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Poor, persecuted, young, and alone: Toward explaining the elevated risk of alcohol problems among Black and Latino men who drink

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Abstract

Background—Even given equivalent drinking patterns, Black and Latino men experience substantially more dependence symptoms and other consequences than White men, particularly at low/no heavy drinking. No known studies have identified factors driving these disparities. The current study examines this question.

Methods—The 2005 and 2010 National Alcohol Surveys were pooled. Surveys are nationally representative, telephone interviews of the U.S. including Black and Latino oversamples; male drinkers were analyzed (N = 4182). Preliminary analyses included negative binomial regressions of dependence symptom and consequence counts testing whether effects for race/ethnicity were diminished when entering potential explanatory factors individually. Additional analyses re-examined effects for race/ethnicity when using propensity score weighting to weight Blacks to Whites, and Latinos to Whites, first on heavy drinking alone, and then on heavy drinking and *all* explanatory factors supported by preliminary analyses.

Results—Preliminary regressions suggested roles for lower individual SES, greater prejudice and unfair treatment, and younger age in the elevated risk of alcohol problems among Black and Latino (vs. White) men at low heavy drinking levels; additional support emerged for single (vs. married) status among Blacks and neighborhood disadvantage among Latinos. When Blacks and Latinos were weighted to Whites on the above variables, effects for race/ethnicity on dependence

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Conflict of interest

No conflict declared.

Contributors

All authors have materially participated in the research and/or article preparation, and all have approved the paper's content. Dr. Zemore, Dr. Mulia, Mr. Ye, and Dr. Jones-Webb conceptualized the study and formulated the hypotheses and analysis plan. Mr. Ye and Dr. Karriker-Jaffe executed data preparation and analysis. Dr. Zemore drafted the manuscript with Dr. Martinez, and all parties suggested revisions.

counts were reduced to nonsignificance, while racial/ethnic disparities in consequence counts were attenuated (by >43% overall).

Conclusions—Heavy drinking may be especially risky for those who are poor, exposed to prejudice and unfair treatment, young, and unmarried, and these factors may contribute to explaining racial/ethnic disparities in alcohol problems.

Keywords

Hispanic; African American; Alcohol use; Disparities; Socioeconomic status; Discrimination

1. Introduction

1.1. Overview

Because excessive alcohol consumption is the third leading cause of preventable death among Americans (Mokdad et al., 2004), its disproportionate impact on racial/ethnic minorities constitutes a major public health problem. Compared to Whites, Blacks and Latinos experience higher rates of alcohol-related mortality (Greenfield, 2001; Hilton, 2006; Keyes et al., 2012; Stinson et al., 1993; Yoon and Yi, 2007), and Black and Latino drinkers are at greater risk than White drinkers for both alcohol dependence and other alcohol-related consequences even given an equivalent amount and pattern of consumption (Herd, 1994; Jones-Webb et al., 1997b; Mulia et al., 2009; Witbrodt et al., 2014). Studies specifically show that, among drinkers, Blacks and Latinos evidence a much higher intercept than Whites for both alcohol dependence and social/health consequences at the lowest consumption level, but a weaker relationship between consumption and problems, with racial/ethnic disparities converging at high consumption levels. This pattern has been repeatedly described in National Alcohol Survey (NAS) data, with remarkable effect sizes. For example, Mulia et al. (2009) reported that among drinkers reporting no/little heavy drinking, Black and Latino males had 5.5 and 4.8 times the odds respectively of 2+ dependence symptoms, vs. White males; among moderate heavy drinkers, odds of 2+ dependence symptoms were 4.1 and 2.2 times greater for Black and Latino than White males. Bivariate tests also compared DSM-IV dependence overall and showed that, compared to White drinkers (at 2.9%), Black drinkers were twice as likely to report dependence (at 5.9%), and Latino drinkers almost three times as likely (at 8.0%). Witbrodt et al. (2014) showed that such disparities are most pervasive for men, though symptom counts were also higher among Black than White women when controlling for heavy drinking. Notably, racial/ethnic differences in overall prevalence of alcohol use disorders do not follow this same pattern, with national studies comparing Blacks, Latinos, and Whites reporting mixed results across time, disorder type, and gender (Caetano and Clark, 1998; Grant et al., 2015; Hasin and Grant, 2004; Kandel et al., 1997; Mulia et al., 2009; Smith et al., 2006; Zemore et al., 2013).

No known study has empirically evaluated factors contributing to disparities in alcohol use disorders across White, Black, and Latino drinkers. Thus, the current study aims to explore potential factors contributing to the elevated rates of alcohol problems among Black and Latino (vs. White) male drinkers at a given level of heavy drinking. We focus on men given

the more extensive nature of racial/ethnic disparities in this population. The investigation is viewed as exploratory given the study's cross-sectional design, which precludes temporal lagging.

1.2. Theoretical rationale and specific aims

Researchers have speculated that various forms of social disadvantage, in combination with cultural/social factors, underlie the special susceptibility of Black men to alcohol problems. Among them, Zapolski et al. (2014) recently proposed a theoretical framework for understanding this phenomenon. They suggest that low-income Black men are at elevated risk for alcohol problems even where drinking is moderate due to greater exposure to racism and residence in low-income neighborhoods, both of which may increase distress (and thus stress-related drinking and problem behaviors) and surveillance by authorities, such as the police. Connected with this, drinking practices common in poor neighborhoods, such as public drinking, may attract special notice. Negative consequences (e.g., problems with family or friends due to drinking) are further worsened, they argue, by more conservative drinking norms in Black communities, which may amplify the social disapproval associated with drinking. Additionally, longer heavy drinking trajectories and restrictions in access to, and use of, health services among poor Black populations may exacerbate the negative effects of heavy drinking. Finally, Zapolski et al. acknowledge that biological vulnerability to the effects of alcohol may differ across race/ethnicity; for example, some evidence suggests that Black males are more sensitive than White males to both positive and negative effects of alcohol, which may have an underlying genetic basis (Pedersen and McCarthy, 2009, 2013). Zapolski's ideas are predicated by work by Jones-Webb and Herd, who pointed out that poverty and residence in poor, predominantly Black neighborhoods may be associated with social conditions increasing the risk of alcohol problems among Black men. Indeed, their analyses suggest that Black-White differences in alcohol problems are greatest among the poor and those living in poor neighborhoods (Herd, 1994; Jones-Webb et al., 1997a, 1995). Others have likewise found that poor neighborhoods connote higher risk for heavy drinking and alcohol disorders (Karriker-Jaffe, 2011; Karriker-Jaffe et al., 2012).

Theory regarding disparities between Latino and White men in the relationship between consumption and problems has been comparatively under-developed. Nevertheless, many of the factors discussed by Zapolski et al., above, seem plausible as causal mechanisms—and particularly those that distinguish Latino from White men, including lower individual and neighborhood socioeconomic status (SES; U.S. Census Bureau, 2013), greater exposure to discrimination (McLaughlin et al., 2010; Mulia et al., 2008; Zemore et al., 2011), more restrictive drinking norms (Keyes et al., 2010; Smith et al., 2010; Zemore et al., 2013), and later and longer heavy drinking careers (Caetano, 1997; Caetano and Kaskutas, 1995; Caetano et al., 2008; Johnson et al., 1998). To our knowledge, there is no evidence of any special biological vulnerability to alcohol's effects among Latino men.

The current study draws on the combined 2005 and 2010 National Alcohol Surveys to assess the contributions of key candidate mechanisms described above to Black-White and Latino-White disparities in alcohol-related problems overall and at low and moderate levels of consumption, targeting men. We specifically examine the contributions of individual and

neighborhood SES, perceived prejudice and unfair treatment (which are conceptually similar to discrimination), drinking norms, and age to these disparities, hypothesizing a substantial reduction in both Black-White and Latino-White disparities when these factors are accounted for. Witbrodt et al. (2014), described above, reported that disparities were minimally affected when accounting for estimated differences in drink size based on race/ethnicity, gender, age, and preferred beverage type, so we do not address drink size here. We also exclude biological factors due to a lack of appropriate measures. Extending Zapolski et al., we have added marital status to our model, recognizing that Black men are more likely than White men to be single (U.S. Census Bureau, 2013), which may lead to a riskier drinking pattern (e.g., higher risk-taking) and hence more problems (see Fig. 1).

2. Materials and methods

2.1. Data source

Data were derived from the 2005 and 2010 National Alcohol Surveys (NAS). The 2005 and 2010 NAS are national, household, Computer Assisted Telephone Interview (CATI) surveys of adults aged 18+ in all 50 U.S. states and Washington, DC. Respondents were sampled via a random digit dialing (RDD) approach using a list-assisted number generation protocol. Black and Latino over-samples were obtained by targeting telephone exchanges in higher density areas, with the exception of the 2005 Latino oversample, drawn using Latino surnames. Interviews were conducted in both English and Spanish.

The total N was 11,839 (2005 NAS = 6631; 2010 NAS = 5208), including 4182 male drinkers (N's = 2841 Whites, 508 Blacks, and 833 Latinos). Although the 2010 NAS included cell phone interviews, these data were excluded because cell surveys did not include key outcomes. Cooperation rates were 56% for the 2005 NAS (53% for the main sample, 63% for the Black oversample, and 70% for the Latino oversample) and 50% for the 2010 NAS when excluding cellphone cases (52% for the main sample and 47% for the racial/ethnic oversamples combined). For more, see Zemore et al. (2013) and Witbrodt et al. (2014).

2.2. Measures

2.2.1. Past-year alcohol consumption—*Current drinker status* was defined as drinking at least one whole drink in the prior 12 months. *Heavy drinking level* was defined using 5 variables, all past-12-months. These included (1) total volume from 5+ drinking sessions and (2) total volume from drinking sessions involving a 3–4-drink maximum, both derived from NAS graduated quantity-frequency (GF) measures (Greenfield, 2000b; Rehm et al., 1999). GF approaches assess frequency of drinking each of several quantities (here, 1, 2, 3–4, 5–8, 9–12, and 12+ drinks), and tend to yield more precise estimates of consumption than do typical frequency-quantity measures (Greenfield, 1998, 2000a; Hilton, 1989; Rehm et al., 1999). Additional indicators were (3) frequency of 5+ drinking, also derived from the GF and commonly used to identify individuals at risk for adverse health outcomes (National Institute on Alcoholism and Alcohol Abuse, 2010), and (4) frequency of intoxication, measured with the item, “How often in the past year did you drink enough to feel drunk?”, itself a strong predictor of alcohol-related consequences and dependence symptoms

(Greenfield, 1998; Midanik, 1999; Zemore, 2005). Last, we assessed (5) maximum drinks consumed on any single day. *Heavy drinking* was defined as a factor score comprised of these 5 indicators; scores were used as continuous variables and to assign respondents to 4 heavy drinking levels. The No Heavy Drinking level included respondents with a daily maximum <5 and no past-year drunkenness. High Heavy Drinking was comprised of the top tenth percentile of heavy drinkers, while the remainder was split into Low and Moderate levels based on a median split. Low and No Heavy Drinking levels were combined for the current study.

2.2.2. Past-year alcohol problems—*Alcohol-related consequences* in the prior 12 months were assessed using 15 items measuring (1) social consequences (4 items), (2) health consequences (3 items), (3) injuries and accidents (2 items), (4) legal consequences (3 items), and (5) workplace consequences (3 items) (see Cahalan, 1970; Midanik and Greenfield, 2000). Variables were created reflecting consequence counts overall and in 3 domains (i.e., social, health/injuries/accidents; and work/legal). *Alcohol dependence symptoms* in the same timeframe were assessed using a 17-item scale based on the American Psychiatric Association's Diagnostic and Statistical Manual, 4th Edition, and measuring symptoms in 7 domains/criteria (DSM-IV; American Psychiatric Association, 1994). Variables were created to reflect total criteria count (0–7 criteria) and DSM-IV dependence (3+ criteria). Alcohol problem measures have been used in the NAS since 1990 (Caetano and Tam, 1995). Many studies have been published using the NAS dependence measure, and findings reveal the expected associations with demographic variables (e.g., age, gender), total volume, and heavy drinking (Bond et al., 2014; Caetano and Tam, 1995; Greenfield et al., 2014a, 2014b; Jones-Webb et al., in press) as well as health services utilization (Cherpitel and Ye, 2015) and substance abuse treatment utilization (Zemore et al., 2009). Additionally, this measure has been associated with other alcohol problem measures such as the RAPS4 and AUDIT (Nayak et al., 2009) and compared favorably to dependence items in the National Epidemiological Survey on Alcohol and Related Conditions (Karriker-Jaffe et al., 2015).

2.2.3. Perceived prejudice and unfair treatment—To assess *prejudice*, we used items from Pinel's (1999) measure of racial/ethnic stigma consciousness, which assesses the extent to which people expect to be stereotyped on the basis of their race/ethnicity—and treated accordingly. Three items were selected based on factor loadings (e.g., "Stereotypes about my race or ethnic group have affected me personally," "My race or ethnic group influences how people act with me"). This scale demonstrates good reliability and associations with perceived discrimination, trust, social anxiety, and problem drinking (Mulia et al., 2008; Pinel, 1999); $\alpha=0.74$. Perceived *unfair treatment* was measured with a single, likert-type item on how often respondents feel that they are treated unfairly. Responses have been associated with heavy drinking, dependence symptoms, and alcohol-related consequences among both Blacks and Latinos (Mulia et al., 2008; Zemore et al., 2011).

2.2.4. Drinking norms—Drinking norms were assessed using 3 longstanding, likert-type NAS items assessing how much drinking is acceptable for a man at a bar with friends, for a

woman at a bar with friends, and at a party at someone else's home (Greenfield and Room, 1997); $\alpha=0.91$.

2.2.5. Neighborhood socioeconomic disadvantage—About 96% of the sample was geocoded to a census tract using either street address or ZIP Code centroid. Respondent data from the 2005 and 2010 NAS were then linked with data from the 2000 Decennial Census and 2010 American Community Survey (ACS), respectively, and a measure of neighborhood disadvantage was computed reflecting the proportions of adults living below poverty, adults without a high school diploma, unemployed males, and adults with working class jobs, averaged ($\alpha=0.82$; Krieger et al., 2002; Wilson, 1987). This measure was negatively correlated with median housing value ($r=-0.43$, $p<0.01$) and positively correlated with proportion of residents receiving public assistance ($r=0.58$, $p<0.01$).

2.2.6. Demographic variables—Demographic variables included gender, race/ethnicity, age, marital status, and socioeconomic status (i.e., household income, education, and employment status).

2.3. Analysis

First, we conducted descriptive analyses of racial/ethnic differences in specific dependence symptoms and consequence types at each heavy drinking level. Analyses provide context for understanding potential causal mechanisms underlying disparities. Due to the exploratory nature of the many tests conducted across specific dependence criteria and consequences types, we used $p<0.001$ as our criterion for these tests. Otherwise, we used $p<0.05$.

We then conducted several preliminary analyses designed to identify potential mediators for further testing. To begin, we examined overall racial/ethnic differences in candidate mediators (using t -tests and chi squares) as well as associations between candidate mediators and alcohol outcomes, controlling for heavy drinking (using negative binomial regressions). Candidate mediators included the disadvantage-related factors and cultural/demographic factors identified in Fig. 1. Next, we used a series of multivariate regressions to individually explore roles for each potential mediator in explaining disparities. Specifically, negative binomial models were fitted to predict the count of dependence criteria and, separately, consequences. Raw models estimated effects for race/ethnicity (Black and Latino vs. White), heavy drinking score, and their interaction. Subsequently, each potential mediator was (separately) added to the model, along with the interaction between that mediator and heavy drinking; we thus accounted not only for the mediator's main effect, but also for the extent to which it modified relationships between heavy drinking and alcohol outcomes. We then tested for significant differences in the coefficient representing the race/ethnicity effect on the intercept in models with and without the candidate mediator of interest. Statistical testing was performed using bootstrap methods and randomly re-sampling 1000 replications. Those variables shown to reduce the coefficient representing the effect for race/ethnicity were retained for the final analysis (below). We used a piecemeal approach informed by Baron and Kenny (1986) for preliminary tests because this approach was best suited to capturing our specific hypotheses (Muller et al., 2005) and because available macros for testing mediated moderation are not yet suitable for multicategory mediators (Hayes, 2014). These

models do however essentially test mediated moderation (Muller et al., 2005): that is, how socioeconomic status, prejudice, unfair treatment, norms, age, and marital status may explain the interaction effect for race/ethnicity and alcohol use in predicting alcohol problems.

Last, we used propensity score (PS) methods to examine the combined effects of all candidate mediators selected via prior models in contributing to racial/ethnic differences in effects for alcohol use on alcohol problems. We selected PS methods as a final step in testing mediation because PS methods do not rely on the many often untenable assumptions of standard covariance adjustment, and as a result, may offer more reliable inferences (Rubin, 1997). PS methods have historically been used predominantly to account for differences in probability of treatment exposure, but can also be used to address causal pathways/ confounding in other circumstances. Rosenbaum and Rubin showed that at a given PS, the conditional distribution of confounders is independent of the treatment assignment/exposure, and the PS adjustment is thus sufficient to remove bias due to observed covariates (Rosenbaum and Rubin, 1983). Here, we used PS weighting (Robins et al., 2000) and “standardized mortality ratio” (SMR) weights, which assign a weight of 1 to the “exposed” group (Black or Latino) and the propensity odds (i.e., $p/(1-p)$, where p is the predicted PS) to the comparison group (White). Specifically, we first weighted Blacks to Whites, and separately Latinos to Whites, on heavy drinking score alone. We then additionally weighted on all candidate mediators selected in prior steps, and compared effects for race/ethnicity on consequence and dependence counts across the two models, examining the total male drinker sample as well as no/low and moderate heavy drinkers alone. Substantial reductions in coefficients for race/ethnicity are suggestive of mediation.

All analyses used data weighted to adjust for probability of selection, nonresponse, demographic variables, and region. PS weights can be combined, via simple multiplication, with sampling weights for population surveys

3. Results

Table 1 displays racial/ethnic differences in specific dependence criteria and consequence types stratified by heavy drinking level. This Table confirms overall higher rates of dependence and alcohol-related consequences among Black and Latino (vs. White) male drinkers, particularly at no/low heavy drinking but also (for dependence) at moderate heavy drinking. Further, the column for no/low heavy drinking indicates substantially higher problem rates for Black male drinkers essentially *across* dependence criteria and consequence types, excepting two dependence criteria that were not significant at $p < 0.001$. Differences between Latino and White men in specific dependence criteria and consequence types tended to be smaller in magnitude and nonsignificant using $p < 0.001$, though rate differentials were in the expected direction. Broadly, the pattern of results suggests that racial/ethnic differences in alcohol-related problems at lower levels of heavy drinking are not attributable to social problems exclusively, but also emerge for biological effects of drinking (e.g., tolerance, withdrawal).

Table 2 shows racial/ethnic differences in the candidate mediators under study. This Table establishes that Black and Latino male drinkers were, vs. Whites, higher on social disadvantage: lower on income, education, employment, and neighborhood SES, and higher on racial/ethnic stigma and unfair treatment. Cultural and demographic factors also differed, with both Blacks and Latinos showing more conservative drinking norms, a younger age distribution, and (especially for Blacks) lower likelihood of being married. Additional analyses (not shown) reveal that, when controlling for heavy drinking, all of the same factors that differentiated Blacks and Latinos were risk factors for dependence and consequences, excepting conservative drinking norms: Problem counts were higher at the same level of drinking for those reporting lower income, lower education, part-time work or unemployment (vs. employment), lower neighborhood SES, higher racial/ethnic stigma, higher unfair treatment, younger age, single (vs. married) status, and unexpectedly, more *permissive* norms (all p 's < 0.05).

Table 3 presents the results of negative binomial regressions assessing the impact of individual candidate mediators on Black-White and Latino-White disparities. Among both Blacks and Latinos, results substantiate roles for all factors, again excepting norms. Among Blacks, adjustments for income, education, employment status, racial/ethnic stigma, unfair treatment, age, and marital status all reduced the size of the coefficient representing the Black (vs. White) intercept difference for dependence symptom count. Among Latinos, results for dependence are similar, except that neighborhood disadvantage was significant while marital status was not (though estimates show a reduced coefficient size). For alcohol-related consequences, evidence supports mediation for a reduced set of these variables, for Blacks including income, education, unfair treatment, and marital status, and for Latinos including income, education, employment status, racial/ethnic stigma, and unfair treatment. Racial/ethnic disparities were actually nonsignificantly larger when accounting for minority men's more conservative drinking norms.

Finally, Table 4 shows the impact of PS adjustments on racial/ethnic disparities in dependence symptom and consequence counts. Based on the above, PS weighting was used to weight Black to White (and separately Latino to White) male drinkers on income, education, employment, racial/ethnic stigma, unfair treatment, age, marital status, and (for Latinos only) neighborhood SES; we also weighted on survey year. Weighting successfully balanced all target variables across racial/ethnic groups: After weighting, none of the candidate mediators differed across racial/ethnic groups for either the total sample or heavy drinking subgroups (all p 's > 0.10).

For dependence, PS adjustments produced large reductions in racial/ethnic disparities above and beyond weighting on heavy drinking alone, with coefficient sizes dropping by 81% for Blacks and 90% for Latinos in samples including all drinkers. *Fully weighted samples showed no significant racial/ethnic disparities in dependence counts at any drinking level.* Models for consequence counts also showed notable reductions in racial/ethnic disparities, such as reductions of 44% in the Black-White coefficient and 68% in the Latino-White coefficient in the full samples.

4. Discussion

4.1. Study summary

The current study represents a new thrust in alcohol disparities research in several respects. First, it focuses on identifying factors that may contribute to racial/ethnic disparities in alcohol problems *at equivalent levels of alcohol consumption*, which few studies have described and none explained. Second, our study empirically evaluates contributions for multiple contextual factors to these disparities. The complex, multifaceted nature of racial/ethnic stratification in the U.S. requires a holistic approach recognizing that minorities are typically exposed to multiple forms of disadvantage as well as sharing distinct cultural norms and practices. Assessing the combined contribution of these factors is important to making appropriate policy and programmatic recommendations. A third innovation is the use of propensity score (PS) weighting. In some studies, PS methods have yielded results largely in agreement with traditional regressions (e.g., Stürmer et al., 2006). However, regression-based methods are not optimal for explaining racial/ethnic disparities where it cannot be established that relationships between covariates and outcomes are invariant across race/ethnicity. Regression-based methods also rely on other assumptions that may not be tenable (e.g., linear or polynomial associations between covariates and outcomes; Rubin, 1997).

Our preliminary regressions suggested roles for lower individual SES, greater prejudice and unfair treatment, and younger age in mediating the elevated rates of alcohol problems among Black and Latino (vs. White) men at no/low heavy drinking. Regressions also supported a role for higher likelihood of being single in Black-White disparities, and a role for higher neighborhood disadvantage in relation to Latino-White disparities. Further, when Blacks and Latinos were weighted to Whites on SES variables, perceived prejudice and unfair treatment, age, and marital status, effects of race/ethnicity on dependence counts were reduced to nonsignificance, while racial/ethnic disparities in consequence counts were much attenuated. Results thus suggest that the moderating effects of race/ethnicity on the relationship between alcohol use and problems may be attributable to associations between race/ethnicity and these social and demographic factors, though race/ethnicity does not necessarily “cause” any or all of them (e.g., age).

Results partially support Zapolski et al.’s (2014) conceptual model for both Blacks and Latinos, suggesting that heavy drinking may be especially harmful when drinkers are poor and prejudice and unfair treatment a frequent reality. Poor people are particularly likely to be unemployed and, if employed, hold hourly jobs with little flexibility (Blank, 1998), and either may result in more social consequences and untreated health problems for a given level of heavy drinking. Similarly, both class-based and racial/ethnic prejudice may generate greater social consequences, as a result of biases, for poor minority drinkers, particularly when they also reside in poor neighborhoods (Herd, 1994). Studies have found that, even at comparable levels of substance use, Blacks are more likely than Whites to be reported to authorities, mandated to treatment, arrested for drunkenness and drug possession, and sent to prison rather than treatment (Chasnoff et al., 1990; D’Avanzo et al., 2000; Polcin, 1999).

It bears emphasis, however, that racial/ethnic disparities emerged across problem types, including injuries, accidents, and physical dependence symptoms. Greater bias and scrutiny alone cannot be responsible for these effects. This may suggest that the *conditions surrounding drinking* also vary for Black men, Latino men, and those most susceptible to alcohol problems at lower heavy drinking levels: those who are poor, exposed to prejudice and unfair treatment, young, and unmarried. One specific possibility is that drinking to cope with difficult life conditions may exacerbate alcohol problems in these groups. Zapolski et al. highlight a possible role for drinking to cope in Black-White disparities, particularly given a lack of other life reinforcers. Drinking to cope predicts alcohol dependence/consequences independently of heavy drinking, though it is not known why (Windle and Windle, 2015; Zemore et al., 2015). It seems possible that, through negative reinforcement, drinking to cope intensifies the physiological and psychological effects that contribute to dependence. Drinking under the influence of negative emotions could also intensify uncomfortable interpersonal interactions (via alcohol-induced myopia) and heighten risky behaviors (by blocking effective self-regulation), thus leading to fights, injuries, and accidents. Future research on how drinking motivations may affect drinking patterns, contexts, and effects among population subgroups would be valuable to explore these possibilities.

Contrary to Zapolski et al., Black and Latino drinkers in our sample were *younger*, not older, than White drinkers, and it was young drinkers who were particularly vulnerable to problems at a given level of consumption. This finding is not entirely incompatible with the proposal that a history of heavy drinking can exacerbate the effects of current heavy drinking; this seems particularly likely for chronic health conditions, not assessed here. However, young—and single—people may face worse immediate consequences when they drink for similar reasons as poor and stigmatized groups: that is, increased scrutiny, bias, and differences in the conditions surrounding drinking. Results also did *not* support expectations that conservative norms among minorities would contribute to racial/ethnic disparities. Instead, we found that consequences were worse, at a given drinking level, when perceived norms were more permissive. This effect may be driven by riskier and more public drinking among those with permissive norms.

4.2. Limitations

A significant limitation is the cross-sectional design. A general limitation of such designs is that reverse causality cannot be ruled out. In the present case, several candidate mediators (i.e., markers of disadvantage, unmarried status) could well be effects of respondent alcohol problems as well as (or instead of) causes. The cross-sectional design also presents difficulties in examining age/lifecourse effects. Accurate assessment of the impact of cumulative heavy drinking on racial/ethnic disparities (and causal analysis generally) is best achieved in the context of longitudinal data.

Another design limitation concerns the cooperation rates, which, though typical of recent U.S. telephone surveys, are lower than those for many face-to-face surveys (Midanik and Greenfield, 2003b). Because telephone break-offs often occur prior to identification of the study topic, low response rates in telephone surveys may introduce less bias than they would

in face-to-face interviews (Groves, 2006). Also, two types of evidence argue against nonresponse bias in the NAS. First, an extensive series of methodological studies comparing identical questions in telephone and in-person surveys has found comparable estimates across modalities for alcohol consumption (Greenfield et al., 2000; Midanik and Greenfield, 2003a,b) and only modest and inconsistent mode effects for alcohol harms (Midanik et al., 2001), despite higher response rates for in-person surveys. Second, analyses examining the 2000 and 2010 NAS sample replicates (each replicate being a random subsample with a specific response rate varying around the overall mean) found no association between replicate response rate and respondent demographics, alcohol consumption, or alcohol problems. Still, it seems possible that representation of the most disadvantaged populations (e.g., the incarcerated, those living in poverty) was compromised. This could have biased estimates of alcohol problems downward, particularly for racial/ethnic minorities (Grant et al., 2015).

Additionally, there were several measurement limitations. First, only the most recent NAS have included direct measures of discrimination, so we were not able to analyze discrimination for this pooled analysis. Nevertheless, our measure of racial/ethnic stigma consciousness was, in the 2010 survey, strongly correlated with Krieger et al.'s (2005) measure of perceived discrimination ($r = 0.52$, $p < 0.001$), and is in some sense superior to discrimination scales as it more accurately captures the many facets of experiencing prejudice, including expectations of stereotyping as well as anticipated discrimination. Further, the norms items focused on a few contexts where heavier drinking occurs (i.e., bars, parties). This implies the potential for significant error and biases, such as ceiling effects that could attenuate racial/ethnic differences on this variable. Relatedly, it may be that more fine-grained hypothesis tests addressing context-specific drinking norms, specific problem types, and social contexts of drinking would yield different results. Future studies are thus needed before it can be concluded that drinking norms are irrelevant to the disparities examined here.

Finally, we did not have biological measures or (related to the above) measures of drinking context. Though racial/ethnic disparities in dependence were nonsignificant following PS weighting, it remains possible that biological differences contribute to disparities in reactivity to alcohol, and hence dependence. Indeed, the striking differences between Black and White men in reported physiological effects of alcohol use, detailed in Table 2, underline the importance of exploring biological contributors to Black-White disparities, particularly since these differences were found among those reporting little or no heavy drinking.

In sum, this study suggests that being poor, exposed to prejudice and unfair treatment, young, and unmarried may exacerbate the impact of a given level of heavy drinking on alcohol problems, particularly at no/low heavy drinking. Additional research should be directed at clarifying just how the conditions of drinking may differ in these groups, and how this relates to the biology of addiction. Also important, future studies might aim to identify the specific types of prejudice and unfair treatment that racial/ethnic minorities experience and how these relate to specific drinking patterns and problems, such as drinking to cope and trouble with the law. More broadly, research is needed to better understand racial/ethnic

disparities in specific alcohol-related consequences, not completely explained here. Meanwhile, researchers, policymakers, and interventionists might consider implications for alcohol risk guidelines. Our results imply that, among the above subgroups, at-risk drinkers are over-represented at lower levels of heavy drinking. This means that education programs relying on a universal risk threshold could be misleading, and that public health interventions relying on alcohol consumption as the only/dominant marker of alcohol problems may inadvertently magnify disparities. Linkages between alcohol consumption and alcohol problems are complex, and a thoughtful approach is needed to avoid widening disparities for vulnerable populations.

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Fig. 1.
Conceptual model.

Table 1

Differences in alcohol dependence criteria and specific consequence types across White, Black, and Latino male drinkers, by heavy drinking level.

N	No/low heavy drinking			Moderate heavy drinking			High heavy drinking		
	White 1846	Black 379	Latino 490	White 643	Black 63	Latino 214	White 286	Black 40	Latino 79
Dependence (0–7)									
Tolerance (%)	2.1	9.0 ^{***}	3.9 [†]	7.7	25.3 ^{**}	18.1 ^{**}	36.5	25.6	39.9
Withdrawal (%)	2.4	13.5 ^{***}	8.2 ^{***}	19.8	23.8	43.8 ^{***}	57.0	58.4	43.3
Larger/longer (%)	1.1	7.3 ^{***}	3.1 [*]	6.4	16.5 [*]	24.7 ^{***}	36.9	41.6	34.1
Quit/control (%)	1.2	7.4 ^{***}	5.3 ^{***}	6.3	16.0 [*]	17.3 ^{**}	21.7	19.5	26.8
Time spent (%)	0.0	1.2 ^{***}	0.7 ^{**}	0.2	2.5 ^{**}	0.3	13.9	9.9	2.6 ^{***}
Activities given up (%)	0.3	1.8 [*]	2.0 ^{**}	1.5	17.1 ^{***}	2.1	20.0	19.5	6.1 ^{***}
Phy/psy problems (%)	0.2	1.8 [*]	1.5 ^{**}	3.3	8.2 [†]	0.7 [*]	15.4	14.6	13.7
Criteria Count (mean)	0.1	0.4 ^{***}	0.3 ^{***}	0.5	1.1 ^{**}	1.1 ^{**}	2.0	1.9	1.6
3+ dependence (%)	0.2	5.3 ^{***}	2.4 ^{***}	3.7	11.0 [*]	13.2 ^{***}	32.0	26.2	32.4
Consequences (0–15)									
Social (%)	1.9	9.6 ^{***}	3.6 [†]	14.6	21.8	23.2 [†]	53.8	53.1	51.4
Injury/accident/health (%)	0.7	5.0 ^{***}	2.5 [*]	2.1	9.7 ^{**}	10.4 ^{***}	16.8	29.1	23.9
Work/legal (%)	0.2	2.8 ^{***}	3.3 ^{***}	2.5	11.0 ^{**}	2.3	15.3	32.3 [†]	20.1 [†]
Item count (mean)	0.0	0.2 [*]	0.1 [*]	0.3	0.6	0.5 [*]	1.5	2.0	1.8
2+ consequences (%)	0.7	4.8 ^{***}	2.3 [†]	5.2	11.1 [†]	8.2	36.0	50.0	37.8

Notes: Significance levels indicated for pairwise Black-White and Latino-White comparisons.

[†] p < 0.10,

* p < 0.05,

** p < 0.01,

*** p < 0.001.

Table 2

Differences in candidate mediators of racial/ethnic disparities across White, Black, and Latino male drinkers.

N	White 2841	Black 508	Latino 833
Disadvantage-related factors			
Family income: \$20k	12.5%	32.9% ***	29.9% ***
\$20,001–40,000	18.6%	20.1%	22.5%
\$40,001–70,000	30.0%	24.2% †	24.5% *
>\$70k	29.3%	13.6% ***	15.4% ***
Missing	9.6%	9.3%	7.7%
Education: <HS grad	6.6%	14.9% **	25.3% ***
HS grad	25.5%	39.5% ***	27.4%
Some college	27.7%	26.0%	25.7%
4-year College grad	40.1%	19.7% ***	21.6% ***
Employment: Full time	64.9%	53.0% **	65.2%
Part time	7.5%	12.0% †	11.3%
Unemployed	5.2%	13.9% **	8.9% *
Retired	13.6%	10.0% †	6.0% ***
Others	8.8%	11.1%	8.7%
Neighborhood disadvantage	0.29	0.36 ***	0.35 ***
Racial/ethnic stigma scale (0–3)	0.72	1.70 ***	1.25 ***
Unfair treatment (0–3)	0.79	1.20 ***	0.95 **
Cultural/demographic factors			
Drinking norms (1–4)	2.57	2.32 ***	2.30 ***
Age: 18–29	20.8%	28.9% *	34.4% ***
30–49	40.9%	45.8%	46.3% †
50–64	26.0%	16.9% ***	13.9% ***
65+	12.3%	8.4% *	5.3% ***
Marital Status: Married	71.1%	50.1% ***	63.3% *
Single	20.2%	36.7% ***	30.4% ***
Separate/Divorce/Widowed	8.7%	13.2% *	6.3%

Notes: Significance levels indicated for pairwise Black-White and Latino-White comparisons.

†
p < 0.10,

*
p < 0.05,

**
p < 0.01,

***
p < 0.001.

Table 3

Negative binominal regression coefficients for models of alcohol dependence criteria and consequence counts conducted among male drinkers to address potential causal factors in disparities.

	Dependence count Black (vs. White) intercept¹	Consequence count Black (vs. White) intercept¹
1. Raw model	1.60 (0.21)***	1.89 (0.33)***
2. Raw model plus single covariate		
Disadvantage-related factors		
Income	1.29 (0.20)*** §§§	1.55 (0.26)*** §§§
Education	1.40 (0.20)*** §§§	1.62 (0.30)*** §§§
Employment	1.49 (0.23)*** §§	1.73 (0.37)***
Neighborhood disadvantage	1.63 (0.24)***	1.97 (0.36)***
Racial/ethnic stigma	1.42 (0.28)*** §	1.89 (0.39)***
Unfair treatment	1.40 (0.19)*** §§§	1.58 (0.24)*** §§
Cultural/demographic factors		
Drinking norms	1.72 (0.22)***	2.06 (0.34)***
Age	1.44 (0.20)*** §§	1.75 (0.30)***
Marital status	1.44 (0.20)*** §§§	1.75 (0.30)*** §
	Latino (vs. White) intercept ¹	Latino (vs. White) intercept ¹
1. Raw model	1.20 (0.17)***	1.17(0.31)***
2. Raw model plus single covariate		
Disadvantage-related factors		
Income	0.95 (0.17)*** §§§	0.97 (0.26)** §§
Education	1.02 (0.16)*** §§§	0.88 (0.27)** §§
Employment	1.10 (0.16)*** §§	0.98 (0.33)** §
Neighborhood disadvantage	1.09 (0.17)*** §	0.96 (0.24)***
Racial/ethnic stigma	1.05 (0.17)*** §§§	0.92 (0.29)** §§
Unfair treatment	1.16 (0.17)*** §	1.02 (0.27)*** §§
Cultural/demographic factors		
Drinking norms	1.33 (0.17)***	1.24 (0.29)***
Age	1.08 (0.17)*** §§§	1.12 (0.33)***
Marital status	1.16 (0.17)***	1.10 (0.33)**

Notes: *Raw model* enters race/ethnicity (Black vs. White or Latino vs. White), heavy drinking, and their interaction only. *Raw model plus single covariate* additionally enters each candidate mediator separately, plus its interaction with heavy drinking. Significance tests reflect (1) standard tests of whether the coefficient for race/ethnicity differs from 0 (***p < 0.001, **p < 0.01) and (2) tests, using bootstrapping, of whether the race/ethnicity coefficient for the expanded model differs from that produced in the raw model (§p < 0.10, §§p < 0.05, §§§p < 0.01).

Table 4

Incidence rate ratios (IRR) from negative binomial regressions conducted on male drinkers before and after weighting Blacks and Latinos to Whites on core candidate mediators.

	Dependence count IRR (95%CI)	Consequence count IRR (95%CI)
Black vs. White		
Total drinker sample		
Raw comparison	2.3 (1.7, 3.1) ***	2.5 (1.6, 3.9) ***
PSW adjustment	1.2 (0.8, 1.8)	1.7 (1.0, 2.9)
% reduction	81%	44%
No/low heavy drinking		
Raw comparison	6.2 (3.6, 10.7) ***	7.8 (3.5, 17.4) ***
PSW adjustment	1.6 (0.7, 3.6)	5.7 (1.9, 17.5) **
% reduction	74%	17%
Moderate heavy drinking		
Raw comparison	2.2 (1.4, 3.5) ***	2.2 (1.1, 4.9) *
PSW adjustment	1.6 (0.8, 3.2)	1.1 (0.4, 3.0)
% reduction	39%	94%
Latino vs. White		
Total drinker sample		
Raw comparison	1.4 (1.1, 1.8) **	1.4 (1.0, 2.1)
PSW adjustment	1.0 (0.8, 1.4)	1.1 (0.7, 1.7)
% reduction	90%	68%
None/low heavy drinking		
Raw comparison	3.6 (2.3, 5.7) ***	4.1 (2.0, 8.5) ***
PSW adjustment	1.7 (0.9, 3.3)	3.4 (1.5, 7.8) **
% reduction	60%	14%
Moderate heavy drinking		
Raw comparison	2.2 (1.6, 3.0) ***	1.7 (1.0, 2.7) *
PSW adjustment	1.4 (0.9, 2.2)	0.86 (0.35, 2.11)
% reduction	52%	130%

Notes: *Raw comparison* derived by weighting on heavy drinking alone. *PSW adjustment* additionally weights on income, education, employment, racial/ethnic stigma, unfair treatment, age, marital status, neighborhood SES (Latinos only), and survey year. % reduction reflects change in the unstandardized coefficient between the raw comparison and the model with full PSW adjustment.

*
p < 0.05,

**
p < 0.01,

***
p < 0.001.