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Intersections of poverty, race/ethnicity, and sex: Alcohol consumption and adverse outcomes in the United States

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Abstract

We examine whether intersectionality theory—which formalizes the notion that adverse health outcomes owing to having a marginalized social status, identity, or characteristic, may be magnified for individuals with an additional marginalized social status, identity, or characteristic—can be applied using quantitative methods to describe the differential effects of poverty on alcohol consumption across sex and race/ethnicity. Using the National Epidemiologic Survey on Alcohol and Related Conditions, we analyze longitudinal data from Black, Hispanic, and White drinkers (n = 21,140) to assess multiplicative interactions between poverty, as defined by the U.S. Census Bureau, sex, and race/ethnicity, on adverse alcohol outcomes. Findings indicated that the effect of poverty on the past-year incidence of heavy episodic drinking was stronger among Black men and Black women in comparison to men and women of other racial/ethnic groups. Poverty reduction programs that are culturally informed may help reduce racial/ethnic disparities in the adverse outcomes of alcohol consumption.

Introduction

Alcohol use is the third leading preventable cause of death in the United States [1]. Among drinkers, racial/ethnic minorities and women are particularly vulnerable to the adverse effects of alcohol [2]. Specifically, although the rates of lifetime abstinence from alcohol are

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higher among Blacks and Hispanics than Whites [3], Blacks and Hispanics have a greater risk of developing alcohol-related liver disease [4], experience more social consequences related to drinking at similar levels of alcohol consumption [5], and are less likely to recover from alcohol dependence when compared to Whites [6]. Similarly, while women are more likely than men to abstain from alcohol, they have greater medical and psychiatric comorbidity owing to alcohol use than men [7, 8].

Social determinants of health, or the conditions in which people live, work, and play that affect access to resources, contribute to health disparities [9–12]. Poverty is a social determinant of health that is greatly elevated among Blacks and Hispanics when compared to Whites [13, 14]. Poverty has been described as a psychosocial stressor that can induce drinking as a means to cope [15, 16], which is a motivation for drinking that may significantly worsen alcohol-related outcomes [17], and multiple studies have identified associations between poverty or low income and heavy episodic drinking and alcohol-related problems [18–24], though one study did not find this association [25].

Intersectionality theory, rooted in Black feminism [26], describes how institutional structures or processes operating at the intersections between multiple identities may create unique forms of burden for those who possess multiple identities that are marginalized or targeted by discrimination in society [27]. For instance, the burden of poverty may be substantively different for Blacks than Whites [26]. With intersectionality theory, one would posit that those experiencing multiple marginalizations would confer an additional unique risk of experiencing adverse outcomes of drinking, which could not be explained solely by the independent risks conferred by each marginalized status. Theorists argue that investigations into health disparities that examine single identities, such as poverty status alone, without considering the intersection with other identities, such as race and sex, are insufficiently comprehensive [28–33].

There has been an increasing interest in using the intersectionality framework to formalize the notion that adverse health outcomes owing to having a marginalized social status, identity, or characteristic, may be magnified for individuals with an additional marginalized social position, identity, or characteristic [28, 34]. The intersectionality framework was developed in the qualitative literature, yet several studies have applied this framework using quantitative methods to understand health disparities [31, 35, 36]. Analytically, the goal of quantitative studies that evaluate intersectionality theory may be to demonstate additive or multiplicative interaction [28]. In the case of multiplicative interaction, the observed joint effect of two social positions would be different from what would be expected when multiplying their independent relative effects [37]. For instance, the effect of living near or below the poverty threshold relative to living above the poverty threshold on the consequences of alcohol consumption may be magnified for women (relative to men) or Blacks or Hispanics (relative to Whites).

We are not aware of quantitative studies that have explicitly aimed to test propositions of intersectionality theory in the context of alcohol consumption to date. However, several important studies have analyzed the National Alcohol Survey, a cross-sectional, population-representative survey to describe disparities in drinking outcomes owing to interactions

between socioeconomic conditions and race/ethnicity. Jones-Webb and colleagues [38] found that, among Black and White men, Black men with lower social class scores (a composite variable of income, educational status, and occupation) had a greater number of drinking consequences than White men with lower social class scores, with a significant interaction between social class and race. In contrast, Herd's [39] study of Black and White men did not find statistically significant interactions between race and measures of family income when examining drinking consequences. Neither of these two studies included women. A recent study by Zemore and colleagues [40] suggested the possibility that the associations between economic loss during the 2008–2009 recession and drinking outcomes were stronger among Blacks than Whites, though the interaction between economic loss and race/ethnicity only approached statistical significance (i.e., $p < 0.10$). Moreover, exploratory subgroup analyses, which could not account for potentially confounding factors owing to small sample sizes, suggested a stronger association between economic loss and drinking outcomes among Black men when compared to Black women [40]. The aforementioned studies provide some evidence that applications of intersectionality theory may yield useful data to inform public health programs that aim to reduce health disparities in alcohol-related outcomes. Further understanding the extent to which effects of poverty on drinking outcomes are magnified or mitigated by other social positions, such as race/ethnicity and sex, could increase our understanding of alcohol health disparities and inform prevention efforts.

Therefore, informed by the intersectionality framework, the aim of the current prospective study was to estimate whether associations between poverty status and drinking outcomes are modified by race/ethnicity and sex among a nationally representative sample of drinkers. We examined three drinking outcomes over a three-year follow-up period. Drinking persistence, which reflects the continuation of drinking and lack of abstinence from alcohol, was examined because although rates of abstinence are higher among women than men, Blacks than Whites, and those with lower incomes compared to those with higher incomes [41], it is possible that who initiate drinking may be more likely to continue drinking in the context of multiple marginalizations, which could inform prevention activities directed towards those with drinking contraindications (e.g., pregnancy, certain medical conditions and medications) [42]. We also examined the presence of heavy episodic drinking, which is associated with health behaviors and health outcomes, including mortality, in epidemiologic studies [43, 44]. Last, we examined counts of alcohol use disorder symptoms, which are self-reported psychological, physical, or social outcomes related to drinking that interfere with functioning [45].

We hypothesized that among drinkers, the effects of poverty on drinking persistence, heavy episodic drinking, and alcohol use disorder symptoms would be stronger among Blacks and Hispanics when compared to Whites, and stronger among women than men. Little data are available to inform a hypotheses regarding a three-way interaction between race/ethnicity, poverty, and sex, as prior research has lacked sufficient sample sizes [40] and has found found three-way interactions to have only marginal statistical significance [46]. Intersectionality theory [27] would posit that the effect of poverty on drinking outcomes would be strongest among Black women in comparison to other racial/ethnic and sex group combinations. This is partially supported by empirical literature, with separate studies

showing a stronger effect of neighborhood disadvantage [46] and economic disruptions [47] on alcohol outcomes among Blacks when compared to Whites, as well as prior findings showing that alcohol outcomes are worse among women than men [7, 8]. However, exploratory analyses in one study found a stronger association between economic loss and alcohol dependence among Black men when compared to Black women [40]. Given the mixed findings in the literature, we aimed to further explore a three-way interaction between poverty, race/ethnicity, and sex in a large, longitudinal, population-based cohort to inform future confirmatory work.

Method

Data and study sample

Longitudinal data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) were used to identify Black, Hispanic, and White respondents who reported consuming at least one alcohol beverage in the year prior to the baseline interview and responded to the follow-up interview (n=21,410). Prior studies have described NESARC methodology (Grant et al., 2004, 2009); baseline interviews were conducted from 2001 to 2002, with a population-representative sample of noninstitutionalized adults living in the United States, followed by re-interviews from 2004 to 2005. There were 43,093 respondents in the baseline interview, and 34,653 were re-interviewed three years later, for an 86.7% follow-up rate. People who became institutionalized or impaired were not eligible for the follow-up interview. Nonresponse is unlikely to bias alcohol consumption estimates [48]. While NESARC oversampled Blacks, Hispanics, and young adults, American Indian, Alaskan Natives, and Asians were not oversampled. This resulted in small cell sizes when estimating interaction effects, and therefore, American Indian, Alaskan Natives and Asian respondents were excluded from analyses in the present study. The Group Health Research Institute Institutional Review Board approved this research.

Measures

Persistence—At the follow-up interview, the outcome of alcohol consumption in the past year was assessed among all 21,410 study subjects with the question, “During the last 12 months, did you have at least 1 drink of any kind of alcohol?” Because the sample was restricted to past-year drinkers at the baseline interview, those who said yes to this question at follow-up had persistent drinking.

Heavy episodic drinking—Sex-specific cutpoints were used to assess the outcome of any heavy episodic drinking in the past-year at follow-up [49] among those who continued to drink at follow-up (n = 18,540). For men, heavy episodic drinking was defined as drinking five or more drinks in a single day. For women, heavy episodic drinking was defined as drinking four or more drinking in a single day [42, 50].

Alcohol use disorder symptoms—The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV assessed the outcome of alcohol use disorder symptoms at the follow-up interview among those who continued to drink at follow-up (n = 18,540) as defined by the Diagnostic and Statistical Manual of Mental Disorders-IV [51]. Symptoms of

alcohol use disorder manifest as social impairment, risky use, having a loss of control of one's drinking, and physiologic changes due to alcohol use [52]. The alcohol use disorder (abuse or dependence) variable was based on a sum of the number of symptoms met in the past-year (range 0–11). This continuous scale approach of measuring severity is common [53] and has been deemed to be "virtually identical" to item response theory analyses that weight the individual symptoms for severity [54, 55].

Poverty status—The primary exposure of poverty status was coded from the baseline interview using thresholds established by the U.S. Census Bureau [56]. 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 NESARC data included all variables necessary to code poverty status according to the threshold in year 2000. Three categories were used: poverty (<100% of the threshold), near poverty (100–150% of threshold), and not in poverty (> 150% of the threshold).

Race/ethnicity and sex—At the baseline interview respondents were asked to select one or more categories that described their race. Ethnicity was assessed with the question, "Are you of Hispanic or Latino origin?" A U.S. Census Bureau algorithm combined race and ethnicity hierarchically into mutually exclusive categories, three of which were used: Hispanic or Latino; Black, not Hispanic; and White, not Hispanic. Those selecting Hispanic or Latino would be classified as such, regardless of race. Those who selected both Black and White would be classified as Black. Sex was assessed by asking participants "What is your sex?" with response options of male and female. Both race/ethnicity and sex were considered as potential effect modifiers of the association between poverty and alcohol outcomes.

Covariates—Covariates were selected that were likely to confound the association between poverty status and alcohol outcomes [57]. Categorical variables were created for age (18–29 years, 30–44 years, 45–64 years, and ≥ 65 years), marital status (never married, previously married, and currently married), education (less than high school, high school or high school equivalency, and greater than high school), employment status (not employed, disabled or retired, employed), health insurance (private insurance with or without public insurance, public insurance only, and no insurance), and religiosity (does not currently attend services; currently attends religious services at a church, synagogue, mosque or other place of worship). Also available in the data were U.S. Census data on geographic region (of nine major census divisions in the United States) and urban/rural status (in metro statistical area and residing in a central city, in a metro statistical area but not in a central city, not in a metro statistical area) [58]. With the exception of religiosity, which was only assessed at the follow-up interview, covariates were coded based on their values at baseline.

Analysis

STATA 14.1 was used for all analyses [59]. Analyses adjusted for the complex survey design of NESARC using strata, cluster, and sampling weight variables to generate population-representative estimates with accurate standard errors.

Sample descriptive statistics

Characteristics of the analytic sample were described by calculating means and standard errors for count variables or proportions and standard errors for categorical variables.

Testing Intersectonality Theory

Multivariable log-linear models with robust standard errors were used to analyze all outcomes. In addition to including main effects for sex, race/ethnicity, and poverty and adjusting for all covariates, analyses of heavy episodic drinking and alcohol use disorder symptoms adjusted for baseline measurements of the outcome variable to reduce bias in the estimated effects of poverty.

To test the intersectionality theory that the effect of poverty status on persistence, heavy episodic drinking, and alcohol use disorder symptoms was stronger among Blacks and Hispanics when compared to Whites, and stronger among women than men, multiplicative interactions of poverty with race/ethnicity and sex were estimated. A fully saturated model that included a three-way interaction between these variables and all two-way interactions was fit. An omnibus test of statistical interaction using the survey-adjusted Wald statistic was used to assess for the presence of any effect modification. This was a 10 degrees of freedom test, which included three levels of poverty status (below threshold and near threshold in comparison to the reference group of >150% of the threshold) interacted with six race/ethnicity-by-sex categories. For each outcome that had a statistically significant overall interaction based on this test, the method of predictive margins was used to generate model-based estimates of the outcome at each level of poverty, race/ethnicity, and sex [60]. Next, linear combinations of the interaction terms were used to estimate measures of relative effect, focusing on the effect of having incomes below the poverty threshold or near the poverty threshold in comparison to the reference group of having an income >150% of the poverty threshold, for different levels of race/ethnicity-by-sex. Last, the survey-adjusted Wald statistic was used to calculate pairwise contrasts to examine how the relative effect of a specific poverty status (below threshold or near threshold) significantly differed across strata of race/ethnicity and sex. These pairwise contrasts were only conducted if a five degree of freedom test indicated that the effect of a specific poverty status varied across race/ethnicity and sex.

Results

Sample characteristics

Baseline characteristics for the sample are described in Table 1. With regard to outcomes, the weighted percentage of drinkers at baseline who had persistent drinking at follow-up was 88.0% (86.6% unweighted). Among past-year drinkers at follow-up, 38.3% engaged in heavy episodic drinking, and the mean value of alcohol use disorder symptoms was 0.7 (range 0–11).

Neither race/ethnicity nor sex modified the effect of povery status on drinking persistence or alcohol use disorder symptoms (Table 2). However, the effect of poverty status on heavy

episodic drinking at follow-up was modified (F [10, 56] = 2.83, p = 0.007); Table 2 (see Online Resource 1 for full regression estimates).

The incidence of past-year heavy episodic drinking within strata of poverty, race/ethnicity, and sex, as well as risk ratios (RRs) for the effect of poverty status on heavy episodic drinking within strata of race/ethnicity and sex, are presented in Table 3. The incidence of past-year heavy episodic drinking at follow-up varied greatly across race/ethnicity, sex, and poverty status. For instance, the past-year incidence of heavy episodic drinking was as low as 21.7% among Black women with incomes > 150% of the poverty threshold, to as high as 56.7% among Black men with incomes near the poverty threshold.

Also shown in Table 3, although the estimated effect of having an income below, relative to > 150% of poverty threshold on the past-year incidence of heavy episodic drinking trended higher among Black and White women, the omnibus five degree of freedom test failed to reject the null hypothesis of no statistical interaction (F [5, 61] = 2.03, p = 0.087; not shown), suggesting that this effect did not vary significantly across race/ethnicity and sex.

In contrast, the effect of having an income near, relative to > 150% of the poverty threshold on the past-year incidence of binge drinking did differ statistically across the six race/ethnicity and gender groups (F [5, 61] = 3.76, p = 0.005; not shown). Effect estimates suggested and pairwise contrasts confirmed the effect of having an income near relative to > 150% of the poverty treshold among both Black men (RR=1.40) and Black women (RR=1.48) was stronger than that of Hispanic men (RR=0.98), Hispanic women (RR=0.91), White men (RR=0.91), and White women (RR=1.00). In terms of incidence, this represents a 16.3 percentage point difference in past-year binge drinking when comparing Black men living near the poverty threshold to Black men living > 150% of the poverty threshold and a 10.6 percentage point difference between these poverty statuses among Black women (calculated from past-year incidence values in Table 3).

Sensitivity Analyses

While our primary analyses of heavy episodic drinking and alcohol use disorder symptoms focused on the differential effect of poverty by race/ethnicity and sex among those who remained exposed to alcohol at follow-up, an alternative question would be whether or not the poverty effect differed among those exposed to alcohol at baseline, regardless of whether or not they remained exposed three years later. Thus, we conducted sensitivity analyses examining the outcomes of heavy episodic drinking and alcohol use disorder symptoms among the whole sample of baseline drinkers (i.e., n = 21,410, which included those who stopped drinking at follow-up). Results were consistent with the main analyses (i.e., for the test of interaction: F [10,56] = 2.98, p = 0.004 for heavy episodic drinking, NS for alcohol use disorder symptoms).

Prior research suggests that there are protective effects of being foreign born on alcohol outcomes for some Hispanics groups, such as Mexican-Americans, and that these protective effects may differ by sex [61]. Because a large proportion of Hispanics (45.1%) in this sample were foreign born, we conducted additional sensitivity analyses excluding foreign-born Hispanics to see if this would change the results. Findings were consistent with our

main analyses. The effect of poverty varied across race/ethnicity and sex for only the heavy episodic drinking outcome (F[10,56] = 2.99, p = 0.004; NS for drinking persistence and alcohol use disorder symptoms). The largest difference in the incidence of past-year heavy episodic drinking when comparing results from the main analytic sample to the revised analytic sample was among Hispanic women below the poverty line (a past-year incidence of 28.5% in the main analytic sample [see Table 3] versus 30.0% in the revised analytic sample [not shown]).

Discussion

This large national longitudinal study of U.S. residents applied intersectionality theory to understand combined effects of poverty, race/ethnicity, and sex on alcohol outcomes in an investigation that included both men and women, the three largest racial/ethnic groups in the United States, and a definition of poverty status that adhered to the U.S. Census Beaurau poverty threshold definition, which optimized its ability to inform policy and practice. Our findings support propositions outlined by intersectionality theory, such that the combined effects of poverty, race/ethnicity, and sex on drinking outcomes were multiplicative. Specifically, among drinkers, the effect of living near, relative to substantially above, the poverty threshold on past-year heavy episodic drinking at a three-year follow-up interview was dependent on race/ethnicity and sex. The effect of living near the poverty threshold (100–150% of the U.S. poverty threshold) appeared strongest among Black men and Black women. Black men and Black women had a higher risk of heavy episodic drinking associated with having incomes near the poverty threshold than men and women of other racial/ethnic groups.

Our finding that the poverty effect appeared stronger among Black men than several other groups was consistent with a prior study focusing on men [38], in which the positive association between social class scores (a composite variable of income, educational status, and occupation) and drinking consequences was stronger among Black men than White men, as well as other studies indicating that economic adversity may have a stronger effect among Blacks than Whites on the outcomes of alcohol consumption [40, 47]. The poverty effect in the current study also appeared stronger in Black women than in men and women of other racial/ethnic groups. The conceptual literature describes unique stressors in the experiences of poverty among Blacks. From a structural perspective, segregation, opportunity, and policing uniquely affect Blacks in poverty [15, 62, 63], which could increase stress and a desire to drink to intoxication, and/or diminish self-efficacy to reduce consumption [47]. Additionally, at the interpersonal level, racial discrimination has been found to be associated with heavy episodic drinking among African-American youth [64]. Because the effect of living near the poverty threshold was worse among Black individuals in the sample, it is important to develop interventions that take elements of Black culture into consideration. For example, beauty salons and barber shops have been found to be promising venues for health promotion and interventions targeting physical and mental health largely in communities of color [65]. This may extend to interventions that could target drinking behavior in barber shops and beauty salons.

Moreover, the current analyses indicated that poverty had a stronger effect on heavy episodic drinking among Blacks than Hispanics, and additionally, the poverty effect among Hispanics was not significantly different from the effect among Whites. Reasons for these differences are not known. A prior study investigating the effects of job loss on alcohol-related outcomes found that social support buffered an association between psychological distress and days of intoxication among Whites and Hispanics but not Blacks [47]. The authors noted that Blacks experiencing distress due to economic disruptions may have less access to social support than Hispanics, which could also include less access to financial support (which was not measured in that study nor in the current study) [47], and which could explain these findings.

While living near or below the poverty threshold would subject individuals and their families to considerable stress, only the effect of living near (but not below) the poverty threshold, relative to living substantially above the poverty threshold, varied across race/ethnicity and sex. Perhaps those living near the poverty threshold may be subjected to a more chaotic living situation, with inconsistent access to means-tested benefits, given that many poverty programs are geared towards those living below the federal poverty threshold. An alternative explanation would be that those living near the poverty threshold may have more access to some disposable income in the context of stress and discrimination, providing a means to afford alcohol. It is also worthwhile to note that a magnified effect of poverty among Black men and Black women was present when investigating heavy episodic drinking, but not present when investigating drinking persistence or alcohol use disorder symptoms. The reason for these differences are unknown, as other studies have found a differential effect of socioeconomic conditions on alcohol use disorder symptoms or drinking consequences across race/ethnicity [40, 47]. More studies are needed to evaluate these outcomes across additional datasets, which would allow for a systematic comparison of differences.

Limitations

Racial/ethnic groups in this study were categorized with a Census Bureau definition that collapsed Hispanic/Latino ethnicity with race. The algorithm did not make distinctions between persons who identified with a single versus multiple race or ethnic categories (e.g., 4.4% of Hispanics in this sample reported Black race), did not consider nativity status or languages spoken, and did not consider subgroups within ethnicity (e.g., Puerto Rican, Mexican, other Hispancs). A different algorithm may have yielded different results. Although beyond the scope of the current study, an additional limitation is the lack of a measure that examined the unique experiences that accompany being a non-White member of society in the U.S. While Black and Hispanics were oversampled in NESARC, Asian, American Indian, and Alaskan Natives were not, leading to smaller sample sizes for interaction analyses and a need to exclude these groups. Oversampling of all major racial/ethnic groups should be considered in future surveys with population-representative designs. Whereas a significant strength of this study was its use of longitudinal data, an appropriate follow-up length for investigating the effect of poverty on drinking outcomes has not been established, as the vast majority of studies investigating how economic hardships impact drinking outcomes have been cross-sectional. The three-year follow-up design may been too long to detect important fluctuations in the outcomes, or may have been too short to detect

risks that accumulate over longer periods. This lag time and the possibility of unmeasured factors limited our ability to estimate causal relationships. Last, the mean number of alcohol symptoms were low in the sample indicating that there was little variability in this outcome, which provided limited statistical power to detect interactions.

Conclusions

This study described the joint effects of poverty, race/ethnicity, and sex on drinking outcomes in a national sample of Black, Hispanic, and White U.S. residents. Findings provide support for using the intersectionality framework to investigate health disparities in the outcomes of alcohol consumption. Regarding heavy episodic drinking,we found that the effect of poverty was worse among Black men and Black women when compared to men and women of other racial/ethnic groups. Our findings may sugest that tailored alcohol prevention programs targeting Blacks in poverty could help reduce racial/ethnic disparities in the adverse outcomes of alcohol consumption.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. JAMA. 2004; 291:1238–45. 291/10/1238 [pii]. DOI: 10.1001/jama.291.10.1238 [PubMed: 15010446]
2. Chartier K, Caetano R. Ethnicity and health disparities in alcohol research. Alcohol Res Health. 2010; 33:152–160. [PubMed: 21209793]
3. Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health (NSDUH): Summary of National Findings. Substance Abuse and Mental Health Services Administration; Rockville, MD: 2013.
4. Flores YN, Yee HF, Leng M, et al. Risk Factors for Chronic Liver Disease in Blacks, Mexican Americans, and Whites in the United States: Results From NHANES IV, 1999–2004. The American Journal of Gastroenterology. 2008; 103:2231–2238. DOI: 10.1111/j.1572-0241.2008.02022.x [PubMed: 18671818]

5. Mulia N, Ye Y, Greenfield TK, Zemore SE. Disparities in Alcohol-Related Problems Among White, Black, and Hispanic Americans. Alcoholism: Clinical and Experimental Research. 2009; 33:654–662. DOI: 10.1111/j.1530-0277.2008.00880.x
6. Dawson DA, Grant BF, Stinson FS, et al. Recovery from DSM-IV alcohol dependence: United States, 2001–2002. Addiction. 2005; 100:281–92. DOI: 10.1111/j.1360-0443.2004.00964.x [PubMed: 15733237]
7. Bradley KA, Badrinath S, Bush K, et al. Medical risks for women who drink alcohol. J Gen Intern Med. 1998; 13:627–639. [PubMed: 9754520]
8. Erol A, Karpyak VM. Sex and gender-related differences in alcohol use and its consequences: Contemporary knowledge and future research considerations. Drug Alcohol Depend. 2015; 156:1–13. DOI: 10.1016/j.drugalcdep.2015.08.023 [PubMed: 26371405]
9. Commission on the Social Determinants of Health. Closing the gap in a generation: Health equity through action on the social determinants of health. World Health Organization; Geneva: 2008.
10. Link BG, Phelan J. Social conditions as fundamental causes of disease. J Health Soc Behav. 1995; (Spec No):80–94. [PubMed: 7560851]
11. Rine CM. Unnatural causes: is inequality making us sick? Health Soc Work. 2010; 35:229–231. [PubMed: 20853651]
12. U.S. Department of Health and Human Services. Healthy People 2020. Washington, DC: 2010.
13. DeNavas-Walt, C., Proctor, BD., Smith, JC. Income, poverty, and health insurance coverage in the United States. U.S. Census Bureau; Washington, DC: 2013.
14. U.S. Census Bureau. Poverty rates for selected detailed race and Hispanic groups by state and place. U.S. Census Bureau; Washington, DC: 2013.
15. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. J Behav Med. 2009; 32:20–47. DOI: 10.1007/s10865-008-9185-0 [PubMed: 19030981]
16. Volpicelli JR. Uncontrollable Events and Alcohol Drinking. Addiction. 1987; 82:381–392. DOI: 10.1111/j.1360-0443.1987.tb01494.x
17. Holahan CJ, Moos RH, Holahan CK, et al. Drinking to cope, emotional distress and alcohol use and abuse: a ten-year model. J Stud Alcohol. 2001; 62:190–198. [PubMed: 11327185]
18. Mossakowski KN. Is the duration of poverty and unemployment a risk factor for heavy drinking? Social Science & Medicine. 2008; 67:947–955. DOI: 10.1016/j.socscimed.2008.05.019 [PubMed: 18573582]
19. Dawson DA, Grant BF, Patricia Chou S, Pickering RP. Subgroup variation in U.S. drinking patterns: results of the 1992 national longitudinal alcohol epidemiologic study. Journal of Substance Abuse. 1995; 7:331–344. DOI: 10.1016/0899-3289(95)90026-8 [PubMed: 8749792]
20. Mäkelä P. Alcohol-related mortality as a function of socio-economic status. Addiction. 1999; 94:867–886. [PubMed: 10665076]
21. Jones-Webb R, Snowden L, Herd D, et al. Alcohol-related problems among black, Hispanic and white men: the contribution of neighborhood poverty. J Stud Alcohol. 1997; 58:539–545. [PubMed: 9273921]
22. Khan S, Murray RP, Barnes GE. A structural equation model of the effect of poverty and unemployment on alcohol abuse. Addictive Behaviors. 2002; 27:405–423. DOI: 10.1016/S0306-4603(01)00181-2 [PubMed: 12118628]
23. Karlamangla A, Zhou K, Reuben D, et al. Longitudinal trajectories of heavy drinking in adults in the United States of America. Addiction. 2006; 101:91–99. DOI: 10.1111/j.1360-0443.2005.01299.x [PubMed: 16393195]
24. Midanik LT, Clark WB. The demographic distribution of US drinking patterns in 1990: description and trends from 1984. Am J Public Health. 1994; 84:1218–1222. [PubMed: 8059875]
25. Mulia N, Ye Y, Zemore SE, Greenfield TK. Social disadvantage, stress, and alcohol use among black, hispanic, and white Americans: Findings from the 2005 U.S. National Alcohol Survey. Journal of Studies on Alcohol & Drugs. 2008; 69:824–833. [PubMed: 18925340]
26. Collins PH. Intersections of race, class, gender, and nation: Some implications for Black family studies. Journal of Comparitive Family Studies. 1998; 29:27–36.

27. Crenshaw K. Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. U Chi Legal F. 1989:139–167.
28. Bauer GR. Incorporating intersectionality theory into population health research methodology: challenges and the potential to advance health equity. Soc Sci Med. 2014; 110:10–17. DOI: 10.1016/j.socscimed.2014.03.022 [PubMed: 24704889]
29. Cochran SD, Mays VM. Depressive distress among homosexually active African American men and women. Am J Psychiatry. 1994; 151:524–529. [PubMed: 8147449]
30. Gattis MN, Larson A. Perceived microaggressions and mental health in a sample of Black youth experiencing homelessness. Social Work Research. (In press).
31. Grollman EA. Multiple Forms of Perceived Discrimination and Health among Adolescents and Young Adults. Journal of Health and Social Behavior. 2012; 53:199–214. DOI: 10.1177/0022146512444289 [PubMed: 22588219]
32. Kelly UA. Integrating Intersectionality and Biomedicine in Health Disparities Research: Advances in Nursing Science. 2009; 32:E42–E56. DOI: 10.1097/ANS.0b013e3181a3b3fc
33. Williams DR, Kontos EZ, Viswanath K, et al. Integrating multiple social statuses in health disparities research: the case of lung cancer. Health Serv Res. 2012; 47:1255–1277. DOI: 10.1111/j.1475-6773.2012.01404.x [PubMed: 22568674]
34. Bowleg L. The problem with the phrase women and minorities: intersectionality-an important theoretical framework for public health. Am J Public Health. 2012; 102:1267–1273. DOI: 10.2105/AJPH.2012.300750 [PubMed: 22594719]
35. Carliner H, Delker E, Fink DS, et al. Racial discrimination, socioeconomic position, and illicit drug use among US Blacks. Soc Psychiatry Psychiatr Epidemiol. 2016; doi: 10.1007/s00127-016-1174-y
36. Diderichsen F, Evans T, Whitehead M. The social basis of disparities in health. Challenging inequities in health: From ethics to action. 2001
37. Szklo, M., Nieto, FJ. Epidemiology: beyond the basics. 3. Jones & Bartlett Learning; Burlington, Mass: 2014.
38. Jones-Webb RJ, Hsiao CY, Hannan P. Relationships between socioeconomic status and drinking problems among black and white men. Alcohol Clin Exp Res. 1995; 19:623–627. [PubMed: 7573784]
39. Herd D. Predicting drinking problems among black and white men: results from a national survey. J Stud Alcohol. 1994; 55:61–71. [PubMed: 8189728]
40. Zemore SE, Mulia N, Jones-Webb RJ, et al. The 2008–2009 Recession and Alcohol Outcomes: Differential Exposure and Vulnerability for Black and Latino Populations. Journal of Studies on Alcohol and Drugs. 2013; 74:9–20. DOI: 10.15288/jsad.2013.74.9 [PubMed: 23200146]
41. Dawson DA, Goldstein RB, Saha TD, Grant BF. Changes in alcohol consumption: United States, 2001–2002 to 2012–2013. Drug Alcohol Depend. 2015; 148:56–61. DOI: 10.1016/j.drugalcdep.2014.12.016 [PubMed: 25620731]
42. National Institute on Alcohol Abuse and Alcoholism. Helping Patients Who Drink Too Much: A Clinician's Guide (Updated 2005 Edition). National Institutes of Health, U.S. Department of Health and Human Services; Bethesda, MD: 2007.
43. Holahan CJ, Schutte KK, Brennan PL, et al. Drinking Level, Drinking Pattern, and Twenty-Year Total Mortality Among Late-Life Drinkers. J Stud Alcohol Drugs. 2015; 76:552–558. [PubMed: 26098030]
44. Paul LA, Grubaugh AL, Frueh BC, et al. Associations between binge and heavy drinking and health behaviors in a nationally representative sample. Addict Behav. 2011; 36:1240–1245. DOI: 10.1016/j.addbeh.2011.07.034 [PubMed: 21868171]
45. Hasin DS, O'Brien CP, Auriacombe M, et al. DSM-5 Criteria for Substance Use Disorders: Recommendations and Rationale. Am J Psychiatry. 2013; 170:834–851. DOI: 10.1176/appi.ajp.2013.12060782 [PubMed: 23903334]
46. Karriker-Jaffe KJ, Zemore SE, Mulia N, et al. Neighborhood disadvantage and adult alcohol outcomes: differential risk by race and gender. J Stud Alcohol Drugs. 2012; 73:865–873. [PubMed: 23036203]

47. Jones-Webb R, Karriker-Jaffe KJ, Zemore SE, Mulia N. Effects of Economic Disruptions on Alcohol Use and Problems: Why Do African Americans Fare Worse? J Stud Alcohol Drugs. 2016; 77:261–271. [PubMed: 26997184]
48. Dawson DA, Goldstein RB, Pickering RP, Grant BF. Nonresponse bias in survey estimates of alcohol consumption and its association with harm. J Stud Alcohol Drugs. 2014; 75:695–703. [PubMed: 24988268]
49. National Institute of Alcohol Abuse and Alcoholism. NIAAA council approves definition of binge drinking. 2004:3.
50. Smith PC, Schmidt SM, Allensworth-Davies D, Saitz R. Primary care validation of a single-question alcohol screening test. J Gen Intern Med. 2009; 24:783–788. DOI: 10.1007/s11606-009-0928-6 [PubMed: 19247718]
51. Grant BF, Dawson DA, Stinson FS, et al. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. Drug Alcohol Depend. 2003; 71:7–16. DOI: 10.1016/S0376-8716(03)00070-X [PubMed: 12821201]
52. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5. American Psychiatric Association; Washington, DC: 2013.
53. Glass JE, Williams EC, Bucholz KK. Psychiatric comorbidity and perceived alcohol stigma in a nationally representative sample of individuals with DSM-5 alcohol use disorder. Alcoholism: Clinical and Experimental Research. 2014; 38:1697–705. DOI: 10.1111/acer.12422
54. Dawson DA, Saha TD, Grant BF. A multidimensional assessment of the validity and utility of alcohol use disorder severity as determined by item response theory models. Drug and Alcohol Dependence. 2010; 107:31–38. DOI: 10.1016/j.drugalcdep.2009.08.019 [PubMed: 19782481]
55. Dawson DA, Grant BF. Should symptom frequency be factored into scalar measures of alcohol use disorder severity?: Symptom frequency and measures of AUD severity. Addiction. 2010; 105:1568–1579. DOI: 10.1111/j.1360-0443.2010.02994.x [PubMed: 20569231]
56. U.S. Census Bureau. [Accessed 29 Jul 2014] Poverty data - poverty thresholds. 2014. https://www.census.gov/hhes/www/poverty/data/threshld/
57. Knol MJ, VanderWeele TJ. Recommendations for presenting analyses of effect modification and interaction. International Journal of Epidemiology. 2012; 41:514–520. DOI: 10.1093/ije/dyr218 [PubMed: 22253321]
58. U.S. Census Bureau. Geographic Terms and Concepts - Census Divisions and Census Regions. U.S. Census Bureau; Washington, DC: 2016.
59. StataCorp. Stata Statistical Software: Release 14. StataCorp, LP; College Station, TX: 2015.
60. Graubard BI, Korn EL. Predictive margins with survey data. Biometrics. 1999; 55:652–9. [PubMed: 11318229]
61. Markides KS, Snih SA, Walsh T, et al. Problem Drinking Among Mexican-Americans: The Influence of Nativity and Neighborhood Context? American Journal of Health Promotion. 2012; 26:225–229. DOI: 10.4278/ajhp.100510-QUAN-146 [PubMed: 22375572]
62. Krieger, N. Discrimination and Health Inequities. In: Berkman, LF.Kawachi, I., Glymour, MM., editors. Social Epidemiology. Oxford University Press; 2014. p. 63-125.
63. Myers HF. Ethnicity- and socio-economic status-related stresses in context: an integrative review and conceptual model. J Behav Med. 2009; 32:9–19. DOI: 10.1007/s10865-008-9181-4 [PubMed: 18989769]
64. Madkour AS, Jackson K, Wang H, et al. Perceived Discrimination and Heavy Episodic Drinking Among African-American Youth: Differences by Age and Reason for Discrimination. J Adolesc Health. 2015; 57:530–536. DOI: 10.1016/j.jadohealth.2015.07.016 [PubMed: 26499858]
65. Linnan LA, D'Angelo H, Harrington CB. A literature synthesis of health promotion research in salons and barbershops. Am J Prev Med. 2014; 47:77–85. DOI: 10.1016/j.amepre.2014.02.007 [PubMed: 24768037]

Table 1

Characteristics of drinkers at baseline who responded to the follow-up interview (n = 21,410)

Variable	Overall (n = 21,410)
	Weighted % (SE) or Mean (SE)
Age (%)	
18–29 years	23.1 (0.4)
30–44 years	33.9 (0.4)
45–64 years	32.1 (0.4)
65 years or older	10.9 (0.3)
Sex (%)	
Female	48.7 (0.4)
Male	51.3 (0.4)
Race/ethnicity (%)	
Black	9.0 (0.6)
Hispanic	9.8 (1.0)
White	81.1 (1.2)
Marital status (%)	
Currently married or living together as if married	64.0 (0.6)
Previously married	14.8 (0.3)
Never married	21.1 (0.5)
Employed (%)	
Unemployed	14.1 (0.4)
Disabled or retired	13.5 (0.3)
Employed	72.4 (0.4)
Poverty status (%)	
<100%	11.0 (0.4)
100–150%	6.6 (0.3)
>150%	82.5 (0.5)
Education (%)	
<HS	10.0 (0.4)
HS or GED	26.8 (0.5)
>HS	63.2 (0.6)
Health insurance (%)	
None	16.7 (0.5)
Public	8.3 (0.3)
Private	75.1 (0.6)
Attends religious services (%)	48.8 (0.7)
Urban/rural status (%)	
In metro statistical area, residing in a central city	32.2 (0.7)
In metro statistical area, not residing in a central city	51.4 (0.7)
Not in a metro statistical area	16.4 (0.6)
Past-year heavy episodic drinking at baseline	31.1 (0.5)

Variable	Overall (*n* = 21,410)
	Weighted % (SE) or Mean (SE)
Alcohol use disorder symptoms at baseline (mean)	0.7 (0.0)

Table 2

Wald tests for interactions investigating whether the effect of poverty on three-year alcohol outcomes varied across race and sex

	***n* = 21,410 drinkers at baseline**	***n* = 18,540 drinkers at baseline and follow-up**	***n* = 18,540 drinkers at baseline and follow-up**
	Persistence	**Heavy episodic drinking**	**Alcohol use disorder symptoms**
Wald test of the interaction terms (H_0: No effect modification)	$F(10, 56) = 0.62$, p = 0.790	***F* (10, 56) = 2.83, p = 0.007**	$F(10, 56) = 1.05$, p = 0.419

Design-based F-test statistics are displayed with numerator degrees of freedom and denominator degrees of freedom. Models adjusted for age, marital status, education, employment status, health insurance, religiosity, geographic region, and urban/rural status. Bolded values and asterisks indicate statistical significance ($p < 0.05$)

Table 3

Racial/ethnic and sex differences in the effect of poverty on the incidence of past-year heavy episodic drinking three years later (n = 18,540 drinkers at the baseline interview who continued to drink at the three-year follow-up)

		Incidence of past-year heavy episodic drinking by poverty threshold, race/ethnicity, and gender			Effect of poverty on heavy episodic drinking (Reference group: > 150% of the poverty threshold)	
		Below threshold	100–150%	>150%	Below threshold vs. >150%	100–150% vs. >150%
Stratum		Past-year incidence (95% CI)			RR (95% CI)	RR (95% CI)
Black	Male	43.2 (34.0–52.5)	56.7 (42.3–71.0)	40.4 (37.9–44.0)	1.07 (0.85–1.34)	[a,b,c,d]**1.40 (1.07–1.84)**
	Female	31.2 (25.3–37.1)	32.3 (22.1–42.4)	21.7 (18.4–25.1)	**1.44 (1.10–1.87)**	[e,f,g,h]**1.48 (1.07–2.05)**
Hispanic	Male	47.9 (42.6–53.1)	43.9 (36.7–51.1)	44.9 (42.1–47.7)	1.07 (0.95–1.19)	[a,e]0.98 (0.83–1.15)
	Female	28.5 (22.4–34.6)	24.4 (17.0–31.9)	26.8 (23.5–30.0)	1.07 (0.84–1.35)	[b,f]0.91 (0.66–1.26)
White	Male	46.4 (43.2–49.7)	40.7 (36.0–45.5)	44.7 (43.2–46.3)	1.04 (0.96–1.12)	[c,g]0.91 (0.81–1.02)
	Female	34.6 (31.6–37.7)	28.8 (24.4–33.2)	28.7 (27.1–30.3)	**1.21 (1.09–1.33)**	[d,h]1.00 (0.86–1.17)

Bolded values and asterisks indicate statistical significance ($p < 0.05$). Alphabetic superscripts that match across table cells indicate that the pairwise contrast between the two risk ratios was statistically significant ($p < 0.05$) based on a survey-adjusted Wald test. For instance, "[a]" indicates a significant difference in the effect of poverty (100–150% vs. >150% of the threshold) between Black men and Hispanic men; if a subscript is not present in any two groups, then differences between those two groups were not statistically significant. Incidence rates were calculated using model-based predictive margins fixing values for gender, race, and poverty and allowing covariates to vary based on values in the observed data. RR=risk ratio, CI=confidence interval. Estimates are adjusted for age, marital status, education, employment status, health insurance, religiosity, geographic region, and urban/rural status.