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Posttraumatic Symptomatology and Alcohol Misuse among Black College Students: Examining the Influence of Anxiety Sensitivity

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Abstract

Objective: Posttraumatic stress symptoms (PTSS) have been found to be associated with alcohol (mis)use among college students. Anxiety sensitivity has been theoretically and empirically linked to both PTSS and alcohol (mis)use. The goal of the present study was to extend research by examining the relations among PTSS, anxiety sensitivity, and alcohol misuse within a sample of trauma-exposed Black college students.

Methods: Participants were 121 Black undergraduate college students who endorsed exposure to a traumatic event (M age = 22.98, 77.7% female).

Results: Correlational findings provide support for significant positive relations between PTSS and both anxiety sensitivity and alcohol misuse. Further, analyses revealed a significant indirect effect of anxiety sensitivity on alcohol misuse through PTSS. Specifically, greater anxiety sensitivity was associated with higher levels of PTSS, which, in turn, were associated with higher levels of alcohol misuse.

Conclusions: These findings suggest that the assessment of anxiety sensitivity may be useful in identifying trauma-exposed Black individuals who are likely to develop alcohol misuse and the clinical utility of addressing PTSS in this population reporting anxiety sensitivity to possibly prevent alcohol misuse and related negative consequences.

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Keywords

trauma; posttraumatic stress symptoms; alcohol misuse; anxiety sensitivity; black individuals; college students

Alcohol use and misuse are highly prevalent among college students. Regarding past month rates of alcohol (mis)use, 59.4% of college students report alcohol use, 39.0% report binge drinking, and 12.7% report heavy drinking; these rates are significantly higher than those of same-aged adults not enrolled in college (50.6%, 33.4%, and 9.3%, respectively; Substance Abuse and Mental Health Administration [SAMHSA], 2014). Moreover, college students are significantly more likely to meet criteria for alcohol use disorder (20.4%) than same-aged peers not in college (17.0%; Blanco et al., 2008). Posttraumatic stress symptoms (PTSS) is one factor that has been found to increase risk for alcohol (mis)use among adults and college students in particular (Kaysen et al., 2014; Possemato et al., 2015; Simpson, Stappenbeck, Luterek, Lehavot, & Kaysen, 2014). The relation of PTSS to alcohol (mis)use may be particularly salient among Black college students. Black individuals have been found to be at increased risk for developing PTSS, even when considering relevant demographic and trauma-related factors ($OR = 1.22$; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011). Moreover, despite lower overall rates of alcohol use compared to White individuals (O'Malley & Johnston, 2002; SAMHSA, 2014), there is evidence that Black individuals who use alcohol are more likely to experience alcohol-related problems than White individuals, including higher rates of alcohol use disorders (McCabe, West, Jutkiewicz, & Boyd, 2017), greater negative social consequences (Mulia, Ye, Greenfield, & Zeng, 2009), and more alcohol-related legal problems (Zapolski, Pedersen, McCarthy, & Smith, 2014). The above findings suggest the need to better understand factors that explain the association of PTSS to alcohol (mis)use among trauma-exposed Black college students.

Anxiety sensitivity may be an important factor to consider in this regard. Anxiety sensitivity refers to a fear of anxiety and anxiety-related physical sensations, typically stemming from a misinterpretation of what these sensations imply, and their perceived social (i.e., peer derogation), cognitive (i.e., mental incapacitation), and physical (i.e., health problems) consequences (Reiss & McNally, 1985). For example, a person with high anxiety sensitivity might incorrectly misinterpret physical symptoms of anxiety (e.g., a racing heart, chest pain) as an indication of a catastrophic health concern (e.g., heart attack), leading to rumination about such symptoms and possible panic attacks. Not surprisingly, anxiety sensitivity is associated with various mental health outcomes (Naragon-Gainey, 2010; Olatunji & Wolitzky-Taylor, 2009; Taylor & Cox, 1998; Taylor, Koch, & McNally, 1992), including PTSS (Keogh, Ayers, & Francis, 2002; Marshall, Miles, & Stewart, 2010; Taylor et al., 1992).

Anxiety sensitivity and PTSS have been proposed to relate to one another in two important ways. First, a predisposition for anxiety sensitivity may increase PTSS susceptibility. Individuals with high levels of anxiety sensitivity may be more likely to have an intensified response to both the traumatic stressor and the subsequent posttraumatic reaction, as they would be more fearful of anxiety-related sensations elicited by the stressor. Thus, the

heightened reaction to both the stressor, and their own posttraumatic response, would then magnify their emotional reaction and subsequent risk for developing PTSS (Marshall, Miles, & Stewart, 2010; Taylor, 2004). The second hypothesized relation suggests that anxiety sensitivity can be produced by exposure to a traumatic stressor. That is, a traumatic stressor may cause an individual to develop a fear of the anxiety-provoking experience (i.e., traumatic stressor) and the associated anxiety-related sensations. This may then amplify the intensity of the posttraumatic reaction, leading to greater PTSS (Marshall, Miles, & Stewart, 2010; Taylor, 2004). To our knowledge, no research has examined the relation of PTSS to anxiety sensitivity among Black individuals; this is an important avenue for future research.

Regarding the relation of anxiety sensitivity to alcohol (mis)use, tension-reduction theory (Capell & Greeley, 1987) posits that alcohol is used because it produces a rewarding sensation by reducing tension (an aversive state). Individuals with high anxiety sensitivity may be particularly motivated to use alcohol to reduce physiological arousal that they fear (Stewart, Samoluk, & MacDonald, 1999). While effective in the immediate moment, efforts to control, suppress, or avoid emotion states often have paradoxical effects (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), increasing distress and motivation to use alcohol in the future (Chapman, Gratz, & Brown, 2006; Gratz & Tull, 2010); this may heighten risk for alcohol misuse. Consistent with theory, empirical research has linked anxiety sensitivity with a wide range of alcohol (mis)use outcomes, including higher rates of drinking, drinking to excess (Stewart, Peterson, & Pihl, 1995), alcohol use disorder (Taylor et al., 1992), negatively reinforced drinking (Lawyer, Karg, Murphy, & Dudley, 2002), and drinking to cope (Stewart & Zeitlin, 1995; Novak, Burgess, Clark, Zvolensky, & Brown, 2003), to name a few. Findings of these studies indicate that anxiety sensitivity is positively associated with alcohol (mis)use, highlighting anxiety sensitivity as a potential risk factor in the development of alcohol misuse.

The current study aims to extend research in important ways. First, while past studies provide support for a relation of anxiety sensitivity to both PTSS and alcohol (mis)use separately, there has been limited research examining how anxiety sensitivity and PTSS, together, relate to alcohol (mis)use. Of particular relevance to the current study, investigations examining anxiety sensitivity, PTSS, and alcohol (mis)use together have not explored the directionality of the PTSS-anxiety sensitivity relation in association to alcohol (mis)use. The current study proposes that the direction of these relations may be reciprocal: pre-existing anxiety sensitivity may increase PTSS by intensifying posttraumatic reactions, and, simultaneously, PTSS may contribute to or amplify anxiety sensitivity as individuals may become sensitive to arousal-related sensations following a traumatic stressor. We propose that both conceptualized pathways will relate to greater alcohol misuse. Specifically, heightened physiological arousal among individuals with PTSS (Litz, Orsillo, Kaloupek, & Weathers, 2000) may lead to catastrophic interpretations of what these sensations imply, which may then produce and/or amplify symptoms of anxiety sensitivity. Discomfort associated with PTSS and anxiety sensitivity may prompt alcohol use to reduce this aversive state. Conversely, individuals with already elevated levels of anxiety sensitivity may be more reactive to both the initial traumatic stressor and the subsequent response (e.g., physiological arousal), leading to greater PTSS. As a result, these individuals may be motivated to avoid physiological arousal given its association with traumatic memories and

cues (American Psychiatric Association, 2013). Thus, individuals who experience PTSS and anxiety sensitivity may be particularly motivated to use alcohol to reduce aversive sensations of tension, consistent with tension reduction theory (Conger, 1956). Thus, anxiety sensitivity and PTSS may, together, help explain alcohol misuse among trauma-exposed individuals. Second, the few studies examining anxiety sensitivity, PTSS, and alcohol (mis)use have explored other alcohol-related outcomes, specifically motives for alcohol use (Berenz et al., 2016) and alcohol consumption (Gillihan, Farris, & Foa, 2011), and alcohol misuse is a stronger predictor of negative alcohol-related consequences. Finally, research on anxiety sensitivity and its relation to both PTSS and alcohol (mis)use has utilized predominantly White samples (e.g., Berenz et al., 2016). Investigations are needed to explore whether these results extend to diverse populations, including those comprised of predominantly Black individuals. Such findings will speak to the generalizability of research in this area, informing culturally-sensitive and competent theory, research, and practice.

Addressing these limitations in the literature, the present study examined the relations among PTSS, anxiety sensitivity, and alcohol misuse in a sample of trauma-exposed Black college students. Specifically, we examined whether anxiety sensitivity explains the association between PTSS and alcohol misuse, and as an alternative model, whether PTSS explains the association between anxiety sensitivity and alcohol misuse. Given evidence for a relation of anxiety sensitivity to both PTSS (Davidson & Foa, 1991; Jones & Barlow, 1990; Mellman & Davis, 1985; Taylor et al., 1992) and alcohol misuse (Lawyer et al., 2002; Novak et al., 2003; Stewart et al., 1995; Stewart & Zeitlin, 1995; Taylor et al., 1992), separately, we hypothesized that anxiety sensitivity would be significantly positively associated with both PTSS and alcohol misuse. Additionally, we hypothesized that a model with anxiety sensitivity explaining the PTSS-alcohol misuse relation would be significant, which would suggest that more PTSS is associated with increased anxiety sensitivity, which, in turn, is associated with greater alcohol misuse. An alternative, and equally plausible, model was hypothesized with PTSS accounting for the anxiety sensitivity-alcohol misuse relation, which would suggest that increased anxiety sensitivity is associated with more PTSS, which then is associated with greater alcohol misuse.

Method

Procedure and Participants

All procedures were reviewed and approved by the Jackson State University Institutional Review Board. Participants from the Introduction to Psychology courses were recruited. Specifically, research assistants were given permission to announce and subsequently administer current study measures to interested students at the end of these class periods. Participants were first informed of study details and had the opportunity to ask questions. Next, interested students provided written informed consent and completed measures in a small group setting (i.e., between 20 and 30 students completed the study measures in a classroom). As compensation, participants received extra credit.

The original sample comprised of 258 undergraduates at a historically black university in the southern United States. We excluded individuals who (a) identified as a race/ethnicity other than African American ($n = 15$) or (b) did not endorse a Criterion A traumatic event (see

Measures; $n = 121$). The subsample utilized in the current study included 122 Black college students. Participants ranged in age from 18 to 42, with an average age of 22.98 ($SD = 5.84$), and were majority female 77.7% ($n = 94$).¹ Most participants were unemployed ($n = 69$, 56.6%); 33.6% ($n = 41$) were employed part-time and 9.8% ($n = 12$) were employed full-time. The majority of the sample reported an annual family income equal to or greater than \$20,000 ($n = 89$; 73.0%).

Measures

The Life Events Checklist (LEC; Gray, Litz, Hsu & Lombardo, 2004) is a 17-item self-report measure designed to screen for traumatic events in a respondent's lifetime. The LEC assesses exposure to 16 traumatic events and includes one item assessing any other extraordinarily stressful event not captured in the first 16 items.² For each item, the respondent is asked to indicate if: (a) the event happened to them personally, (b) they witnessed the event, or (c) they learned about the event. To determine whether or not participants met DSM-IV-TR Criterion A traumatic exposure for PTSD (APA, 2000), and consistent with past research (Tull, Barrett, McMillian, & Roemer, 2007; Weiss et al., 2012), respondents who reported direct (i.e., the event happened to them personally) or indirect (i.e., they witnessed or learned of the event) exposure to at least one traumatic event were also asked to indicate which of the events was most traumatic and whether or not they experienced fear, helplessness, and/or horror as a result. The LEC has demonstrated convergent validity with measures assessing varying levels of exposure to traumatic events and psychopathology known to relate to traumatic exposure (Gray et al., 2004).

The PTSD Checklist – Civilian Version (PCL-C; Weathers et al., 1993) is a 17-item self-report measure of the severity of re-experiencing, avoidance, and hyperarousal PTSS. Participants completed the PCL-C referring to the traumatic event identified as most stressful on the LEC. Using a 5-point Likert-type scale (1 = *not at all*, 5 = *extremely*), participants rate the extent to which each symptom has bothered them in the past month. Higher scores indicate more severe PTSS symptoms. The PCL-C has been found to have excellent internal consistency and test-retest reliability in college students (Ruggiero et al., 2003). According to Blanchard et al. (1996), a score of 44 or above on the PCL-C is indicative of a probable posttraumatic stress disorder (PTSD) diagnosis (see Ruggiero et al., 2003) for evidence supporting the use of this cut-off score in college student samples). Internal consistency of the overall score in this sample was excellent ($\alpha = .95$).

The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) is an 18-item self-report questionnaire designed to assess fear of bodily symptoms associated with anxious arousal (e.g., increased heart rate, shortness of breath, dizziness) due to beliefs that these sensations will have negative somatic, cognitive, or social consequences. Participants rate each item using a 5-point Likert-type scale (0 = *very little*, 4 = *very much*). A composite score was

¹Among individuals attending Jackson State University, 63.6% identify as female. The larger sample was comprised of 66.5% females.

²Of note, individuals that indicated any other extraordinarily stressful event not captured in the first 16 items as the most distressing had their written responses reviewed. Of the six individuals identified, it was unclear whether four would have met Criterion A (e.g., one reported relationship conflict broadly). For sensitivity purposes, we excluded these four individuals from the analysis, and then re-ran the models. Our findings remained the same, so we included the full sample in the final analysis.

obtained by summing all of the items. Higher scores indicate greater anxiety sensitivity. Internal consistency in the current sample was good ($\alpha = .93$). Of note, the ASI-3 has been found to demonstrate adequate configural and metric/scalar invariance (indicating construct equivalence) across White, Latina/o, and Black participants (Fergus, Kelley, & Griggs, 2017).

The Alcohol Use Disorder Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) is a 10-item self-report measure that assesses alcohol consumption, drinking behaviors, adverse reactions to drinking, and alcohol-related problems. Five of the ten questions ask participants to rate items using a 5-point Likert-type scale (0 = *never*, 4 = *daily or almost daily*). Two of the questions ask participants to respond using a 3-point scale (0 = *no*, 2 = *Yes, but not in the last year*, 4 = *Yes, during the last year*), and one of the questions asks respondents to indicate their typical number of daily drinks consumed on a 5-point scale (0 = *1 or 2*, 4 = *10 or more*). A composite score is obtained by summer all of the items. Higher scores indicate greater likelihood of alcohol misuse. The AUDIT shows good reliability and validity (Saunders et al., 1993). A score of 8 or higher for men and 7 or higher for women is related to hazardous or harmful drinking patterns (Babor, Higgins-Biddle, Saunders, Monteiro, & World Health Organization, 2001). Cronbach's α in the current study was .86.

The Depression Anxiety Stress Scale – 21 (DASS-21; Lovibond & Lovibond, 1995) is a 21-item self-report instrument designed to measure past-month psychological distress across three domains: depression (e.g., “I felt that I had lost interest in just about everything”), anxiety (e.g., “I felt I was close to panic”), and stress (e.g., “I found myself getting upset rather easily”). Participants are asked to rate their level of agreement to each statement on a 4-point Likert-type scale (0 = *Did not apply to me*, 3 = *Applied to me very much, or most of the time*). Scores for the DASS-21 depression, anxiety, and stress scales are calculated by summing respective items. Higher scores indicate greater psychological distress. The DASS-21 has demonstrated good psychometric properties (Sinclair et al., 2012). The current analysis used the anxiety subscale to control for anxiety. Reliability in the current study was good for the anxiety subscale ($\alpha = .84$).

Demographic information.—All participants completed a demographics form assessing age, gender, employment status, and annual household income. These characteristics were examined as potential covariates.

Data Analysis

Study variables were examined for assumptions of normality and multicollinearity using recommendations set by Tabachnick and Fidell (2007). Descriptive information and Pearson correlations were calculated to examine intercorrelations among the primary study variables. Next, we utilized one-sample *t*-tests to compare the mean score of anxiety sensitivity obtained in our sample of Black individuals to the mean scores obtained in the predominantly White sample used to validate the ASI-3 (Taylor et al., 2007), as well as a predominately White trauma-exposed sample (Berenz et al., 2016).

Analyses were then conducted to examine the direct and indirect associations among anxiety sensitivity, PTSS, and alcohol misuse. In the first model, PTSS was included in the model as the predictor (X), alcohol misuse as the outcome (Y), and anxiety sensitivity as the mediating variable. This model was tested to examine how anxiety sensitivity indirectly affects the relation between PTSS and alcohol misuse.

An alternative model was tested to examine the reverse relation between PTSS and anxiety sensitivity on alcohol misuse. Specifically, anxiety sensitivity was included in the model as the predictor (X), alcohol misuse as the outcome (Y), and PTSS as the mediating variable. This model was tested to examine how PTSS indirectly affects the relation between anxiety sensitivity and alcohol misuse in a Black sample.

The analysis was conducted using SPSS macro PROCESS (model 4). PROCESS uses ordinary least squares regression and bootstrapping procedures, which is a nonparametric resampling procedure that is considered the most powerful and effective method for estimating the significance of indirect effects, does not assume normal distribution, and is robust against Type 1 errors (Preacher and Hayes, 2004). Bootstrapping was done with 10,000 random samples generated from the observed covariance matrix to estimate 95% confidence intervals (CIs) and significance values. The mediation is considered significant if the upper and lower bounds of the 95% confidence interval does not contain zero (Preacher & Hayes, 2004). As recommended by Hayes (2009), the regression coefficients are all reported in unstandardized form. Of note, although previous approaches to mediation required demonstration of a significant relation between the independent and dependent variables (see Baron & Kenny, 1986; Judd & Kenny, 1981; James & Brett, 1984), more recent evidence (see Hayes, 2009; MacKinnon et al., 2000; Rucker, Preacher, Zakary, Tormala, & Petty, 2011; Shrout & Bolger, 2002; Zhao et al., 2010) suggests that this perspective is too restrictive and may impair theory development and testing. Moreover, simulation studies show that mediation can occur when the total or direct effects are missing (Rucker et al., 2011).

In both models, the a paths represent the associations between the predictor (Model 1: PTSS; Model 2: anxiety sensitivity) and the mediator (Model 1: anxiety sensitivity; Model 2: PTSS). The b paths represent the associations between the mediator variable and the outcome (alcohol misuse). The c' path represent the direct path from the predictor to the outcome, while controlling for the indirect paths in the model. The indirect effects are the product of paths a and b . Given that anxiety has been shown to significantly influence PTSS (Bromet, Sonnega, & Kessler, 1998), anxiety sensitivity (Naragon-Gainey, 2010), and alcohol misuse (Sloan, Roache, & Johnson, 2003), anxiety (measured by the DASS-21) was controlled for in the mediation models.

Results

Descriptive Data

Descriptive data for the primary study variables are presented in Table 1. Thirty (24.6%) participants reported PTSS consistent with probable PTSD, with PCL-C scores ranging from 17 to 81 ($M = 33.24$, $SD = 15.83$). Thirteen (10.7%) participants reported alcohol use scores

consistent with harmful or hazardous drinking, with AUDIT scores ranging from 0 to 34 ($M = 3.39$, $SD = 4.73$).

Intercorrelations among the primary variables are presented in Table 2. PTSS was significantly positively associated with both anxiety sensitivity ($r = .62$, $p < .001$), and alcohol misuse ($r = .22$, $p = .019$).

The one-sample t -tests revealed that our sample ($M = 16.78$, $SD = 14.49$) had significantly higher scores on the ASI-3 than the sample used to validate the ASI-3 ($M = 12.80$, $SD = 10.60$), $t(105) = 2.81$, $p = .006$; however, our sample's ASI-3 scores were not significantly different when compared to a predominately White trauma-exposed sample ($M = 18.14$, $SD = 14.43$), $t(105) = -0.96$, $p = .34$.

Examination of the first model (see Figure 1 and Table 3) revealed that PTSS was significantly associated with anxiety sensitivity ($B = 0.33$, $SE = .07$, $t = 4.67$, $p < .001$, 95% CI [0.19, 0.46]). However, anxiety sensitivity was not significantly associated with alcohol misuse, $B = -0.01$, $SE = .01$, $t = -1.01$, $p = .32$, 95% CI [-0.03, 0.01]. Further, the indirect effect of PTSS on alcohol misuse through anxiety sensitivity was not significant, $B = -0.004$, $SE = .004$, 95% CI [-0.01, 0.004], and the direct effect was significant, even after controlling for the indirect associations, $B = 0.02$, $SE = .01$, $t = 2.10$, $p = .04$, 95% CI [0.001, 0.03].

The alternative model (see Figure 2 and Table 3), testing the reverse directionality of PTSS and anxiety sensitivity, revealed that anxiety sensitivity was significantly associated with PTSS, $B = 0.55$, $SE = .12$, $t = 4.67$, $p < .001$, 95% CI [0.32, 0.79]. Further, PTSS was significantly associated with alcohol misuse, $B = 0.02$, $SE = .01$, $t = 2.10$, $p = .04$, 95% CI [0.001, 0.03]. The indirect effect of anxiety sensitivity on alcohol misuse through PTSS was significant, $B = 0.01$, $SE = .005$, 95% CI [0.001, 0.02]. The direct effect between anxiety sensitivity and alcohol misuse was not significant when controlling for the indirect relations in the model, $B = -0.01$, $SE = .01$, $t = -1.01$, $p = .32$, 95% CI [-0.03, 0.01].

Discussion

The goal of the current study was to examine the relations among PTSS, anxiety sensitivity, and alcohol misuse in a sample of trauma-exposed Black college students. Correlational findings support significant positive relations of PTSS with both anxiety sensitivity and alcohol misuse. Further, PTSS was found to explain the relation between anxiety sensitivity and alcohol misuse. These findings have important implications for future research and clinical practice.

Results of the current study further support the previously demonstrated relations between PTSS and both anxiety sensitivity (Taylor et al., 1992) and alcohol misuse (Contractor et al., 2016; Kaysen et al., 2014; Possemato et al., 2015; Simpson et al., 2014). Furthermore, our findings are consistent with a recent systematic review examining the role of anxiety sensitivity in the association between PTSS and substance use disorders, which found that elevated levels of anxiety sensitivity are consistently associated with greater PTSS among individuals that use various substances, including alcohol (Vujanovic et al., 2018).

Extending this work, we found that PTSS helps to explain the relation between anxiety sensitivity and alcohol misuse. This may suggest that anxiety sensitivity may intensify posttraumatic reactions, potentially resulting in greater PTSS, which may then lead to a more alcohol use (possibly to reduce the aversive state). This finding is consistent with models of PTSS that suggest negative posttraumatic interpretations of psychological and physical symptoms can influence the onset and exacerbation of PTSS symptoms (Ehlers & Clark, 2000). Therefore, a predisposition for anxiety sensitivity may increase catastrophic interpretations of the perceived consequences of arousal-related posttraumatic sensations (e.g., intrusion symptoms being interpreted as an indication of looming insanity), which has been supported by previous research that has shown that anxiety sensitivity predicts PTSS (e.g., Fedoroff, Taylor, Asmundson, & Koch, 2000). Furthermore, research has largely found that PTSS is positively associated with the use of alcohol (Kaysen et al., 2014; Possemato et al., 2015; Simpson et al., 2014), which supports our hypothesis that anxiety sensitivity may be an important vulnerability factor that extends our knowledge of the relation between PTSS and alcohol misuse. Conversely, anxiety sensitivity did not explain the association between PTSS and alcohol misuse, which suggests that one's fear of the negative somatic, cognitive, or social consequences associated with anxious arousal does not help to explain the association between PTSS and alcohol misuse. Given our use of a Black sample, future research is needed to explore the directionality of these associations across diverse samples (e.g., with regard to race/ethnicity).

Most research to date on the relations among PTSS, anxiety sensitivity, and/or alcohol misuse has relied on predominantly White samples. To our knowledge, this is the first study to examine these relations in a Black sample. Our findings provide insight into how PTSS, anxiety sensitivity, and alcohol misuse relate among Black individuals. Prior research has shown that sociocultural factors (e.g., ethnic identity, stigma toward mental illness) contribute to racial and ethnic differences in the experience, expression, and understanding of anxiety (Hopkins & Shook, 2017). Further, the correlates of alcohol misuse have been found to differ across racial and ethnic groups (Darrow, Russell, Cooper, Mudar, & Frone, 1992). Results of the present study further highlight the importance of recruiting racially and ethnically diverse samples and investigating the role of race and ethnicity in relation to posttraumatic outcomes. Attention to race and ethnicity in research will inform the development of culturally-sensitive interventions for alcohol misuse that are tailored to the unique needs of racially and ethnically diverse individuals.

A few additional findings warrant discussion. First, the prevalence rate of traumatic exposure in our sample (47%) is lower than what has been found in the general population (89.7%; Kilpatrick, Resnick, Milanak, Miller, Keyes, & Friedman, 2013) and among college students in particular (66%; Read, Ouimette, White, Colder, & Farrow, 2011). This lower rate of traumatic exposure in our sample may be due to our use of an African American sample. Indeed, Roberts et al. (2011) found that Whites had significantly higher rates of traumatic exposure compared to African Americans (although African Americans are significantly more likely to report severe traumas, such as child maltreatment and assaultive violence). Second, we compared our sample's level of anxiety sensitivity to the original ASI-3 validation sample, and found that our sample was found to have significantly higher scores on the ASI-3 than the original validation sample of predominantly White individuals

(Taylor et al., 2007). However, this discrepancy no longer remained when ASI-3 scores were compared to a predominately White trauma-exposed sample, indicating that our sample had comparable levels of anxiety sensitivity found in other trauma-exposed samples. Finally, the proportion of women (78%) in this subsample was significantly higher than in the larger sample (67%). This finding is not entirely surprising given evidence for significantly higher rates of traumatic exposure among females compared to males (Kilpatrick et al., 2013).

Although the present study contributes to the literature on PTSS, anxiety sensitivity, and alcohol misuse, there are several limitations worthy of consideration. First, the use of cross-sectional data means that the direction of the relations examined cannot be determined; future research should examine the nature of these relations using longitudinal methods. Second, the current study relied on self-report data, responses to which may be influenced by an individual's willingness and/or ability to report accurately on behaviors. Future investigations should include multi-method assessment (e.g., physiological, behavioral). Third, we do not have data on how many students eligible to participate (i.e., students taking Introduction to Psychology at Jackson State University) declined participation; such data may reveal sampling or participation bias. Fourth, results of Fergus et al. (2017) provide support for a bifactor conceptualization of the ASI-3, consisting of a general factor and three domain-specific factors (i.e., Physical, Cognitive, and Social). The current study was underpowered to explore the proposed relations using structural equation modeling (required for examination of latent variables; Wolf, Harrington, Clark, & Miller, 2013); thus, this would be an important avenue for future research. Fifth, we evaluated two models that examined a unidirectional relation between PTSS and alcohol misuse (consistent with self-medication hypothesis; Khantzian, 2003), but there is evidence that alcohol use may actually lead to PTSS risk (Holmes et al., 2012), and thus it would be useful for future investigations to further explore the directionality of the relations examined here. Finally, given the preliminary nature of this study – as well as the fact that we utilized a homogeneous, nonclinical sample of participants – future research is needed to speak to the robustness and reproducibility of our findings. Although our focus on trauma-exposed Black college students is a strength of this study, replication of these findings in larger, more diverse samples is warranted, including community and clinical samples. Moreover, research is needed to explore the relations among PTSS, anxiety sensitivity, and alcohol misuse in other racial and ethnic groups.

Despite limitations, results of the present study extend the body of research on PTSS, anxiety sensitivity, and alcohol misuse. PTSS was found to help explain the relation between anxiety sensitivity and alcohol misuse in our sample of Black individuals, such that higher levels of anxiety sensitivity were associated with more PTSS, which, in turn, were associated with greater alcohol misuse. Results underscore the importance of utilizing diverse samples in research and considering the role of race and ethnicity in relations of interest. Moreover, they have important clinical implications. Specifically, our results suggest that assessment of anxiety sensitivity may be useful in identifying alcohol misuse risk among trauma-exposed Black individuals. Further, if replicated, our findings indicate that it may be beneficial for clinicians to monitor and treat PTSS among trauma-exposed Black college students reporting anxiety sensitivity, to possibly inhibit excessive alcohol misuse. Such findings are consistent with support for trauma intervention components

targeting anxiety sensitivity such as interoceptive exposure (Wald & Taylor, 2007). An avenue for future research would be to explore relative changes in PTSS, anxiety sensitivity, and alcohol misuse with progress in treatment.

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Figure 1.

Proposed model of PTSS on alcohol misuse through anxiety sensitivity

Note. Anxiety was included as a covariate in this model. PTSS = Posttraumatic stress symptoms.

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

Figure 2.

Proposed model of anxiety sensitivity on alcohol misuse through PTSS

Note. Anxiety was included as a covariate in this model. PTSS = Posttraumatic stress symptoms.

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

Table 1.

Descriptive data

Variables	<i>M (SD)</i>	<i>n (%)</i>
Age	22.98 (5.84)	
Gender		
Female		94 (77.7%)
Male		27 (22.3%)
Employment Status		
Unemployed		69 (56.6%)
Employed Part-time		41 (33.6%)
Employed Full-time		12 (9.8%)
Family Annual Income		
\$9,999		14 (11.7%)
\$10,000–\$19,999		19 (15.8%)
\$20,000–\$29,999		27 (22.5%)
\$30,000–\$39,999		7 (5.8%)
\$40,000–\$49,999		14 (11.7%)
\$50,000–\$59,999		7 (5.8%)
\$60,000–\$69,999		12 (10.0%)
\$70,000–\$79,999		6 (5.0%)
\$80,000–\$89,999		4 (3.3%)
\$90,000–\$99,999		3 (2.5%)
\$100,000		7 (5.8%)
Family type		
Two parent		60(49.2%)
Single mother		49 (40.2%)
Single father		1 (0.8%)
Adopted		1 (0.8%)
Extended family		9 (7.4%)
Other		2 (1.6%)
Anxiety Sensitivity	16.68 (14.6)	
PTSD	33.24 (15.8)	
Probable PTSD		30 (24.6%)
AUDIT	3.39 (4.7)	
Probable Alcohol Use Disorder		13 (10.7%)

Note. SD = standard deviation; PTSD = Posttraumatic stress disorder; AUDIT = Alcohol Use Disorder Identification Test.

Table 2.

Intercorrelations among PTSS, anxiety sensitivity, and alcohol misuse

	1	2	3
1. PCL-C	--	--	--
2. AUDIT	.22 *	--	--
3. Anxiety Sensitivity	.62 **	.05	--

Note. PCL-C = Posttraumatic Stress Disorder Checklist - Civilian version; AUDIT = Alcohol Use Disorder Identification Test.

*
 $p < .05$.

**
 $p < .001$.

Table 3.

Summary of mediational analyses

Paths	Unstandardized coefficient (<i>B</i>)	<i>SE</i>	<i>t</i>	<i>P</i> -value
Model 1				
PTSS → Anxiety Sensitivity (<i>a</i>)	0.33	.07	4.67	< .001
Anxiety Sensitivity → Alcohol Misuse (<i>b</i>)	−0.01	.01	−1.01	.32
PTSS → Alcohol Misuse (<i>c'</i>)	0.02	.01	2.10	.04
Model 2				
Anxiety Sensitivity → PTSS (<i>a</i>)	0.55	.12	4.67	< .001
PTSS → Alcohol Misuse (<i>b</i>)	0.02	.01	2.10	.04
Anxiety Sensitivity → Alcohol Misuse (<i>c'</i>)	−0.01	.01	−1.01	.32
Indirect Paths	Unstandardized coefficient (<i>B</i>)	<i>SE</i>	BootLLCI	BootULCI
Model 1				
Anxiety sensitivity (<i>a × b</i>)	−0.004	.004	−.01	.004
Model 2				
PTSS (<i>a × b</i>)	0.01	.005	.001	.02

Note. Anxiety was included as a covariate in these models. PTSS = Posttraumatic stress symptoms; BootLLCI = Bootstrapping lower limit confidence interval; BootULCI= Bootstrapping upper limit confidence interval; *SE* = Standard error.