



Racial/ethnic discrimination and alcohol use disorder severity among United States adults

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ABSTRACT

Background: Racism, and resultant racial/ethnic discrimination is a ubiquitous social determinant of health that is linked to adverse alcohol-related outcomes. To our knowledge, no studies have examined whether manifestations of racial/ethnic discrimination increase risk of DSM-5 alcohol use disorder (AUD) severity levels.

Methods: Analyses were conducted among 17,115 racial/ethnic minority respondents of the National Epidemiologic Survey on Alcohol-Related Conditions III (NESARC-III), a cross-sectional survey fielded in 2012–2013. We used multinomial logistic regression to examine the associations between measures of racial/ethnic discrimination and past-year AUD severity levels following the DSM-5 definition, while adjusting for poverty thresholds set by the U.S. Census Bureau, and race/ethnicity (American Indian or Alaskan Native; Asian, Native Hawaiian, or Other Pacific Islander; Black or African American; Hispanic or Latino). We also evaluated whether associations between discrimination and AUD severity varied by poverty status and race/ethnicity.

Results: Covariate-adjusted multinomial logistic regressions suggested that in comparison to those who did not experience discrimination, those who experienced discrimination had a 1.5-fold greater risk of mild AUD, a 1.6-fold greater risk of moderate AUD, and a 2.3-fold greater risk of severe AUD. We found no evidence to suggest that the strength of the association between racial/ethnic discrimination and AUD severity varied across race/ethnic group or poverty status.

Conclusions: Experience of racial/ethnic discrimination is associated with greater AUD severity in the U.S. regardless of one's specific racial/ethnic group membership or poverty status. Strategies to reduce risk for severe AUD should include efforts to minimize the occurrence and impact of interpersonal and institutional racism.

1. Introduction

Discrimination is defined as the unjust or prejudicial treatment of individuals or groups of people based on their membership in socially constructed categories (Dovidio and Gaertner, 1986). Discrimination is a prevalent social stressor and ubiquitous social determinant of health in the United States (Keyes and Galea, 2016) experienced by anywhere from 25 to 75 % of the general population depending on the group and definition of discrimination (Boutwell et al., 2017; Lee et al., 2019). A meta-analytic review showed that discrimination has deleterious effects on mental and physical health (Pascoe and Smart Richman, 2009). Racial/ethnic discrimination, a form of racism (Boyd et al., 2020), is when unjust or prejudicial behaviors are directed at individuals based on phenotypic characteristics such as skin color (Borrell et al., 2006).

Racial/ethnic discrimination is a strong and consistent predictor of poor health status (Borrell et al., 2006), including an increased risk for alcohol-related outcomes, such as drinking above recommended limits or experiencing alcohol-related problems (Blume et al., 2012; Boynton et al., 2014; Gilbert and Zemore, 2016; Martin et al., 2003). However, a recent systematic review found that of 31 studies evaluating a direct association between various measures of racial/ethnic discrimination and alcohol-related outcomes, less than half found a positive association, and results varied according to the specific outcomes that were evaluated (Gilbert and Zemore, 2016). Most of the reviewed studies examined consumption outcomes, namely the quantity, frequency, or presence of alcohol consumption (Gilbert and Zemore, 2016). However, a more consistent picture emerged among studies examining alcohol use disorder (AUD) as defined by the Diagnostic and Statistical Manual

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of Mental Disorders Revised Third Edition (DSM-III-R) or Fourth Edition (DSM-IV). Among the 13 studies that specifically examined an association between racial/ethnic discrimination and AUD, nearly all of the studies (92 %) found a positive association (Chae et al., 2008; Cheadle and Whitbeck, 2011; Clark et al., 2015; Gray and Montgomery, 2012; Hunte and Barry, 2012; McLaughlin et al., 2010; Mulia and Zemore, 2012; Otiniano Verissimo et al., 2014; Rodriguez-Seijas et al., 2015; Savage and Mezuk, 2014; Whitbeck et al., 2004).

Prior studies on the association between racial/ethnic discrimination and AUD have relied on older versions of the DSM. Since its publication in 2013, the Fifth Edition of the DSM (DSM-5) has revised and elaborated on the clinical criteria of AUD, which is now conceptualized as a single disorder as opposed to the two separate conditions of alcohol abuse and alcohol dependence (American Psychiatric Association, 2013; Hasin et al., 2013). Moreover, the characterization of AUD is not defined by a single clinical threshold; rather, it is specified by the level of severity, including mild, moderate, and severe (American Psychiatric Association, 2013). Although research on discrimination and AUD may be clinically informative, to our knowledge, there are no studies that have examined the associations between racial/ethnic discrimination and alcohol use severity as it is defined by the DSM-5. Moreover, almost all prior studies on racial/ethnic discrimination and alcohol-related outcomes have used city, state, or regional samples, or conducted analyses within one or two racial/ethnic groups, as opposed to large nationally-representative datasets reflecting the racial/ethnic diversity of the U.S. (Gilbert and Zemore, 2016).

Therefore, using data from a nationally representative sample of the U.S., we sought to (1) examine the associations between racial/ethnic discrimination and AUD severity according to the DSM-5, and whether these associations persisted above and beyond socio-demographic variables; (2) examine the association between specific discriminatory situations and AUD severity; and (3) examine the association between the count of discriminatory situations experienced and AUD severity. Several studies and theory have suggested that the impact of risk factors such as racial/ethnic discrimination on alcohol-related outcomes can vary based on one's poverty status or race/ethnicity, but findings have differed across studies (Dawson et al., 2005; Glass et al., 2017; Hatch, 2005; Mulia and Zemore, 2012; Savage and Mezuk, 2014; Zemore et al., 2011). Thus, we also (4) examined whether the strength of the association between racial/ethnic discrimination and AUD severity varied across race/ethnicity and poverty status because this has yet to be examined in nationally representative data with four large U.S. racial/ethnic groups.

2. Methods

2.1. Sample

The National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC III; 2012–2013) is a survey of a nationally representative sample of non-institutionalized U.S. residents, aged 18 years and older, drawn from households and selected group quarters (Grant et al., 2014). Respondents were selected through multistage probability sampling. Primary, secondary, and tertiary sampling units were defined at the county-level, census-block level, and household level, respectively. Black or African American; Asian, Native Hawaiian, or Other Pacific Islander; and Hispanic or Latino household members had higher selection probabilities than White individuals. The overall response rate was 60.1 %. Data were adjusted for non-response and weighted to represent the non-institutionalized U.S. adult population. The total sample size was 17,115: 511 were American Indian or Alaskan Native; 1801 were Asian, Native Hawaiian, or Other Pacific Islander; 7766 were Black or African American; and 7037 were Hispanic or Latino. We excluded a total of 19,194 respondents who were classified as White because most would be members of the majority racial/ethnic group in the U.S. Secondary analyses of the NESARC data for the

current study were deemed to be exempt from review by the Kaiser Permanente Washington Institutional Review Board.

2.2. Measures

The AUD and Associated Disabilities Interview Schedule-5 (AUDADIS-5), a computerized structured diagnostic interview of risk factors and psychiatric disorders, was used to collect data during in-person interviews in households (Hasin et al., 2015). We note that although DSM-5 criteria were released in 2013, they were known earlier and incorporated into the AUDADIS-5 instrument (Hasin et al., 2015).

2.2.1. Alcohol use disorder (AUD) severity

AUD severity was measured using the AUDADIS-5 assessment of DSM-5 criteria for AUD. AUD is defined as having at least 2 of the 11 DSM-5 criteria in the 12 months preceding the interview. Consistent with the DSM-5 severity specifier, AUD severity levels were classified as mild, moderate, or severe (endorsing 2–3, 4–5, or ≥ 6 DSM-5 criteria, respectively) (Hasin et al., 2013). Analyzing AUD severity as a categorical variable, rather than as a continuous variable, has advantages because it includes a reference group of individuals who did not meet criteria for AUD (0–1 symptoms) and maintains consistency with DSM-5 nosology (Hasin et al., 2013).

2.2.2. Discrimination

Discrimination experiences were assessed using a series of questions adapted from the Experiences of Discrimination (EOD) Scale, a valid and reliable measure that has been used widely in studies of discrimination and health (Krieger et al., 2005). Confirmatory factor analyses have indicated that the items of the EOD measure discrimination on a single scale (Krieger et al., 2005). Studies have demonstrated value in analyzing the EOD scale's individual items (Carliner et al., 2016; Krieger et al., 2005). The EOD scale implemented in the AUDADIS-5 had good to excellent reliability for assessing past-year racial/ethnic discrimination (Intraclass Correlation Coefficient = 0.68, $\alpha = 0.74$) (Ruan et al., 2008). Respondents were asked how often in the past year they had “experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior” because they were Hispanic or Latino, or because of their race or ethnicity. The survey queried discrimination in six different situations, including discrimination affecting one's ability to obtain health care and insurance; getting health care treatment; in public (e.g. on the streets or in stores or restaurants); when obtaining a job, housing, schooling/training or when interacting with the courts or police; and being made fun of, picked on, pushed, shoved, or threatened. Respondents were asked to indicate the frequency of these experiences: never, sometimes, fairly often, or very often. Following several studies that used the EOD scale as a predictor as a predictor of past-year psychiatric disorders (Carliner et al., 2017, 2016; McLaughlin et al., 2010), our main measure of discrimination was “experienced any discrimination in the past year”, a single dichotomous variable coded as positive for participants who reported discrimination in any situation either sometimes, fairly often, or very often. Also following prior studies, we created the secondary discrimination measures “situation in which discrimination was experienced”, resulting in six dichotomous items, one for each situation (Carliner et al., 2016; McLaughlin et al., 2010); and “number of situations in which discrimination was experienced”, which was a single variable with 4 categories: 0 situations, 1 situation, 2 situations, and 3 or more situations (Carliner et al., 2016).

2.2.3. Covariates

Sociodemographic variables included sex (male, female), race/ethnicity (American Indian or Alaskan Native; Asian, Native Hawaiian, or Other Pacific Islander; Black or African American; Hispanic or Latino), age (< 35, 35–49, 50–64, ≥ 65), education (less than high school, high school or General Education Development (GED) equivalent,

education beyond high school), employment status (employed, unemployed), and poverty status. Poverty status was coded using thresholds established by the U.S. Census Bureau for 2010 (U. S. Census Bureau, 2020). Family income thresholds that determine poverty status vary according to the number of individuals in the household and their ages (e.g. < 18, 18–64, > = 65) (the U.S. Census Bureau considers over 30 combinations of these values). Three categories were used: below the poverty threshold (< 100 % of the threshold), near the poverty threshold (100–150 % of threshold), and not in poverty (> 150 % of the threshold).

2.3. Analysis

We computed descriptive statistics of our sample, including weighted percentages of 12-month DSM-5 AUD and AUD severity level (mild, moderate, and severe). In our first regression model, relative risk ratios (RRRs) obtained from multinomial logistic regression estimated the associations between any discrimination and AUD severity, adjusted for all covariates. Multinomial logistic regression was chosen for all models over ordinal logistic regression because a Brant test rejected the assumption of proportional odds (Brant, 1990). In our second model, we used multinomial logistic regression to evaluate the associations between discrimination situations and AUD severity, with all six discrimination situations entered in the same model. In our third regression model, we estimated the association between the number of discrimination situations and AUD severity.

To explore the prevalence of racial/ethnic discrimination in key sociodemographic groups, we graphed the prevalence of any discrimination and type of discrimination situation across categories of race/ethnicity and poverty status.

Finally, we calculated survey-adjusted Wald statistics to test for effect modification of the association between our main discrimination measure, any discrimination, and AUD severity. Two interaction terms were specified: the first between the two levels of discrimination (any versus none) and four levels of race/ethnicity, and the second between two levels of discrimination and three levels poverty status.

All analyses were conducted using Stata 15.1 (StataCorp, 2017). Analyses accounted for the complex survey design of NESARC-III by using weight, stratification, and cluster variables provided in the data (National Institute on Alcohol Abuse and Alcoholism, 2014). Significance was set at $\alpha = 0.05$.

3. Results

Descriptive statistics are displayed in Table 1. Most participants did not have AUD (86.4 % of the study population). Mild, moderate, and severe AUD was experienced by 6.8 %, 3.1 %, and 3.6 %, respectively. Approximately 27.6 % reported any racial/ethnic discrimination in the past year. The most common discrimination situations were being discriminated against in public settings (18.1 %), when encountering institutions (13.3 %), and being called a racist name (8.2 %), though being pushed, shoved, or threatened (3.1 %) and facing discrimination while trying to obtain healthcare (7.2 %) or when getting treatment in healthcare (7.2 %) were also fairly common. Approximately 12.4 %, 7.5 %, and 7.8 % of the population experienced discrimination in one, two, and three or more situations, respectively. In terms of poverty, 18.8 %, 11.6 %, and 69.6 % of participants were below the poverty threshold, near the threshold, or 150 % above the threshold, respectively.

The prevalence of racial/ethnic discrimination varied across racial groups, both in terms of any discrimination and the specific situations in which discrimination occurred (Fig. 1a). Black or African American, and American Indian or Alaskan Native individuals reported the highest levels of any racial/ethnic discrimination, but substantial proportions of Hispanic or Latino and Asian, Native Hawaiian, or Other Pacific Islanders also reported any racial/ethnic discrimination. Some discrimination situations were more common in certain groups (e.g.,

Table 1

Descriptive characteristics of NESARC III participants who were American Indian or Alaska Native; Asian, Hawaiian, or Other Pacific Islander; Black or African American; or Hispanic or Latino (n = 17,115).

	Weighted % (SE)
Experienced discrimination in the past year	
No	72.4 (0.6)
Yes	27.6 (0.6)
Situations in which discrimination was experienced	
Obtaining health care	7.2 (0.3)
Treatment in health care	7.2 (0.3)
Public settings	18.1 (0.5)
Encountering institutions	13.3 (0.4)
Called a racist name	8.2 (0.3)
Pushed, shoved, or threatened	3.1 (0.2)
Sum of different situations in which discrimination was experienced	
0 situations	72.4 (0.6)
1 situation	12.4 (0.4)
2 situations	7.5 (0.2)
3 or more situations	7.8 (0.3)
Age	
< 35	38.1 (0.6)
35–49	29.7 (0.5)
50–64	21.8 (0.4)
> = 65	10.3 (0.4)
Female	52.6 (0.5)
Race/ethnicity	
American Indian or Alaskan Native	4.6 (0.4)
Asian, Native Hawaiian, or Other Pacific Islander	16.9 (1.4)
Black or African American	34.9 (1.6)
Hispanic or Latino	43.6 (1.8)
Poverty	
Below the poverty threshold	27.7 (0.6)
Near the poverty threshold	14.2 (0.3)
Not in poverty	58.0 (0.8)
Education	
Less than high school	21.4 (0.7)
High school or GED	27.0 (0.6)
Education beyond high school	51.5 (0.8)
Employment	
Not employed	42.0 (0.6)
Employed	58.0 (0.6)
Consumed alcohol in past year	67.7 (0.6)
Post-year alcohol use disorder (AUD) severity	
No AUD (< 2 DSM-5 AUD criteria)	86.4 (0.4)
Mild (2–3 criteria)	6.8 (0.3)
Moderate (4–6 criteria)	3.1 (0.2)
Severe (> = 7 criteria)	3.6 (0.2)

SE = standard error; GED = General Education Development.

racial/ethnic discrimination in public settings or when encountering institutions for Black Americans; healthcare-related discrimination, being called a racist name, or being pushed, shoved, or threatened for American Indian or Alaskan Natives). Any discrimination and discrimination in each of the six situations were slightly elevated among those experiencing poverty (Fig. 1b). The biggest differences in terms of poverty status were that people living above the poverty threshold reported experiencing less healthcare-related discrimination due to their race/ethnicity than those who were living at or near the poverty line.

Our first multinomial logistic regression model indicated that in comparison to those who experienced no discrimination, those who experienced any discrimination had a greater risk of mild (RRR = 1.5, 95 % Confidence Interval [CI] = 1.3–1.8), moderate (RRR = 1.6, 95 % CI = 1.3–2.0), and severe AUD (RRR = 2.3, 95 % CI = 1.9–2.9) relative to no AUD (Table 2). Living below the poverty threshold was associated with a greater risk of severe AUD (RRR = 1.2, 95 % CI = 1.0–1.5), but not with mild nor moderate AUD (Supplement 1).

In our second model, which entered all discriminatory situations simultaneously, being called a racist name was associated with 1.6 times greater odds of having mild AUD versus having no AUD (Table 2). Encountering discrimination in public settings and being called a racist name were each associated with 1.4 times greater odds of moderate

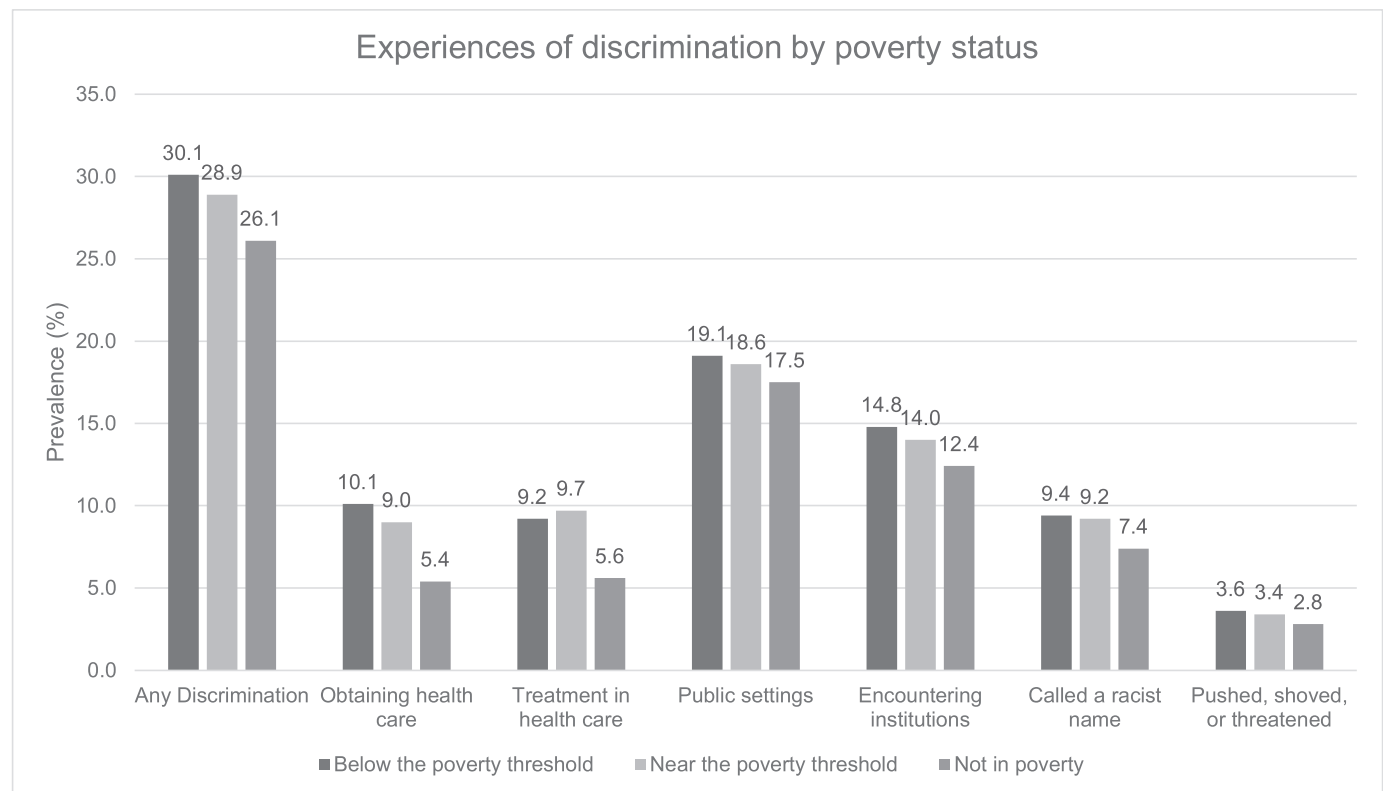
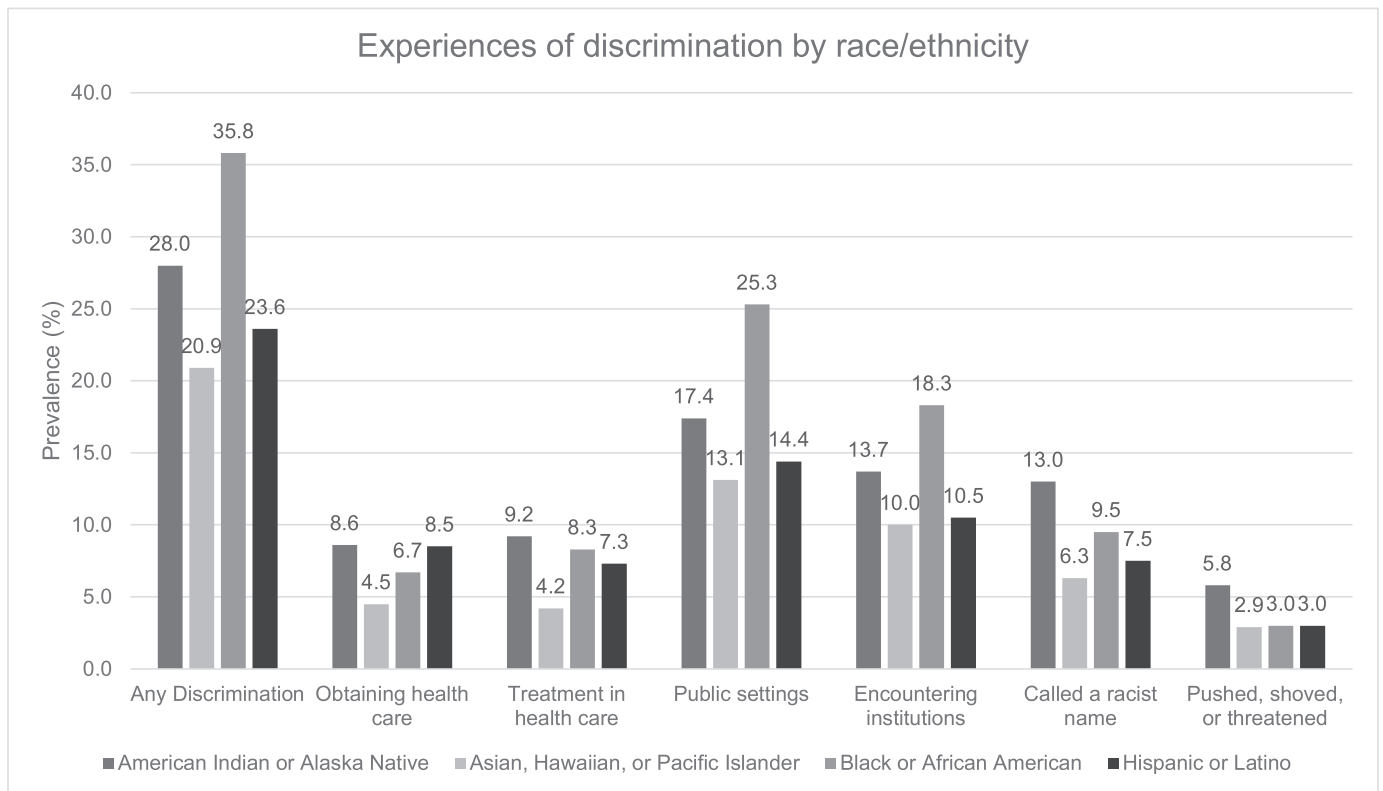


Fig. 1. a. The prevalence of any racial/ethnic discrimination in the past year, and the prevalence of racial/ethnic discrimination in specific situations in the past year, across four large U.S. racial/ethnic minority groups. b. The prevalence of any racial/ethnic discrimination in the past year, and the prevalence of racial/ethnic discrimination in specific situations in the past year, among people in three groups defined by income-to-poverty ratios calibrated to U.S. Census Bureau poverty thresholds.

Table 2

Estimates from three regression models of racial/ethnic discrimination as a predictor of past-year DSM-5 alcohol use disorder (AUD) severity among NESARC-III respondents who were American Indian or Alaskan Native; Asian, Native Hawaiian, or Other Pacific Islander; Black or African American; or Hispanic or Latino.

	Mild AUD (n = 1,210)	Moderate AUD (n = 546)	Severe AUD (n = 652)
	Relative Risk Ratio (95 % CI)		
I. Experienced any discrimination in the past year	1.5 (1.3–1.8)	1.6 (1.3–2.0)	2.3 (1.8–2.9)
II. Type of situation in which discrimination was experienced			
Obtaining health care	1.0 (0.7–1.4)	1.3 (0.9–1.8)	1.5 (1.1–2.0)
Treatment in health care	1.1 (0.8–1.5)	1.0 (0.7–1.5)	0.9 (0.6–1.4)
Public settings	1.1 (0.9–1.4)	1.4 (1.0–1.9)	1.4 (1.0–1.9)
Encountering institutions	1.1 (0.9–1.5)	1.1 (0.8–1.6)	1.2 (0.9–1.6)
Called a racist name	1.6 (1.2–2.0)	1.4 (1.0–2.0)	1.9 (1.3–2.8)
Pushed, shoved, or threatened	1.2 (0.7–1.9)	0.8 (0.5–1.3)	1.4 (1.0–2.1)
III. Number of situations in which discrimination was experienced			
0 situations	Ref	Ref	Ref
1 situation	1.5 (1.2–1.9)	1.3 (1.0–1.7)	1.8 (1.3–2.4)
2 situations	1.3 (1.0–1.7)	1.6 (1.2–2.2)	2.0 (1.4–2.8)
3 or more situations	1.8 (1.3–2.4)	2.1 (1.4–3.0)	3.4 (2.5–4.6)

Models included age, sex, race/ethnicity, education, employment, and poverty as covariates. The relative risk ratio represents the risk of having a specific AUD severity (mild, moderate, or severe) relative to having no AUD (n = 14,702 had no AUD). In the model evaluating specific types of discrimination experiences, all discrimination experiences were entered concurrently. Bolded values are statistically significant at $p < 0.05$.

AUD. Discrimination while obtaining health care (RRR: 1.5, 95 % CI: 1.1–2.0), encountering discrimination in public settings (RRR: 1.4, 95 % CI: 1.0–1.9), and being called a racist name (RRR: 1.9, 95 % CI: 1.3–2.8) were associated with severe AUD.

Our third model indicated that alcohol use disorder severity appeared worse for persons who experienced a greater number of discrimination situations (Table 2). For instance, those who reported discrimination in three or more situations had 1.8 times greater odds of mild AUD, 2.1 times greater odds of moderate AUD, and 3.4 times greater odds of severe AUD. We note that results from an analogous model with the number of discrimination situations represented as a continuous variable provided evidence for a linear trend; the increased number of situations in which discrimination was experienced was associated with the increased odds of having mild (RRR: 1.2, 95 % CI = 1.1–1.2), moderate (RRR: 1.2, 95 % CI = 1.1–1.3), and severe AUD (RRR: 1.3, 95 % CI = 1.3–1.4) (not shown).

Analyses testing whether the association between any discrimination and AUD severity varied by race/ethnicity or poverty status found no evidence for effect modification. Specifically, the Wald tests found no evidence of a multiplicative interaction between race/ethnicity and any discrimination ($F [12, 105] = 1.96$, $p = 0.052$; not shown), nor poverty and any discrimination ($F [6, 108] = 0.77$, $p = 0.593$; not shown).

In a sensitivity analysis, we repeated the main and interaction analyses with education and employment status omitted from the model because of the potential for multi-collinearity between socioeconomic constructs. The point estimates and statistical significance for any racial/ethnic discrimination and poverty did not change substantially.

4. Discussion

The current study contributes to the literature demonstrating the substantial impact racism has on health (Pascoe and Smart Richman, 2009). In the present study we specifically found that racial/ethnic discrimination over the past year was associated with greater odds of

having mild, moderate, and severe AUD versus having no AUD. We also found that racial/ethnic discrimination in specific situations was associated with various levels of AUD severity, and that experiencing racial/ethnic discrimination in a greater number of situations increased the odds of having each level of severity in a dose-response fashion. While the moderation analyses did not indicate that the association between racial/ethnic discrimination and AUD severity varied by race/ethnicity or poverty status, our descriptive findings identified more experiences of racial/ethnic discrimination in some racial/ethnic groups (e.g., Black or African American, American Indian or Alaskan Native) and for those experiencing poverty. To our knowledge, no prior studies have examined the associations between racial/ethnic discrimination and AUD severity defined by the DSM-5 in the general population of U.S. adults.

This study's ability to examine the association between racial/ethnic discrimination and AUD severity in four large racial/ethnic groups in the U.S. adds a new perspective to the literature. With few exceptions (Mulia and Zemore, 2012), previous studies highlighted the relationship between racial/ethnic discrimination and AUD largely in within-group analyses using surveys that recruited just one or two racial/ethnic groups (Chae et al., 2008; Cheadle and Whitbeck, 2011; Clark et al., 2015; Gray and Montgomery, 2012; Hunte and Barry, 2012; McLaughlin et al., 2010; Otiniano Verissimo et al., 2014; Rodriguez-Seijas et al., 2015; Savage and Mezuk, 2014; Whitbeck et al., 2004). Our findings indicated that racial/ethnic discrimination may increase risk for mild, moderate, and severe alcohol use disorder in all four large U.S. racial/ethnic minority groups in this study. While racial/ethnic discrimination was associated with mild, moderate, and severe AUD, the associations were strongest for severe AUD. Moreover, experiencing a broad range of discrimination in various situations was associated with AUD severity.

Although persons living below and near the poverty threshold experienced higher levels of racial/ethnic discrimination than those who were not in poverty, we did not find evidence that the association between racial/ethnic discrimination and AUD severity varied across poverty status. The lack of evidence of a moderation effect runs counter to several empirical studies that suggested poverty may exacerbate the impact of racial stigma, general unfair treatment, or other stressors on alcohol-related outcomes (Dawson et al., 2005; Mulia and Zemore, 2012; Zemore et al., 2011). We note that the cumulative stress hypothesis would suggest that persons in poverty could be more vulnerable to the effects of racial/ethnic discrimination if they are already 'worn down' with depleted levels of coping resources (Hatch, 2005; Mulia and Zemore, 2012). However, it is also possible that racial/ethnic discrimination itself may diminish any protective effects of having a higher socioeconomic position on health (Hudson et al., 2013, 2012). Moreover, the current study did not find evidence that the association between racial/ethnic discrimination and AUD severity varied by race/ethnicity. Others have similarly found no evidence for a moderation effect by race/ethnicity, and have speculated that the impact of risk factors may be similar across racial/ethnic groups, even though they may be present at different levels or under different circumstances (Savage and Mezuk, 2014).

4.1. Potential limitations

Our study should be interpreted bearing in mind a number of potential limitations. First, our study was cross-sectional, which did not allow us to make any causal inferences. While discrimination may give rise to AUD severity, it is also possible that having AUD may expose individuals to more situations where they may be confronted by racism in health care settings, public spaces, and workplaces. While we used a validated and reliable measure that asked about experiences of racial/ethnic discrimination, self-report scales of discrimination rely on the perception and disclosure of experiences (Krieger et al., 2005). Further, discrimination can be further compounded and complicated by the intersection of identities, such that people can be mistreated for multiple

reasons. For example, while respondents attributed their discriminatory experiences to race/ethnicity, it is also possible that they may have experienced discrimination because of their gender and sexuality as well. Discrimination measures rarely account for multiple attributions, so future studies can elicit more information about the potential motivations that underlie the discriminatory events. Also, we did not account for racial identity or other measures that may moderate the association between discrimination and alcohol use (Richman et al., 2013).

4.2. Future directions

Considering these findings in the context of the broader literature on racism and racial/ethnic discrimination and AUD severity, we provide several directions for future research. The current study did not provide evidence that the association between racial/ethnic discrimination and AUD severity varied across poverty status or race/ethnicity. However, future studies should still explore moderation effects in light of prior literature (Dawson et al., 2005; Glass et al., 2017; Mulia and Zemore, 2012; Savage and Mezuk, 2014; Zemore et al., 2011). Social stress theory posits that stress exposures, which cause adverse health problems, are unevenly distributed across social and economic lines (Aneshensel et al., 1991). This can lead to a disproportionate impact of stressors among groups (e.g., racial/ethnic groups) that society has placed at a disadvantage (Grusky, 2018; Rothman, 2015). When psychosocial stressors proliferate and accumulate over time, they may combine with other environmental conditions to degrade health status; stressors are rarely singular events that occur in isolation (Cochran and Mays, 1994; Diderichsen et al., 2001; Grollman, 2012). Several empirical studies in the alcohol literature provide some evidence for this (Glass et al., 2017; Haeny et al., 2019; Zemore et al., 2011). For instance, analyses of the National Alcohol Survey found that the associations of experiencing racial prejudice and unfair treatment with problem drinking were stronger for Blacks living below the poverty line as compared to Blacks living above the poverty line (Zemore et al., 2011). Given the potential interacting nature of psychosocial stressors in increasing risk for alcohol-related outcomes, studies that only consider single risk factors may ignore the full picture. While studies of risk factors are critical, studies of moderation should also consider protective factors and resilience. Prior studies have highlighted that certain cultural factors can buffer against the risks posed by discrimination on alcohol use disorder, such as being embedded in traditional cultural practices (Whitbeck et al., 2004) or having high levels of ethnic identification (Chae et al., 2008).

4.3. Implications

Our findings prompt researchers and practitioners to consider the extent to which systems of oppression can impact the pathogenesis, trajectories, and recoveries (including relapse) of AUD, and how shifting policies and practices can move toward the dismantling of oppression that give rise to illnesses (Griffith et al., 2007). Future research can identify causal mechanisms that can help inform individual-level interventions to reduce the impact of racism on health. Interventions have been developed to cultivate and fortify resilience in individuals (Joyce et al., 2018). Moreover, it remains critical to investigate ways to prevent racism in the first place. For instance, our study showed that discrimination in public settings and institutions were among the most common forms of discrimination. Cultural and structural competency trainings and other interventions could potentially reduce interpersonal and institutional racism in these settings/situations. Further, enforcing anti-racism and anti-discrimination policies in the situations/settings listed in the discrimination measure in this study (and beyond), could reduce that societal burden of AUD among people of color.

5. Conclusions

Racial/ethnic discrimination is associated with greater AUD severity in the U.S. regardless of other key factors (specific racial/ethnic group membership, poverty status) that increase risk for experience of discrimination. Institutions should work to dismantle systems of oppression that can result in experiences of racism, and healthcare clinics and community service settings may wish to identify patients or clients who have been affected by discrimination to cultivate resilience and connect individuals to community support systems. However, our findings call for concerted inter-disciplinary efforts to eliminate racism in society as a means of curbing the incidence and trajectories of AUD.

Contributors

All authors contributed to the conceptualization and writing of the manuscript. Dr. Glass analyzed the data and obtained funding for the study. All authors have read and approved the final manuscript.

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Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Supplementary data

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References

- American Psychiatric Association, 2013. *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition. American Psychiatric Association, Washington, DC.
- Aneshensel, C.S., Rutter, C.M., Lachenbruch, P.A., 1991. Social structure, stress, and mental health: competing conceptual and analytic models. *Am. Sociol. Rev.* 56, 166. <https://doi.org/10.2307/2095777>.
- Blume, A.W., Lovato, L.V., Thyken, B.N., Denny, N., 2012. The relationship of micro aggressions with alcohol use and anxiety among ethnic minority college students in a historically White institution. *Cult. Divers. Ethnic Minor. Psychol.* 18, 45–54. <https://doi.org/10.1037/a0025457>.
- Borrell, L.N., Kiefe, C.I., Williams, D.R., Diez-Roux, A.V., Gordon-Larsen, P., 2006. Self-reported health, perceived racial discrimination, and skin color in African Americans in the CARDIA study. *Soc. Sci. Med.* 63, 1415–1427. <https://doi.org/10.1016/j.socscimed.2006.04.008>.
- Boutwell, B.B., Nedelec, J.L., Winegard, B., Shackelford, T., Beaver, K.M., Vaughn, M., Barnes, J.C., Wright, J.P., 2017. The prevalence of discrimination across racial groups in contemporary America: results from a nationally representative sample of adults. *PLoS One* 12, e0183356. <https://doi.org/10.1371/journal.pone.0183356>.
- Boyd, R.W., Lindo, E.G., Weeks, L.D., McLemore, M.R., 2020. On racism: a new standard for publishing on racial health inequities. *Health Aff. Blog*. <https://doi.org/10.1377/hblog20200630.939347>.
- Boynnton, M.H., O'Hara, R.E., Covault, J., Scott, D., Tennen, H., 2014. A mediational model of racial discrimination and alcohol-related problems among African American college students. *J. Stud. Alcohol Drugs* 75, 228–234. <https://doi.org/10.15288/jsad.2014.75.228>.
- Brant, R., 1990. Assessing proportionality in the proportional odds model for ordinal

- logistic regression. *Biometrics* 46, 1171–1178.
- Carliner, H., Delker, E., Fink, D.S., Keyes, K.M., Hasin, D.S., 2016. Racial discrimination, socioeconomic position, and illicit drug use among US Blacks. *Soc. Psychiatry Psychiatr. Epidemiol.* <https://doi.org/10.1007/s00127-016-1174-y>.
- Carliner, H., Sarvet, A.L., Gordon, A.R., Hasin, D.S., 2017. Gender discrimination, educational attainment, and illicit drug use among U.S. women. *Soc. Psychiatry Psychiatr. Epidemiol.* 52, 279–289. <https://doi.org/10.1007/s00127-016-1329-x>.
- Chae, D.H., Takeuchi, D.T., Barbeau, E.M., Bennett, G.G., Lindsey, J.C., Stoddard, A.M., Krieger, N., 2008. Alcohol disorders among Asian Americans: associations with unfair treatment, racial/ethnic discrimination, and ethnic identification (the national Latino and Asian Americans study, 2002–2003). *J. Epidemiol. Community Health* 62, 973–979. <https://doi.org/10.1136/jech.2007.066811>.
- Cheadle, J.E., Whitbeck, L.B., 2011. Alcohol use trajectories and problem drinking over the course of adolescence: a study of North American indigenous youth and their caretakers. *J. Health Soc. Behav.* 52, 228–245. <https://doi.org/10.1177/0022146510393973>.
- Clark, T.T., Salas-Wright, C.P., Vaughn, M.G., Whitfield, K.E., 2015. Everyday discrimination and mood and substance use disorders: a latent profile analysis with African Americans and Caribbean Blacks. *Addict. Behav.* 40, 119–125. <https://doi.org/10.1016/j.addbeh.2014.08.006>.
- Cochran, S.D., Mays, V.M., 1994. Depressive distress among homosexually active African American men and women. *Am. J. Psychiatry* 151, 524–529.
- Dawson, D.A., Grant, B.F., Ruan, W.J., 2005. The association between stress and drinking: modifying effects of gender and vulnerability. *Alcohol Alcohol. Oxf. Oxf.* 40, 453–460. <https://doi.org/10.1093/alcalk/agh176>.
- Diderichsen, F., Evans, T., Whitehead, M., 2001. The social basis of disparities in health. In: Evans, T. (Ed.), *Challenging Inequities in Health: From Ethics to Action*. Oxford University Press, New York.
- Dovidio, J.F., Gaertner, S.L., 1986. *Prejudice, Discrimination, and Racism*. Academic Press.
- Gilbert, P.A., Zemore, S.E., 2016. Discrimination and drinking: a systematic review of the evidence. *Soc. Sci. Med.* 161, 178–194. <https://doi.org/10.1016/j.socscimed.2016.06.009>.
- Glass, J.E., Rathouz, P.J., Gattis, M., Joo, Y.S., Nelson, J.C., Williams, E.C., 2017. Intersections of poverty, race/ethnicity, and sex: alcohol consumption and adverse outcomes in the United States. *Soc. Psychiatry Psychiatr. Epidemiol.* 52, 515–524. <https://doi.org/10.1007/s00127-017-1362-4>.
- Grant, B.F., Chu, A., Sigman, R., Amsbary, M., Kali, J., Sugawara, Y., Jiao, R., Ren, W., Goldstein, R., 2014. *Source and Accuracy Statement: National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III)*. National Institute on Alcohol Abuse and Alcoholism, Rockville, MD.
- Gray, C.M.K., Montgomery, M.J., 2012. Links between alcohol and other drug problems and maltreatment among adolescent girls: perceived discrimination, ethnic identity, and ethnic orientation as moderators. *Child Abuse Negl.* 36, 449–460. <https://doi.org/10.1016/j.chiabu.2012.03.002>.
- Griffith, D.M., Mason, M., Yonas, M., Eng, E., Jeffries, V., Plihcik, S., Parks, B., 2007. Dismantling institutional racism: theory and action. *Am. J. Community Psychol.* 39, 381–392. <https://doi.org/10.1007/s10464-007-9117-0>.
- Grollman, E.A., 2012. Multiple forms of perceived discrimination and health among adolescents and young adults. *J. Health Soc. Behav.* 53, 199–214. <https://doi.org/10.1177/0022146512444289>.
- Grusky, D.B., 2018. *Social Stratification: Class, Race, and Gender in Sociological Perspective*, 4th ed. Routledge, New York. <https://doi.org/10.4324/9780429494642>.
- Haeny, A.M., Sartor, C.E., Arshanapally, S., Ahuja, M., Werner, K.B., Bucholz, K.K., 2019. The association between racial and socioeconomic discrimination and two stages of alcohol use in blacks. *Drug Alcohol Depend.* 199, 129–135. <https://doi.org/10.1016/j.drugalcdep.2019.02.026>.
- Hasin, D.S., O'Brien, C.P., Auriacombe, M., Borges, G., Bucholz, K., Budney, A., Compton, W.M., Crowley, T., Ling, W., Petry, N.M., Schuckit, M., Grant, B.F., 2013. DSM-5 criteria for substance use disorders: recommendations and rationale. *Am. J. Psychiatry* 170, 834–851. <https://doi.org/10.1176/appi.ajp.2013.12060782>.
- Hasin, D.S., Greenstein, E., Aivadyan, C., Stohl, M., Aharonovich, E., Saha, T., Goldstein, R., Nunes, E.V., Jung, J., Zhang, H., Grant, B.F., 2015. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5): procedural validity of substance use disorders modules through clinical re-appraisal in a general population sample. *Drug Alcohol Depend.* 148, 40–46. <https://doi.org/10.1016/j.drugalcdep.2014.12.011>.
- Hatch, S.L., 2005. Conceptualizing and identifying cumulative adversity and protective resources: implications for understanding health inequalities. *J. Gerontol. Ser. B* 60, S130–S134. https://doi.org/10.1093/geronb/60.Special_Issue_2.S130.
- Hudson, D.L., Bullard, K.M., Neighbors, H.W., Geronimus, A.T., Yang, J., Jackson, J.S., 2012. Are benefits conferred with greater socioeconomic position undermined by racial discrimination among African American men? *J. Mens Health* 9, 127–136. <https://doi.org/10.1016/j.jomh.2012.03.006>.
- Hudson, D.L., Puterman, E., Bibbins-Domingo, K., Matthews, K.A., Adler, N.E., 2013. Race, life course socioeconomic position, racial discrimination, depressive symptoms and self-rated health. *Soc. Sci. Med.* 97, 7–14. <https://doi.org/10.1016/j.socscimed.2013.07.031>.
- Hunte, H.E.R., Barry, A.E., 2012. Perceived discrimination and DSM-IV based alcohol and illicit drug use disorders. *Am. J. Public Health* 102, e111–e117. <https://doi.org/10.2105/AJPH.2012.300780>.
- Joyce, S., Shand, F., Tighe, J., Laurent, S.J., Bryant, R.A., Harvey, S.B., 2018. Road to resilience: a systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open* 8, e017858. <https://doi.org/10.1136/bmjopen-2017-017858>.
- Keyes, K.M., Galea, S., 2016. *Population Health Science*. Oxford University Press, New York, NY.
- Krieger, N., Smith, K., Naishadham, D., Hartman, C., Barbeau, E.M., 2005. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc. Sci. Med.* 1982 (61), 1576–1596. <https://doi.org/10.1016/j.socscimed.2005.03.006>.
- Lee, R.T., Perez, A.D., Boykin, C.M., Mendoza-Denton, R., 2019. On the prevalence of racial discrimination in the United States. *PLoS One* 14, e0210698. <https://doi.org/10.1371/journal.pone.0210698>.
- Martin, J.K., Tuch, S.A., Roman, P.M., 2003. Problem drinking patterns among African Americans: the impacts of reports of discrimination, perceptions of prejudice, and “risky” coping strategies. *J. Health Soc. Behav.* 44, 408–425.
- McLaughlin, K.A., Hatzenbuehler, M.L., Keyes, K.M., 2010. Responses to discrimination and psychiatric disorders among black, hispanic, female, and lesbian, gay, and bisexual individuals. *Am. J. Public Health* 100, 1477–1484. <https://doi.org/10.2105/AJPH.2009.181586>.
- Mulia, N., Zemore, S.E., 2012. Social adversity, stress, and alcohol problems: are racial/ethnic minorities and the poor more vulnerable? *J. Stud. Alcohol Drugs* 73, 570–580.
- National Institute on Alcohol Abuse and Alcoholism, 2014. *National Epidemiologic Survey on Alcohol and Related Conditions -III (NESARC-III): Data Notes*. National Institute on Alcohol Abuse and Alcoholism, Rockville, MD.
- Otiniano Verissimo, A.D., Gee, G.C., Ford, C.L., Iguchi, M.Y., 2014. Racial discrimination, gender discrimination, and substance abuse among Latina/os nationwide. *Cult. Divers. Ethnic Minor. Psychol.* 20, 43–51. <https://doi.org/10.1037/a0034674>.
- Pascoe, E.A., Smart Richman, L., 2009. Perceived discrimination and health: a meta-analytic review. *Psychol. Bull.* 135, 531–554. <https://doi.org/10.1037/a0016059>.
- Richman, L.S., Boynton, M.H., Costanzo, P., Banas, K., 2013. Interactive effects of discrimination and racial identity on alcohol-related thoughts and use. *Basic Appl. Soc. Psychol.* 35, 396–407. <https://doi.org/10.1080/01973533.2013.803966>.
- Rodriguez-Seijas, C., Stohl, M., Hasin, D.S., Eaton, N.R., 2015. Transdiagnostic factors and mediation of the relationship between perceived racial discrimination and mental disorders. *JAMA Psychiatry* 72, 706. <https://doi.org/10.1001/jamapsychiatry.2015.0148>.
- Rothman, R.A., 2015. *Inequality and Stratification: Race, Class, and Gender*, 1st ed. Routledge, New York. <https://doi.org/10.4324/9781315662794>.
- Ruan, W.J., Goldstein, R.B., Chou, S.P., Smith, S.M., Saha, T.D., Pickering, R.P., Dawson, D.A., Huang, B., Stinson, F.S., Grant, B.F., 2008. The alcohol use disorder and associated disabilities interview schedule-IV (AUDADIS-IV): reliability of new psychiatric diagnostic modules and risk factors in a general population sample. *Drug Alcohol Depend.* 92, 27–36. <https://doi.org/10.1016/j.drugalcdep.2007.06.001>.
- Savage, J.E., Mezuk, B., 2014. Psychosocial and contextual determinants of alcohol and drug use disorders in the National Latino and Asian American Study. *Drug Alcohol Depend.* 139, 71–78. <https://doi.org/10.1016/j.drugalcdep.2014.03.011>.
- StataCorp, 2017. *Stata Statistical Software: Release 15*. StataCorp, LLC, College Station, TX.
- U. S. Census Bureau, 2020. *Poverty Thresholds [WWW Document]*. URL <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html> (Accessed 7.6.20).
- Whitbeck, L.B., Chen, X., Hoyt, D.R., Adams, G.W., 2004. Discrimination, historical loss and enculturation: culturally specific risk and resiliency factors for alcohol abuse among American Indians. *J. Stud. Alcohol* 65, 409–418. <https://doi.org/10.15288/jsa.2004.65.409>.
- Zemore, S.E., Karriker-Jaffe, K.J., Keithly, S., Mulia, N., 2011. Racial prejudice and unfair treatment: interactive effects with poverty and foreign nativity on problem drinking. *J. Stud. Alcohol Drugs* 72, 361–370.