HHS Public Access

Author manuscript

Behav Res Ther. Author manuscript; available in PMC 2021 September 01.

Published in final edited form as:

Behav Res Ther. 2020 September ; 132: 103690. doi:10.1016/j.brat.2020.103690.

Race and Cultural Factors in an RCT of Prolonged Exposure and Sertraline for PTSD

Alexander C. Kline[a], **Norah C. Feeny**[a], **Lori A. Zoellner**[b]

[a]PTSD Treatment and Research Program, Case Western Reserve University, Department of Psychological Sciences, 11220 Bellflower Road, Cleveland, OH, USA, 44106-7123

[b]Center for Anxiety and Traumatic Stress, University of Washington, Department of Psychology, Guthrie Hall, Box 351525, Seattle, WA, USA, 98195-1525

Abstract

The efficacy of treatments for posttraumatic stress disorder (PTSD) among African Americans is less clear given underrepresentation in clinical research. Additionally, intervention research examining race has typically not considered within-group heterogeneity, such as acculturation, ethnic identity, and cultural attitudes. In a randomized controlled trial, African American (n = 43) and Caucasian (n =130) individuals received prolonged exposure (PE) or sertraline for PTSD, comparing: treatment response, retention, and treatment beliefs and preferences. Indirect effects of cultural variables were also examined. African Americans reported stronger ethnic identity (d = 0.71), less positive attitudes toward other groups (d = 0.36), and less acculturation (d = 0.51) than Caucasians. Noninferiority analyses indicated clinically equivalent PTSD outcomes for African Americans and Caucasians in both treatments. Groups showed comparable improvements in depression and functioning, and similar treatment preferences and beliefs. African Americans attended fewer sessions in PE (d = 0.87) and sertraline (d = 0.53) than Caucasians. Indirect effects analyses indicated positive cultural attitudes toward other ethnoracial groups were consistently associated with better treatment outcome and retention. Despite no differential effectiveness, findings may highlight the need to target retention among African Americans. Within-group cultural aspects of race may be an informative complement to basic, categorical conceptualizations.

Corresponding Author: Alexander C. Kline, Ph.D., Case Western Reserve University, Department of Psychological Sciences, Mather Memorial Building, Room 103, 11220 Euclid Avenue, Cleveland OH, 44106-7123. alexander.kline@va.gov.
Present address of corresponding author: VA San Diego Healthcare System, 3350 La Jolla Village Drive, MC116B, San Diego, CA 92161.

Alexander Kline: Conceptualization, Methodology, Formal Analysis, Writing – Original Draft, Writing – Review & Editing **Norah Feeny:** Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, Writing – Review & Editing, Supervision, Funding Acquisition **Lori Zoellner:** Conceptualization, Methodology, Investigation, Resources, Data Curation, Writing – Review & Editing, Supervision, Funding Acquisition

The authors declare no conflict of interest.

Keywords

posttraumatic stress disorder; treatment; prolonged exposure; sertraline; race; culture; ethnic identity

Although efficacious treatment options exist for posttraumatic stress disorder (PTSD; e.g., Watts et al., 2013; Cusack et al., 2016), considerable evidence suggests that these benefits are not being shared by all who are in need. Significant treatment disparities persist among ethnoracial minorities, including African Americans, in the United States (U.S.), including less access to and availability of healthcare resources and services, decreased likelihood of receiving treatment and remaining in treatment, and greater likelihood of receiving poor quality mental healthcare relative to Caucasians (Cook et al., 2014; Sue, 2006; United States Department of Health and Human Services [USDHHS], 2001).[1] Evidence also suggests that in addition to increased risk of trauma exposure and the development of PTSD (e.g., Gillespie et al., 2009), African Americans are less likely to seek treatment following trauma (Roberts, Gilman, Breslau, Breslau, & Koenen, 2011).

Compounding these issues are limitations regarding knowledge of the effectiveness of empirically supported treatments across racial and ethnic groups. Exposure-based cognitive behavioral treatments, such as prolonged exposure (PE), possess strong empirical support for treatment of PTSD, as do selective serotonin reuptake inhibitors (SSRIs), such as sertraline (Brady et al., 2000; Watts et al., 2013). However, the efficacy of these treatments among ethnoracial minority individuals, having been underrepresented in clinical research, is less understood (e.g., Miranda, Nakamura, & Bernal, 2003; Pole et al., 2008). This absence in clinical research limits both the external validity and generalizability of findings from prior clinical trials (Hohmann & Parron, 1996), as well as the ability of mental health professionals to most effectively treat individuals across ethnic and racial groups (Williams, Beckmann-Mendez, & Turkheimer, 2013). Notably, in PTSD, both prolonged exposure and cognitive processing therapy were initially validated in inner-city samples, drawing from diverse populations (Foa et al., 1999; Resick, Nishith, Weaver, Astin, & Feuer, 2002). More broadly however, the longstanding underrepresentation of ethnoracial minorities from treatment research and the subsequent insufficient empirical base (Hall, 2001) has prompted calls for increased treatment efficacy research with these groups (e.g., USDHHS, 2005). Secondary analyses from PTSD psychotherapy trials has suggested that African Americans respond to treatments comparably to Caucasians (e.g., Lester, Young-Xu, Resick, & Artz, 2010; Zoellner, Feeny, Fitzgibbons, & Foa, 1999), but this literature is limited. Research on pharmacotherapy efficacy for PTSD among African Americans is even more sparse (Alim et al., 2006), as nearly all trials examining the efficacy of SSRIs for PTSD have predominantly enrolled Caucasians (Marshall et al., 2007).

[1]In line with Pole, Gone, and Kulkarni, (2008) and Williams et al. (2013), the term “ethnoracial minority” will be used to include three federally recognized “racial minority” groups (African American, American Indians, Asian and Pacific Islander Americans), as well as one recognized “ethnic minority” group (Hispanic or Latino; USDHHS, 2001). The terminology in the current paper is also consistent with the guidelines of the American Psychological Association regarding multiculturalism and diversity in research (2003).

Rates of treatment completion are another important clinical outcome also understudied among ethnoracial minorities, further limiting broader understanding of the effectiveness of these treatments across groups. Across diagnoses and treatments, poor retention is generally associated with worse patient outcomes and inefficient use of resources (e.g., Barrett et al., 2008; Swift & Greenberg, 2012). Dropout is a pressing concern in treatments for PTSD, where attrition estimates for psychotherapy (Imel, Laska, Jakupcak, & Simpson, 2013; Hembree, Foa, Dorfan, Kowalski, & Tu, 2003) and pharmacotherapy for PTSD (Lurie & Levine, 2010) are around 18% or more. Findings from the limited studies of dropout and ethnoracial groups are somewhat mixed, though some literature suggests that African Americans may be more likely to drop out of PTSD treatment (e.g., Lester et al., 2010). Overall, similar to treatment response, conclusions regarding likelihood of treatment completion among African Americans lack certitude given the small number of studies and their underrepresentation in PTSD treatment research.

More effectively engaging and treating ethnoracial minorities is likely to be enhanced by greater understanding of treatment preferences and beliefs toward treatments, such as perceived treatment credibility and judgment of treatment rationales. Such factors have been consistently linked to response and retention across disorders (Swift & Callahan, 2009). Treatment beliefs, such as perceived credibility and reactions to rationales, play a crucial role in boosting rapport, patient engagement, therapeutic alliance, and therapy outcomes (e.g., Addis & Jacobson, 2000). Research to date examining race and PTSD treatment beliefs and preferences is sparse (Zoellner, Roy-Byrne, Mavissakalian, & Feeny, 2019). Yet, the need for additional research with these constructs may be particularly important among African Americans given evidence that, relative to Caucasians, they may hold more negative attitudes towards both psychological and pharmacological treatments (Wagner et al., 2005) and feel greater mistrust toward mental healthcare services (e.g., Whaley, 2001). These findings, in conjunction with the clinical significance of treatment beliefs and preferences, highlight the need for a more nuanced examination of these constructs as a potential avenue to better engage and treat African Americans with PTSD.

Beyond the established need to better understand treatment engagement and outcomes among ethnoracial minorities, another step in more effectively delivering these treatments is to also consider the diversity and heterogeneity within ethnoracial groups (e.g., Sue, 2006; Triffleman & Pole, 2010) rather than strictly adhere to conventional, broad categorizations of race. Within groups, this heterogeneity may include sociocultural characteristics, attitudes toward other ethnic groups, and ethnic identity, conceptualized as self-identification and a sense of belonging toward one’s group (Phinney, 1992). These constructs are likely to provide additional nuance to the conventional, dichotomous split of “Caucasian versus non-Caucasian” for subgroup analyses that have typically been used in treatment research (Triffleman & Pole, 2010). In particular, the assessment of cultural characteristics and acculturation, defined as the extent to which individuals identify with their own culture versus that of the dominant, nonminority culture, have been suggested as potentially useful constructs to address disparities and boost clinical outcomes (e.g., Miranda et al., 2003). In the context of mental health, the construct of acculturation has been shown to be complex, as it likely promotes social support in some circumstances, yet creates distress in others if caught between two conflicting cultures (Koneru, Weisman de Mamani, Flynn, &

Betancourt, 2007). More broadly, cultural variables have been identified as a means of better understanding psychopathology; a recent review for example of sociocultural factors and anxiety in Caucasians and African Americans (Hopkins & Shook, 2017) cites ethnic identity as a potential buffer against the impact of anxiety among the latter group specifically. Beginning to better understand the links between cultural attitudes and beliefs and evidence-based treatments is one step toward better implementing such interventions, improving outcomes, and, if needed, potentially adapting such treatments (e.g., Williams, Malcoun, Sawyer, Davis, Nouri, & Bruce, 2014). Critically, though cultural factors likely have an impact on treatment processes and outcomes such as treatment response and retention (e.g., Pole et al., 2008), they have yet to be systematically investigated in treatment research. Given their potential utility in further understanding aspects of race and culture, these within-group cultural variables – such as acculturation, ethnic identity, and attitudes toward other groups – and their potential impact on these relationships warrant further examination.

We examined African Americans and Caucasians receiving one of two treatments for PTSD, prolonged exposure (PE) or sertraline as part of a randomized clinical trial, regarding: treatment outcomes, treatment retention; and treatment beliefs and preferences. First, it was hypothesized that African Americans and Caucasians would respond similarly to both PE and sertraline. It was determined *a priori* to follow nonsignificant findings for the primary outcome, clinician-rated PTSD severity, with noninferiority testing to ensure that treatment efficacy could be considered clinically equivalent between groups. Next, it was hypothesized that African Americans would demonstrate poorer treatment retention for both treatments and would report less confidence and perceived credibility in both treatments compared to Caucasians, while both groups would report a preference for PE. Additionally, in light of the limitations of conventional classifications of race, the current study explored potential indirect effects of within-group cultural constructs – measured via acculturation, ethnic identity, and attitudes towards other ethnoracial groups – on the relationships between race and treatment efficacy, retention, and beliefs and preferences.

Method

Participants

The sample consisted of 173 African American and Caucasian treatment-seeking individuals who participated in a larger doubly randomized preference trial ($N = 200$) examining PE and sertraline treatment for chronic PTSD (Zoellner et al., 2019). All participants were between the ages of 18 and 65 and had a primary DSM-IV (American Psychiatric Association, 2000) diagnosis of chronic PTSD. Exclusion and inclusion criteria were designed to recruit a clinically representative sample of patients with chronic PTSD. Exclusion criteria included: current diagnosis of schizophrenia or other psychotic disorder, medically unstable bipolar disorder, depression requiring immediate psychiatric treatment or with psychotic features; alcohol or substance dependence within three months prior to assessment; severe self-injurious behavior or suicide attempt within three months prior to assessment; ongoing relationship with perpetrator (in assault cases); a change in dose of psychiatric medication within the past three months; medical contraindication for taking sertraline; or previous

non-response to adequate trial of either PE or sertraline. Ineligible participants were offered appropriate referrals.

The sample was 75.1% Caucasian (n = 130) and 24.9% African American (n = 43).[2] Within the sample, 24.3% (n = 42) were male and 75.7% (n = 131) were female, with a similar distribution in both Caucasian and African American groups. Mean age was slightly higher for African Americans (M = 40.47, SD = 9.02) compared to Caucasians (M = 36.79, SD = 11.80), $t(93) = 2.13$, $p = .04$, $d = 0.44$. Significant differences in education and income emerged within the sample, as 11.6% of African Americans held a Bachelor's degree compared to 36.9% of Caucasians, χ^2 (1, N = 173) = 8.58, $p = .003$, $phi = 0.24$, while 25.6% of African Americans earned more than $20,000 per year annually compared to 58.5% of Caucasians, χ^2 (1, N = 173) = 12.69, $p < .001$, $phi = 0.28$. Index traumas reported in the current sample were adult sexual assault (32.4%), adult non-sexual assault (23.7%), childhood sexual assault (15.6%), childhood physical assault (6.9%), accident (12.2%), death or violence to a loved one (7.5%), and combat/war (1.7%); reported index trauma did not differ by racial group. Average amount of time since index trauma was 11.26 years (SD = 12.24), with no difference between groups.

Interview Measures

PTSD Symptom Scale-Interview (PSS-I; Foa, Riggs, Dancu, &Rothbaum, 1993).—PTSD severity was assessed with the PSS-I, a 17-item interview measure reflecting DSM-IV symptom criteria. Each item is rated on a four-point Likert scale based on frequency and/or severity, with higher ratings indicating greater PTSD severity. The PSS-I is well-validated with good convergent validity and inter-rater reliability (Foa & Tolin, 2000). In the entire sample, over 10% of cases were rerated for inter-rater reliability; reliability was high for PTSD severity scores (ICC = .99) and PTSD diagnosis (κ = 1.00).

Hamilton Rating Scale for Depression ($HRSD_{24}$; Hamilton, 1960).—The HRSD is an interview assessing depressive symptoms with 24 items scored from either 0 to 2 or 0 to 4, with higher scores reflecting greater severity. The HRSD has excellent inter-rater reliability (r = .90) and good internal consistency (α = .76; Rehm & O'Hara, 1985). In the full sample, 10% of cases were rerated and indicated good reliability of the HRSD (ICC = .89).

Structured Clinical Interview for *DSM-IV* (SCID-IV; First, Spitzer, Gibbon, & Williams, 1995).—The SCID-IV, a well-validated semi-structured clinical interview, was used to help determine primary diagnosis and to screen for exclusion criteria. In the full sample, 10% of cases were rerated for inter-rater diagnostic reliability, which was acceptable (κ = .80).

[2]Race and ethnicity data were collected in line with National Institute of Health policy (2001), recording each participant's ethnic category (Hispanic or Latino versus Not Hispanic or Latino), and racial category (Caucasian, African American, Asian, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander). A vast majority of individuals in the trial identified as Not Hispanic or Latino (95%, n = 190). Due to the limited number of individuals in other racial groups (combined n = 27), analyses were restricted to African Americans and Caucasians.

Self-Report Measures

Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992).—The MEIM is a 20-item questionnaire measuring the extent to which individuals identify with their ethnic group. The MEIM assesses several aspects of ethnic identity: positive ethnic attitudes and sense of belonging, ethnic identity achievement, ethnic behaviors or practices, as well as other-group orientation. Confirmatory factor analysis indicated a two-factor structure (ethnic identity [EI] and other-group orientation [OGO]; Phinney, 1992) as the best fit (Ponterotto, Gretchen, Utsey, Stracuzzi, & Saya Jr., 2003). The EI subscale is 14 items assessing aspects of ethnic identity, such as positive ethnic attitudes and engagement in ethnic practices and behaviors (e.g., "I feel a strong attachment towards my own ethnic group."). The OGO subscale is 6 items reflecting attitudes and orientation toward other groups (e.g., "I like meeting and getting to know people from ethnic groups other than my own."). In this sample, internal consistency was good for the EI (α = .89) and OGO (α = .74) subscales. EI and OGO scores were used in indirect effects analyses, with higher scores indicating stronger ethnic identity and other-group orientation.

Pan-Acculturation Scale (PAN; Soriano & Hough, 2000).—The PAN is a 23-item measure based on a bidimensional model of acculturation which asks individuals rate the extent to which they identify with mainstream American culture versus that of their own cultural group on items pertaining to language use, values and beliefs, social environment, ethnic identity, and cultural traditions and practices. A similar, shorter 16-item version of the measure used in this study shows good internal consistency, with α ranging from .90 to .91 (Lau et al., 2005). Internal consistency for the current sample was good (α = .92). The American culture affiliation subscale of the PAN, with higher scores reflecting more acculturation, was used in the current study for indirect effects analyses.

Sheehan Disability Scale (SDS; Sheehan, 1983).—The SDS consists of 3 items rated on a Likert scale from 0 (*not at all*) to 10 (*extremely*), with higher scores reflecting greater impairment. The SDS assesses three domains of functioning: work, social activities, and family/home responsibilities. The SDS has adequate validity and reliability (α = .56 – .86; Leon, Shear, Portera, & Klerman, 1992). Internal consistency for the current sample was good (α = .77).

Credibility Scale (CS; Addis & Carpenter, 1999).—The CS is a 7-item self-report questionnaire adapted for PE and sertraline assessing perceived credibility, such as the extent to which patients believe the treatment to be logical, scientific, and efficacious. Items are rated on a 7-point Likert scale, with higher scores reflecting stronger perceived credibility. Internal consistency for the current sample was excellent for both PE (α = .90) and sertraline (α = .91).

Personal Reactions to Rationale (PRR; Addis & Carpenter, 1999).—The PRR is a 5-item self-report questionnaire assessing patient beliefs adapted for PE and sertraline examining perceived helpfulness in treating PTSD, and understanding and coping with symptoms. Items are rated on a 7-point Likert scale, with higher scores reflecting more

positive reactions. Internal consistency for the current sample was excellent for both PE (α = .93) and sertraline (α = .94).

Expectancy of Therapeutic Outcome (ETO; Foa, Rothbaum, Riggs, & Murdock, 1991).—The ETO is a 4-item self-report assessing expectations and confidence in treatment. Each item is a rated on a 9-point Likert scale, with higher scores reflecting greater perceived treatment credibility and expectations. Internal consistency for the current sample was excellent (α = .90).

Working Alliance Inventory-Patient (WAI; Tracey & Kokotovic, 1989).—The WAI 12-item short form is a self-report questionnaire assessing client-rated therapeutic alliance. Items (e.g., "We agree on what is important for me to work on.") were rated on a 7-point Likert scale, with higher scores reflecting stronger therapeutic alliance. The WAI was rated by clients at sessions 2 and 4 of treatment, with averaged scores from these sessions used in analyses. The WAI has good internal consistency (α = .83 – .98; Tracey & Kokotovic, 1989).

Responder status.—Responders were defined as those at post-treatment with PSS-I scores < 24 and impairment scores < 4 on the Clinical Global Impression Scale (CGI-I; Guy, 1976). The CGI-I is a brief clinician-rated measure assessing general, social, and occupational functioning on a 1–7 Likert scale, with higher scores reflecting greater impairment. This cutoff identifies the point at which an individual patient's level of functioning is statistically more likely to be in the functional rather than dysfunctional population (Jacobson & Truax, 1991).

Procedure

Data for this study came from a NIMH-funded treatment study for chronic PTSD. Preliminary eligibility was determined via phone screen utilizing a semi-structured interview, and potential participants were scheduled for an in-person intake. Following informed consent, independent evaluators (IEs) collected demographic information and completed diagnostic assessments (PSS-I, HRSD, SCID-IV) to determine study eligibility. After viewing standardized, counterbalanced videos describing each treatment and their respective rationale, the CS and PRR were completed and patients reported their treatment preference. Rationales included: efficacy information, an analogy about mechanism of action, procedure, and possible side effects. If eligible, participants came for a randomization appointment, where treatment condition was determined. At this randomization visit, a battery of self-report measures was completed (SDS, PAN, MEIM), after which participants received up to 10 weekly sessions of either PE or sertraline. At session 1, patients completed the ETO. Immediately following treatment, an IE blinded to treatment condition conducted a post-treatment evaluation, where PTSD and depression symptoms and functioning were assessed.

Treatments and Treatment Delivery

Psychotherapy (Prolonged Exposure; PE).—PE (Foa, Hembree, & Dancu, 2002) consisted of 10 weekly, 90–120 min sessions, including psychoeducation regarding common reactions to trauma, breathing retraining, approaching avoided situations outside of therapy

(i.e. *in vivo exposure*), and repeatedly revisiting the trauma memory (i.e. *imaginal exposure*). Patients were given weekly imaginal and *in vivo* homework.

Pharmacotherapy (Sertraline).—Pharmacotherapy consisted of 10 weeks of sertraline monitored by a study psychiatrist following a treatment manual (Brady et al., 2000). Sessions lasted up to 30 min, with the first session lasting approximately 45 min. Sertraline was adjusted according to a standardized titration algorithm (Brady et al., 2000), beginning at 25 mg/day and proceeding up to 200 mg/day, if indicated and tolerated. Mean end of treatment dosage for the current sample was 122.75 mg/day (*SD* = 77.71). During each visit, the psychiatrist monitored side effects, adjusted dosage of medication, and provided general encouragement and support.

Supervision and treatment integrity.—Treatment sessions were audio recorded or videotaped. All PE clinicians had at least master's level clinical training and received standardized training via workshops as well as weekly clinical supervision. All pharmacotherapists were board-certified psychiatrists. Treatment integrity was very good with no protocol violations observed (see Zoellner et al., 2019 for more detail).

Data Analyses

Analyses were intent-to-treat, with missing data multiply imputed (10 datasets) via SAS PROC MI and pooled across imputations via SAS PROC MI ANALYZE. All analyses examining outcome measures at post-treatment (PSS-I, HRSD, SDS) used models with pretreatment symptom severity as a covariate for each respective outcome measure. Analyses compared African Americans and Caucasians via ANCOVA or t-tests after checking for treatment interactions. As noted above, African Americans and Caucasians differed regarding household income and education at baseline, variables which were used as a proxy for SES. Covariates should be limited to as few as possible and should be uncorrelated (Kraemer, 2015). Given the substantial correlations between SES and race, SES variables were excluded from current reported analyses. To confirm results, analyses were run with SES variables as covariates, with parallel analyses producing virtually equivalent findings.

For the primary outcome measure (PSS-I), nonsignificant findings were followed up with noninferiority testing for the primary outcome measure (PSS-I) only to examine if the outcome was clinically equivalent between African Americans and Caucasians for both PE and sertraline. In these analyses, differences that fall within predetermined margins, established *a priori* based on statistical reasoning and clinical judgment (Kaul & Diamond, 2006), are considered to be clinically indistinguishable. Following the method of Nacasch and colleagues (2015), means of the differences between African Americans and Caucasians on each of the two treatments were first calculated. Next, confidence intervals were calculated by taking the product of the pooled standard error of these means by the critical *F* value needed to reject the hypothesis. Last, this product was added or subtracted from the observed difference means. PSS-I margins were set at 7, identical to those used in previous research (Nacasch et al., 2015) and drawing from the reliable change index formulated by Jacobson and Truax (1991) and applied in PTSD treatment research by Devilly and Foa

(2001). Additionally, Cohen's *d* effect sizes less than 0.2 (i.e., less than a small effect) between groups on the PSS-I were regarded as supporting non-inferiority, mirroring prior work by Nacasch and colleagues (2015).

Potential indirect effects of cultural within-group variables (acculturation [PAN], ethnic identity [EI], and other group orientation [OGO]) on the relationship between race and outcomes of interest (i.e., treatment outcome; beliefs and preferences; retention) were tested using a SPSS macro (Preacher, Rucker, & Hayes, 2007), collapsing across treatment condition if no interaction was observed. A bootstrapping method with $n = 5000$ bootstrap resamples was utilized. In these analyses, an indirect effect represents a significant mean difference between African Americans and Caucasians on an outcome of interest (e.g., treatment retention) that results from the effect of racial group on the indirect variable (e.g., ethnic identity) that in turn affects the outcome of interest (e.g., treatment retention; Hayes & Preacher, 2013). It was determined *a priori* to explore potential indirect effects even in the absence of a significant initial path; this approach adheres to more contemporary models of studying relationships among variables so as not to inadvertently neglect meaningful relationships between constructs (e.g., Hayes, 2009).

Results

Baseline Symptoms and Cultural Variables.

Table 1 presents relationships among baseline psychopathology and cultural variables. African Americans indicated stronger ethnic identity ($M = 2.88$, $SD = 0.64$) compared to Caucasians ($M = 2.43$, $SD = 0.65$), $t(171) = 4.11$, $p < .001$, $d = 0.71$, while Caucasians reported stronger other-group orientation ($M = 3.40$, $SD = 0.55$) relative to African Americans ($M = 3.19$, $SD = 0.58$), $t(171) = -2.04$, $p = .04$, $d = 0.36$. African Americans also reported lower levels of acculturation ($M = 7.63$, $SD = 8.72$) compared to Caucasians ($M = 12.04$, $SD = 8.44$), $t(171) = -2.83$, $p = .005$, $d = 0.51$. As seen in Table 2, no differences in psychopathology were observed at baseline between African Americans and Caucasians or between treatment conditions. Both groups indicated moderate to severe PTSD and moderate depressive symptoms and functional impairment. Early alliance was also compared between African Americans and Caucasians in each treatment, with no significant differences observed; these results are listed in Table 4.

Treatment Outcomes.

Consistent with hypotheses, African Americans and Caucasians generally showed similar treatment outcomes for PTSD severity (PSS-I), depression (HRSD), and functioning (SDS) in both PE and sertraline, listed in Table 2.

Noninferiority analysis suggested that the primary PTSD outcome between groups was clinically equivalent. The 95% confidence intervals of observed deltas (differences in means) was $[-\infty, 3.14]$ for PE and $[-\infty, 6.35]$ for sertraline. The upper endpoint of the confidence interval for the observed delta (African American group mean minus Caucasian group mean) was less than the *a priori* margin of 7, indicating noninferiority. Further, as noted in Table 2,

the observed effect sizes for PSS-I differences (d = 0.13 for PE and d = 0.09 for sertraline), were both in the "small effect" range, further supporting noninferiority.

In regard to dichotomous treatment response, logistic regression analyses controlling for pre-treatment PSS-I scores indicated that race did not predict responder status for either PE (χ^2 = 3.96, p = .28) or sertraline (χ^2 = 1.16, p = .52).

Indirect effects of cultural variables (acculturation [PAN], ethnic identity [EI], other group orientation [OGO]) on the relationship between race and treatment outcome were next examined, with each respective model controlling for pre-treatment symptom severity (i.e., PSS-I, HRSD, SDS). Treatment condition was initially entered into models to test for possible treatment moderation effects; no interactions were observed, after which both treatment conditions were collapsed and tests for indirect effects were run. Results showed that race directly affected other-group orientation (PSS-I model: b = 1.22, SE = 0.56, 95% CI [0.12, 2.33], p = .03, HRSD model: b = 1.13, SE = 0.56, 95% CI [0.03, 2.24], p = .04), with lower scores among African Americans. Lower other-group orientation scores predicted higher PTSD (b = −0.53, SE = 0.22 95% CI [−0.98, −0.10], p = .02) and higher depression scores (b = −0.57, SE = 0.24, 95% CI [−1.04, −0.10], p = .02) at post-treatment. The indirect effect of race on PTSD and depression treatment outcomes through OGO was significant, as indicated in Table 3, suggesting that race is linked to treatment outcomes through OGO. African Americans reported lower OGO, which was associated with worse treatment outcomes. There were no other indirect effects of these cultural variables on treatment outcome.

Treatment retention.

In the PE condition, 24 African Americans and 76 Caucasians were randomized, of whom 11 and 55 completed treatment, respectively. In the sertraline condition, 19 African Americans and 54 Caucasians were randomized, of whom 12 and 41 completed treatment, respectively. African Americans completed significantly fewer sessions in both treatment conditions, as depicted in Table 4. Notably, these results remained consistent for separate models covarying indices of SES, education and income.[3]

Indirect effects of cultural variables (acculturation [PAN)], ethnic identity [EI], other-group orientation [OGO]) on the relationship between race and number of treatment sessions were next examined. Race directly affected other-group orientation (b = 1.23, SE = 0.56, 95% CI [0.12, 2.33], p = .03), with lower scores among African Americans. Lower other-group orientation scores predicted fewer sessions attended (b = 0.27, 95% CI [0.11, 0.44], p = .001). The indirect effect of race on treatment retention through OGO was significant, as indicated in Table 3, suggesting that race is linked to treatment attendance through OGO. African Americans reported lower OGO, which was associated with worse treatment attendance. There were no other indirect effects of these cultural variables on treatment outcome. No indirect effects were observed for EI or PAN.

[3]Equivalent patterns of results were obtained in parallel analyses using a binary treatment completer variable (completed treatment/did not complete treatment), defined as attendance of 7 or more sessions. Equivalent results were also found for indirect effects analyses.

Treatment Beliefs and Preferences.

To examine treatment beliefs (CS, PRR, ETO), a series of *t*-tests compared African Americans and Caucasians in both treatment conditions. As indicated in Table 4, there were no significant differences between groups prior to treatment, suggesting similar beliefs regarding credibility and confidence in treatments. Treatment preferences were evaluated via chi-square, with no differences emerging between groups, χ^2 (1, N = 173) = 0.05, p = .83, *phi* = .03; both African Americans (55.8%) and Caucasians (59.2%) indicated preference for PE. Indirect effects of cultural variables (acculturation [PAN], ethnic identity [EI], other-group orientation [OGO]) on the relationship between race and treatment beliefs and preferences were next examined, with none observed for measures of treatment beliefs; this was also the case for treatment preference.

Discussion

There was no differential perceived utility or efficacy of PE and sertraline for PTSD treatment among Caucasians and African Americans, findings that are especially relevant given widespread calls for increased treatment research among ethnoracial minorities. In both PE and sertraline – two very different treatment options – groups demonstrated comparable outcomes, treatment-related beliefs, and treatment preferences. However, differences regarding treatment retention were notable, where African Americans attended significantly fewer sessions in both PE and sertraline. These retention findings are consistent with some recent literature indicating a similar pattern (e.g., Lester et al., 2010) and warrant follow-up investigation of the role of lower other-group orientation (e.g., attitudes and orientation toward other ethnoracial groups) potentially underlying differences in attendance.

Regarding treatment outcomes, African Americans and Caucasians both showed strong treatment responses to PE and sertraline, demonstrating considerable reductions in PTSD, depression symptoms, and functional impairment. Findings are in line with prior reviews showing the efficacy of PE and sertraline (Watts et al., 2013; Cusack et al., 2016) as effective treatments for PTSD, as well as a small subset of secondary analyses from prior clinical trials suggesting that African Americans and Caucasians respond similarly to PTSD treatments (e.g., Lester et al., 2010; Zoellner et al., 1999) and mental disorders more broadly (e.g., Schraufnagel, Wagner, Miranda, & Roy-Byrne, 2008). Additionally, non-inferiority testing on the primary outcome measure, interviewer-rated PTSD severity, showed clinically equivalent outcomes.

African Americans in both treatments attended significantly fewer sessions, contributing to a small yet growing literature linking African Americans and poor PTSD treatment retention even when taking indices of SES, such as education and income, into account as the current study did (e.g., Lester et al., 2010; Snowden, 2001; Spoont et al., 2015). Closer examination of the impact of barriers to treatment such as practical resources, transportation difficulties, or unfamiliarity with mental healthcare may also be warranted, as they have been linked to worse treatment retention among ethnoracial minorities (e.g., Davis, Ressler, Schwartz, Stephens, & Bradley, 2008). It is also possible that some patients felt they had achieved sufficient symptom reduction and had adequately addressed their respective treatment

goals. Importantly, African Americans in this study demonstrated similar outcomes, further highlighting the importance of facilitating treatment retention with these patients.

In the current study, cultural attitudes toward other groups contributed to the relationships between race and both treatment retention and PTSD and depression outcomes. Positive attitudes toward other groups – predictive of larger reductions in PTSD and depression severity as well as better treatment attendance – were significantly lower among African Americans. Though literature regarding within-group cultural aspects of race and ethnicity is extremely limited, this cultural construct may reflect personal openness or willingness to engage with other people and experiences. This possible reluctance regarding engagement and disclosure is consistent with prior research regarding African Americans and clinical research, where African Americans have reported concern regarding risks in clinical research, as well as a desire to confide only in close others (Williams et al., 2013). This is also consistent with literature regarding cultural mistrust among African Americans toward mental healthcare more broadly (e.g., Whaley, 2001). Additionally, other-group orientation has been found to be negatively associated with cultural mistrust (Phelps, Taylor, & Gerard, 2001), also in line with the current pattern of findings. It is also critical to note that attitudes toward other groups are likely to be more negatively shaped when one is part of a historically marginalized group, as is the case for African Americans (Williams et al., 2013). It should also be noted, however, that the relationship between this construct and attendance was observed across both African Americans as well as Caucasians, suggesting relevance across racial group. Clinically, this construct may impact treatment, possibly reflecting reluctance to engage and stay in treatment or hesitancy regarding personal disclosure, each of which may adversely affect therapeutic outcomes.

Prolonged exposure was preferred to sertraline for both Caucasians and African Americans, consistent with prior research investigating treatment choice (e.g., Feeny et al., 2009; Feeny, Zoellner, & Kahana, 2009). African Americans and Caucasians did not differ on personal reactions to and confidence in PE and sertraline. Although some literature has suggested more pessimistic or distrustful treatment beliefs toward mental health interventions (e.g., Wagner et al., 2005), other literature suggests that African Americans may actually be more likely than Caucasians to believe in the helpfulness of mental health professionals (Anglin, Alberti, Link, & Phelan, 2008) and may also have higher expectancies regarding benefits of treatment (Lester et al., 2010). Yet, African Americans are often less likely to seek treatment following trauma (Roberts et al., 2011). Given that African Americans responded favorably to treatment rationales and expressed confidence in the utility of treatments, it is critical to address discrepancies between these positive treatment beliefs and lower rates of treatment-seeking and completion.

Consistent with prior research (Williams, Chapman, Wong, & Turkheimer, 2012), African Americans reported stronger ethnic identity as compared to Caucasians. Ethnic identity has been suggested as a potential protective factor against the negative effects of racial discrimination (Williams et al., 2012) and anxiety (Hopkins & Shook, 2017). It has also been associated with better psychological well-being and resilience (Lee, 2003) and linked to lower depression and anxiety among African Americans (Williams et al., 2012). Taken together, ethnic identity may provide resilience against psychopathology. Although there

were no indirect effects tied to this construct, the differences in ethnic identity between African Americans and Caucasians warrant further attention to gain a more nuanced understanding of this construct and its place in mental health treatment.

Acculturation, or the extent to which individuals identify with their own culture versus that of the dominant culture, did not appear to substantially impact the relationship between race and outcomes, beliefs, preferences, or retention. This may reflect its lack of significance in PE and sertraline treatment or, alternatively, a complex relationship and heterogeneous construct that are difficult to index (Koneru et al., 2007). There appears to be significant within-group and between-group differences among ethnic and racial minorities regarding acculturation and its impact (Sue & Chu, 2003). Additionally, the relationship between the construct of acculturation and treatment is likely to be more relevant for some groups than others; for example, it is possible that the current measure used is more germane to those who have recently immigrated. Better understanding this construct and the links between within-group differences and treatment outcomes reflect important areas for future work.

The present results should be interpreted with several limitations in mind. First, a wide range of racial groups were unable to be examined given sample size limitations, a common difficulty in research examining ethnoracial minorities (Sue, 2006). Consideration of the current study's conclusions should also be weighed against the distribution of race within our sample, which included significantly more Caucasians relative to African Americans. As results are drawn from a relatively small sample of African Americans, additional research investigating within-group cultural constructs will strengthen conclusions in this domain. However, the sample size of African Americans in the current study provided the opportunity for preliminary yet in-depth examination of an ethnoracial minority group that has been understudied in psychotherapy and pharmacotherapy research. Second, the current study was unable to examine provider/patient match. In lieu of this, early alliance was examined, which did not appear to explain differences in retention, as African American and Caucasians rated early alliance comparably. Third, because only treatment-seeking individuals were investigated, the current study did not examine barriers to initiating treatment, which have been shown to impact treatment attendance (e.g., Davis et al., 2008). Practical and financial resources via examination of household income and education, and retention effects remained robust when accounting for these variables. SES can be operationalized and defined in various ways, as can the relationship between SES and race (e.g., Williams, Mohammed, Leavell, & Collins, 2010). Though the current study did not include a comprehensive examination of SES, the findings did not differ when controlling for income and education. Fourth, the psychometric properties of the acculturation measure are less established. This measure has been used in other studies (e.g., Lau et al., 2005; Bedard-Gilligan, Jaeger, Echiverri-Cohen, & Zoellner, 2012), however, and in the current sample there was strong internal consistency. In addition, the current study highlights cultural constructs and their links to mental health treatment, an area where additional understanding is needed.

Treatment outcomes and patient beliefs and preferences did not differ between Caucasians and African Americans, and the groups were functionally equivalent in terms of post-treatment PTSD severity. However, the current findings contribute to a growing literature

hinting at suboptimal rates of retention among African Americans. Taken with prior treatment literature, there appears to be a clear need to address this issue, increase treatment engagement, and boost retention among African Americans. Notably, several aspects of treatment – retention and treatment outcome – were consistently and at times strongly linked to a within-group cultural variable, other-group orientation, a construct that has also been tied to trust, engagement, and openness. While preliminary, the current study provides key future directions line with prior calls of researchers for nuanced investigations into the interactions between race, cultural factors, and mental health interventions. These findings highlight the potential utility of complementing traditional categorizations of race and ethnicity, as models taking into account within-group cultural variables in increasingly nuanced ways may be more informative in understanding the relationships between race and treatment in comparison to conventional, binary categories.

Acknowledgement:

The authors thank Allison Baier for her careful review of this manuscript.

Funding: Preparation of this manuscript was supported by grants to Drs. Zoellner and Feeny from the National Institute of Mental Health (R01 MH066347, R01 MH066348) and the William T. Dahms, M.D. Clinical Research Unit, funded under the Cleveland Clinical and Translational Science Award (UL1 RR024989).

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- African American and Caucasian patients differed on cultural constructs.
- African Americans and Caucasians achieved similar PTSD treatment response.
- African Americans attended significantly fewer sessions in both PE and sertraline.
- Indirect effects analyses linked response and retention to cultural constructs.

Table 1

Correlations among Baseline Psychopathology Scores and Cultural Variables (N = 173)

	1.	2.	3.	4.	5.	6.
1. PTSD Severity (PSS-I)	-					
2. Depression (HRSD)	.63**	-				
3. Functioning (SDS)	.36**	.38**	-			
4. Ethnic Identity (MEIM: EI)	−.16*	−.17*	.01	-		
5. Other-Group Attitudes (MEIM: OGO)	−.10	−.16*	−.14	.13	-	
6. Acculturation (PAN)	.08	.08	−.05	−.30**	−.16*	-

Note. PSS-I = PTSD Symptom Scale-Interview version; HRSD = Hamilton Rating Scale for Depression; SDS = Sheehan Disability Scale; MEIM: Multigroup Ethnic Identity Measure; EI: Ethnic Identity subscale; OGO: Other-Group Orientation subscale; PAN: Pan-Acculturation Scale.

** $p < .001$;

* $p < .05$

Table 2

Pretreatment Means with Standard Deviations and Pretreatment Symptom Severity-Adjusted Means with Standard Deviations of Psychopathology Scores Between Racial Groups at Posttreatment (N = 173)

	Pre-treatment				***Post-treatment***			
	African Americans (*n* = 43)	**Caucasians (*n* = 130)**			**African Americans (*n* = 43)**	**Caucasians (*n* = 130)**		
Measures	**Mean (*SD*)**	**Mean (*SD*)**	***F***	***d***	**Mean (*SD*)**	**Mean (*SD*)**	***F***	***d***
PE								
PTSD Severity (PSS-I)	28.71 (*7.34*)	29.76 (*6.43*)	0.68	0.14	9.58 (*12.59*)	11.07 (*10.81*)	0.54	0.13
Depression (HRSD)	25.06 (*12.86*)	22.49 (*9.42*)	1.06	0.21	11.77 (*12.93*)	11.85 (*11.25*)	0.02	0.01
Functioning (SDS)	18.71 (*7.30*)	18.43 (*6.53*)	0.17	0.03	8.98 (*10.19*)	11.10 (*8.89*)	0.95	0.22
Sertraline								
PTSD Severity (PSS-I)	30.79 (*6.92*)	29.28 (*6.55*)	0.85	0.20	13.67 (*11.99*)	12.61 (*11.54*)	0.32	0.09
Depression (HRSD)	26.37 (*11.43*)	24.53 (*10.17*)	0.66	0.16	17.09 (*12.16*)	12.26 (*11.46*)	1.46	0.41
Functioning (SDS)	19.26 (*7.96*)	19.90 (*6.36*)	0.35	0.08	12.99 (*10.46*)	10.97 (*9.11*)	0.73	0.21

Note. PE: Prolonged Exposure; PSS-I = PTSD Symptom Scale-Interview version; HRSD = Hamilton Rating Scale for Depression; SDS = Sheehan Disability Scale.

Table 3

Indirect Effects of Cultural Variables on Treatment Outcomes (N = 173)

Measures	Indirect effect	*SE*	LL 95% CI	UL 95% CI
Ethnic Identity (*MEIM: EI*)				
PTSD Severity (PSS-I)	−0.23	0.30	−0.89	0.30
Depression (HRSD)	−0.11	0.30	−0.75	0.49
Functioning (SDS)	−0.02	0.20	−0.42	0.38
Sessions attended	−0.01	0.10	−0.21	0.18
Other-Group Attitudes (*MEIM: OGO*)				
PTSD Severity (PSS-I)	−0.65*	0.44	−1.92	−0.06
Depression (HRSD)	−0.65*	0.45	−1.98	−0.05
Functioning (SDS)	−0.10	0.25	−0.80	0.28
Sessions attended	0.34*	0.20	0.04	0.87
Acculturation (*PAN*)				
PTSD Severity (PSS-I)	−0.14	0.20	−0.63	0.18
Depression (HRSD)	−0.18	0.21	−0.72	0.16
Functioning (SDS)	−0.14	0.16	−0.53	0.11
Sessions attended	−0.03	0.08	−0.21	0.10

Note. MEIM: Multigroup Ethnic Identity Measure; EI: Ethnic Identity subscale; OGO: Other-Group Orientation subscale; PAN: Pan-Acculturation Scale; PSS-I = PTSD Symptom Scale-Interview version; HRSD = Hamilton Rating Scale for Depression; SDS = Sheehan Disability Scale.

Bootstrapping sample size = 10,000. LL = lower limit; UL = upper limit; CI = confidence interval.

* $p < .05$

Table 4

Means and Standard Deviations of Treatment Beliefs, and Attendance Between Racial Groups (N = 173)

	African Americans (*n* =43)	Caucasians (*n* =130)		
Measures	**Mean (*SD*)**	**Mean (*SD*)**	***t***	***d***
PE				
Treatment Credibility (CS)	37.77 (*7.41*)	37.03 (*6.96*)	0.57	0.10
Reaction to Rationale (PRR)	27.72 (*6.30*)	26.94 (*6.27*)	0.71	0.12
Outcome Expectancy (ETO)	24.16 (*6.61*)	23.64 (*6.63*)	0.38	0.08
Sessions attended	5.67 (*4.02*)	7.97 (*3.41*)	−2.54*	0.87
Early alliance (WAI)	73.12 (*18.09*)	66.78 (*16.08*)	1.56	0.32
Sertraline				
Treatment Credibility (CS)	34.77 (*8.39*)	34.15 (*8.44*)	0.42	0.07
Reaction to Rationale (PRR)	23.49 (*9.27*)	20.84 (*7.46*)	1.89	0.31
Outcome Expectancy (ETO)	24.42 (*6.63*)	22.00 (7.35)	1.21	0.35
Sessions attended	5.05 (*3.47*)	7.19 (3.59)	−2.25*	0.53
Early alliance (WAI)	64.71 (*20.23*)	62.20 (*17.14*)	0.51	0.12

Note. PE: Prolonged Exposure; CS = Credibility Scale; PRR = Personal Reactions to Rationale; ETO = Expectancy of Therapeutic Outcome; WAI = Working Alliance Inventory (Client Rated) at Sessions 2 and 4.

CS and PRR completed at randomization visit; ETO completed at session 1.

* $p < .05$