/Latino (n=22)	Test
Demographic				
Age	45.49 (8.77)	44.00 (9.07)	41.86 (11.10)	$F(2, 104)=1.27, p=.285$
Female	18 (27.7%)	11 (55.0%)	10 (45.5%)	$\chi^2(2)=5.89, p=.053$
Employment (past 3 years)				$\chi^2(4)=5.36, p=.252$
Full time	21 (32.3%)	6 (30.0%)	5 (22.7%)	
Part time/Student	20 (30.8%)	11 (55.0%)	9 (40.9%)	
Unemployed/Disability	24 (36.9%)	3 (15.0%)	8 (36.4%)	
Education (years)	12.99(2.10)	13.95 (4.10)	13.22 (2.31)	$\chi^2(2)^b=4.75, p=.093$
DSM-IV Criterion A trauma exposure				
Type				
Physical assault	38 (58.5%)	14 (70.0%)	11 (50.0%)	$\chi^2(2)=1.74, p=.418$
Sexual assault	19 (29.2%)	7 (35.0%)	14 (63.6%)	$\chi^2(2)=8.37, p=.015$
Accident or disaster	9 (13.9%)	0 (0%)	0 (0%)	$\chi^2(2)=6.35, p=.042$
Sudden injury or death of other	27 (41.5%)	7 (35.0%)	11 (50.0%)	$\chi^2(2)=0.99, p=.611$
Other	8 (12.3%)	2 (10.0%)	1 (4.6%)	$\chi^2(2)=1.08, p=.584$
Multiple trauma	44 (67.7%)	15 (75.0%)	16 (72.3%)	$\chi^2(2)=0.48, p=.786$
Age at first trauma	20.86 (14.20)	15.70 (12.12)	15.95 (14.20)	$\chi^2(2)^b=4.47, p=.107$
Time since last trauma (years)	14.31 (13.21)	19.25 (16.82)	12.64 (11.18)	$\chi^2(2)^b=1.53, p=.466$
Alcohol and substance use				
Alcohol Dependence	49 (75.4%)	18 (90.0%)	15 (68.2%)	$\chi^2(2)=2.93, p=.231$
Substance Dependence	45 (69.2%)	10 (50.0%)	17 (77.3%)	$\chi^2(2)=3.82, p=.148$
Alcohol & Substance Dependence	31 (47.7%)	8 (40.0%)	10 (45.5%)	$\chi^2(2)=0.37, p=.833$
Primary substance				$\chi^2(8)=32.12, p<.001$
Alcohol	25 (38.5%)	15 (75.0%)	7 (31.8%)	
Cannabis	4 (6.2%)	0 (0%)	5 (22.7%)	

Characteristic	Mean (SD) or N(%)			Test
	Black/African American (n = 65)	White/Caucasian (n = 20)	Hispanic/Latino (n=22)	
Cocaine	13 (20.0%)	3 (15.0%)	2 (9.1%)	
Alcohol and stimulants	22 (33.9%)	1 (5.0%)	3 (13.6%)	
Other polysubstance	1 (1.5%)	1 (5.0%)	5 (22.7%)	
Other diagnoses				
Major Depressive Disorder	13 (20.0%)	7 (35.0%)	10 (45.5%)	$\chi^2(2)=5.87, p=.053$
Outcomes at baseline past 7 days				
MPSS-SR	56.75 (24.72)	50.50 (22.42)	51.41 (25.60)	$F(2,104)=0.72, p=.491$
Days of Primary substance use	3.92 (2.35)	3.75 (2.24)	4.36 (2.87)	$\chi^2(2)=0.96, p=.618$

Note. MPSS-SR = Modified PTSD Symptom Scale Self-Report

^aThree participants who self-identified as Native American or Other were excluded from the analyses.

^bThree participants who self-identified as Native American or Other were excluded from the analyses.

^cNon-parametric Kruskal-Wallis Test