Disparities in Alcohol-Related Problems Among White, Black, and Hispanic Americans

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Background: This study assesses racial/ethnic disparities in negative social consequences of drinking and alcohol dependence symptoms among white, black, and Hispanic Americans. We examine whether and how disparities relate to heavy alcohol consumption and pattern, and the extent to which social disadvantage (poverty, unfair treatment, and racial/ethnic stigma) accounts for observed disparities.

Methods: We analyzed data from the 2005 U.S. National Alcohol Survey, a nationally representative telephone-based survey of adults ages 18 and older (N = 6,919). Given large racial/ethnic differences in abstinence rates, core analyses were restricted to current drinkers (N = 4,080). Logistic regression was used to assess disparities in alcohol-related problems at 3 levels of heavy drinking, measured using a composite variable incorporating frequency of heavy episodic drinking, frequency of drunkenness, and maximum amount consumed in a single day. A mediational approach was used to assess the role of social disadvantage.

Results: African American and Hispanic drinkers were significantly more likely than white drinkers to report social consequences of drinking and alcohol dependence symptoms. Even after adjusting for differences in heavy drinking and demographic characteristics, disparities in problems remained. The racial/ethnic gap in alcohol problems was greatest among those reporting little or no heavy drinking, and gradually diminished to nonsignificance at the highest level of heavy drinking. Social disadvantage, particularly in the form of racial/ethnic stigma, appeared to contribute to racial/ethnic differences in problems.

Conclusions: These findings suggest that to eliminate racial/ethnic disparities in alcohol-related problems, public health efforts must do more than reduce heavy drinking. Future research should address the possibility of drink size underestimation, identify the particular types of problems that disproportionately affect racial/ethnic minorities, and investigate social and cultural determinants of such problems.

Key Words: Racial/Ethnic Disparities, Alcohol Problems, Social Consequences, Alcohol Dependence.

AFRICAN AMERICANS AND Hispanics bear a greater burden of alcohol-related health problems compared to whites, as evidenced by higher rates of liver cirrhosis, death rates due to cirrhosis, and rates of overall alcohol-related mortality (Greenfield, 2001; Yoon et al., 2001). It is unclear, however, whether racial disparities also extend to problems such as alcohol dependence and negative social consequences of drinking. Alcohol dependence has been linked to chronic health conditions, such as liver and cardiovascular disease, and to higher rates of alcohol-related morbidity and mortality (Dawson, 2000; Rehm et al., 2003). Though less often studied, alcohol dependence has also been linked to acute and chronic social consequences of drinking (Drummond, 1990), such as relationship, employment, financial, and legal problems. It seems plausible that social and dependence-related problems might precede or co-occur with adverse alcohol-related health conditions, and therefore that the racial/ethnic patterning of such problems might also show evidence of differential risk. Yet the findings from large, general population surveys are mixed on this point.

While some national surveys find that African American and Hispanic men are more likely to report dependence symptoms and negative social consequences of drinking (Caetano and Clark, 1998b; Greenfield et al., 2003; Herd, 1994), other data indicate that rates of alcohol dependence and abuse (the latter capturing, in part, social problems associated with drinking) are roughly comparable or even elevated among whites, relative to blacks and Hispanics (Grant et al., 2004). Discrepancies might reflect methodological differences across studies; for instance, in how drinking problems are operationalized (Midanik et al., 2007), and in the choice of population to determine prevalence rates (Greenfield and Kerr, 2008). While it is important to examine overall rates within the general population of drinkers and nondrinkers, racial/ethnic differences in abstinence can result in distorted estimates of disparities in drinking problems, since problems can only occur among those who drink. And

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while summary indices are valuable for assessing the overall impact of alcohol use on diverse aspects of people's lives, measures that distinguish social and dependence-related problems are important for the purposes of prevention, as the etiology of these problems may differ.

Beyond the question of whether disparities exist is the question of why, if indeed they do. One logical explanation would be that some groups drink more heavily than others, yet studies have found limited ethnic variation in heavy episodic drinking, a pattern predictive of problems (e.g., see Caetano and Clark, 1998a; Dawson et al., 1995; Office of Applied Studies, 2001). Even after taking into account consumption and drinking pattern, ethnic differences in alcohol problems have been found. Herd's (1994) analysis of the 1984 NAS showed that despite similarities in heavy drinking patterns, black men reported more social consequences and alcohol dependence symptoms than white, particularly as the frequency of heavy drinking increased. In their follow-up study of the 1984 NAS, Jones-Webb and colleagues (1997b) similarly found greater social consequences among African American as compared to white men, but the racial gap was seen at *lower* levels of alcohol consumption and did not extend to alcohol dependence. These studies suggest that racial disparities might exist at specific levels of heavy drinking, and that factors other than consumption and drinking pattern might help to explain them.

Race/ethnicity may be viewed as a social status category in the U.S., associated with differential resources, opportunities, and treatment (Williams et al., 1994). It has recently been argued that dual aspects of social disadvantage—disadvantaged economic position and experiences of minority status—are critical to understanding health disparities (Kawachi et al., 2005). Indeed, racial gaps in health have been found at every level of socioeconomic status (SES), suggesting that factors beyond SES contribute to health status differences (LaVeist, 2005; Williams, 2005). While the deleterious effects of poverty have long been known, the stress of minority status has only recently gained attention through studies of perceived discrimination and its negative impact on health (e.g., see Jackson et al., 1996; Williams et al., 2003). Research in the alcohol field, though sparse in its attention to discrimination, corroborates these patterns found in the broader public health literature.

Studies have associated socioeconomic disadvantage with alcohol problems and alcohol-related mortality (Harrison and Gardiner, 1999; Khan et al., 2002). Research further suggests that this link might, in some instances, occur independently of alcohol consumption. For example, persons with low SES have been shown to be more likely to drink in parking lots and street corners, locations under public scrutiny that can carry a higher risk of social consequences regardless of the amount of alcohol consumed (Herd, 1994; Herd and Grube, 1993). More recently, studies have found perceived racial discrimination and unfair treatment to be related to psychological distress, drinking to cope with stress, and alcohol problems among racial/ethnic minorities (Martin et al., 2003; Mulia et al., 2008; Williams et al., 1997). While drinking as a means of coping might be an important link between experiences of minority status and alcohol problems, it is also possible that the drinking behavior of racial/ethnic minorities elicits different societal and cultural reactions, and possibly more severe social consequences (see Herd, 1994; Jones-Webb et al., 1995). A question that arises, then, is whether the disadvantaged economic and social status of black and Hispanic Americans make them more prone to experiencing alcohol-related problems.

In this study, we examine racial/ethnic disparities in alcohol-related problems, whether and how disparities relate to heavy consumption and pattern, and whether social disadvantage contributes to disparities. Here, we aim to extend the seminal work of Herd, Jones-Webb and colleagues, and to use rigorous techniques to assess disparities in the context of differences in heavy consumption and pattern. By drawing upon the 2005 National Alcohol Survey with large minority oversamples, we seek to broaden earlier racial comparisons to investigate differences across African American, white and, notably, Hispanic drinkers. Finally, this study specifically considers whether poverty, unfair treatment, and racial/ethnic stigma helps to account for racial/ethnic differences in the risk for alcohol-related problems.

METHODS

Sample

The 2005 U.S. National Alcohol Survey (NAS) is a national household Computer Assisted Telephone Interview (CATI) survey of persons ages 18 and older. Data were collected using list-assisted Random Digit Dialing (RDD) with a sampling frame of all 50 states and the District of Columbia. In addition to the main sample, the NAS includes oversamples of African Americans and Hispanics, as well as residents of low-population states. Interviews were conducted in either English or Spanish, according to respondent preference. Data were collected from 6,919 respondents, including 3,967 whites, 1,054 blacks, and 1,610 Hispanics; among these were 2,810 white, 504 black, and 766 Hispanic current drinkers. The response rate was 56%, consistent with current response rates for telephone surveys (Curtin et al., 2005). While such rates raise concerns about nonresponse bias, recent methodological studies find that increased nonresponse does not necessarily result in biased population estimates (Groves, 2006; Keeter et al., 2006). Moreover, a series of mode studies conducted on the NAS showed that telephone-based results with this level of response are not biased in their alcohol-related variables, as compared with earlier face-to-face surveys typically achieving higher response rates (see Greenfield et al., 2006; Midanik and Greenfield, 2003).

Measures of Alcohol-Related Problems

To assess alcohol-related problems, we follow a sociological tradition in which problems are disaggregated into broad categories and studied separately as the negative social consequences of drinking, and alcohol dependence symptoms (Midanik and Clark, 1995). Our index of social consequences has been used in previous NAS surveys and consists of 15 items tapping 5 types of negative consequences that the respondent attributed to his or her own drinking: arguments or fights, such as with a spouse or people with whom the respondent lives, accidents, and workplace, legal, and health problems as a result of drinking (Midanik and Greenfield, 2000). Our index of dependence

symptoms includes 13 items assessing loss of control, blackouts, hands shaking, and other physiological symptoms of excessive alcohol use (ibid.). In our main analyses, we examined *1 or more social consequences* and *2 or more dependence symptoms* as 2 distinct outcomes. Use of these relatively low thresholds provided greater statistical power in our multivariate models of racial disparities in alcohol problems. In our bivariate analyses, however, we utilized a third, more stringent measure to capture *DSM-IV alcohol dependence*, defined as having at least 1 symptom in at least 3 of 7 DSM-IV domains [for further details, see Greenfield et al. (2006) and Caetano and Tam (1995)].

Measures of Heavy Episodic Consumption and Drinking Pattern

In principle, a variety of indicator variables could be used to capture the frequency and intensity of heavy drinking episodes, shown to be important determinants of alcohol-related health and social problems (Rehm et al., 2006; Room et al., 1995). The frequency of drinking 5 or more drinks on a single occasion or day is a widely used measure of heavy episodic drinking (HED). Alternatively, the frequency of subjective drunkenness provides information not captured by other drinking pattern measures (Greenfield and Kerr, 2008), and has been shown in several general population studies to be a better predictor of alcohol problems than the frequency of HED (Midanik, 1999). A third measure of heavy drinking, the maximum amount drank on any given day in the past year is considered to improve prediction of alcohol problems such as drunk driving, injury and criminal behavior (Greenfield et al., 2006).

To take advantage of the information provided by these different measures, we created a composite variable of heavy drinking based on all 3 indicators (frequency of drinking 5+ in a day; frequency of subjective drunkenness; and the maximum amount, in standard drink equivalents, consumed in a single day, all within the last 12 months). Principle-axis factor analysis was conducted using our sample of current drinkers, that is, those who reported drinking at least 1 drink in the last 12 months, to derive a single factor accounting for 53% of the common variance, and which had factor loadings of 0.90, 0.60, 0.65 for number of 5+ days, frequency of drunkenness, and maximum daily volume, respectively. The composite measure was the factor score, initially categorized as 4 levels to capture substantive differences in heavy drinking, and also reflecting the skewed distribution of heavy drinking in the general population (Kerr and Greenfield, 2007): no or very low heavy drinking (40% of the sample), low (30%), moderate (20%), and high (10%). Table 1 shows how these 4 levels of the composite measure differ with respect to the 3 heavy drinking indicators, and prevalence of alcohol-related problems. Given the extremely low rate of problems at the "no/very low" heavy drinking level, we combined the 2 lowest levels (none/very low, and low) to gain greater statistical power. Among the 2,897 drinkers at the combined no/low heavy drinking level, one-fourth (24.7%) reported either 5+ drinking in a day, or drunkenness, and an additional one-fifth (19.6%) reported 3+ drinking. All further analyses were conducted using the 3-level indicator of heavy drinking: none/low ($n = 2897$), moderate ($n = 865$), and high ($n = 421$).

Measures of Social Disadvantage

In keeping with recent evidence that the disadvantaged economic and social status of racial/ethnic minorities is relevant to understanding health disparities, we examine 3 forms of social disadvantage: poverty, unfair treatment, and racial/ethnic stigma consciousness (for a detailed discussion, see Mulia et al., 2008). *Poverty level* was measured according to U.S. federal poverty guidelines for 2004 (U.S. Department of Health and Human Services, 2005). Income per family member was derived from items on respondents' household income and composition, and categorized as greater than 200% of the federal poverty level, 100 to 200% of the poverty level, or below the poverty level (less than 100%). *Unfair treatment* was based on a single item that asks "how often do you feel that you are treated unfairly." Responses ranged on a 5-point scale and were categorized as "Never/seldom," "Sometimes," and "Often/very often." Because the measure does not specify an attribution, it can capture unfair treatment on the basis of race as well as other characteristics, such as SES. Our analyses indicate, for example, that unfair treatment is associated with minority race/ethnicity, as well as homelessness ($\chi^2 = 196.3$, 2 df, $p < 0.001$), income ($r = -0.148$, $p < 0.001$), and education ($r = -0.120$, $p < 0.001$) (Mulia et al., 2008). *Racial/ethnic stigma consciousness* was derived using 3 items from Pinel's (1999) stigma consciousness scale. Respondents reported the extent to which they agreed or disagreed with the following statements: (1) "Stereotypes about my race or ethnic group have affected me personally," (2) "My race or ethnic group influences how people act with me," and (3) "Many people have a problem viewing my race or ethnic group as equal." Responses ranged on a 4-point scale, from "disagree very much" (coded as 0) to "agree very much" (coded as 3). Items were summed to yield a total score (0–9) which was categorized as low (0–3), medium (4–6), and high (7–9) levels of stigma consciousness.

Statistical Analysis

Data were weighted to adjust for the probability of selection (number of households, multiple phone lines, and adult residents in households) and nonresponse. Poststratification weights were also applied to reflect the U.S. Census-derived demographics of the U.S. population ages 18 and older (gender, age, race/ethnicity and region, and among Hispanics, U.S. nativity). The Hispanic oversample was further adjusted to reflect the income distribution of the Hispanic main sample. With the exception of factor analyses to derive the composite heavy drinking measure, all analyses were weighted and conducted using Stata survey commands (Stata Corp., 2005) that apply appropriate standard errors adjusting for probabilities of selection and poststratification weighting. *t*-tests and chi-square analyses were used to compare indicators of heavy drinking, alcohol-related problems,

Table 1. Heavy Drinking Indicators and Alcohol-Related Problems in the Past 12 Months by Overall Heavy Drinking Level, Current Drinkers Only ($N = 4,080$)

	Heavy drinking and alcohol-related problems				
Overall heavy drinking level	Days of 5+ drinking M (SD)	Days of drunkenness M (SD)	Maximum drinks M (SD)	1+ Social consequences (%)	2+ Dependence symptoms (%)
None/very low ($n = 1663$)	0	0.1 (0.5)	1.4 (0.5)	1.3	0.3
Low ($n = 1231$)	0.04 (0.20)	1.8 (3.8)	3.5 (0.9)	4.9	1.9
Moderate ($n = 865$)	8.2 (9.0)	9.3 (18.5)	7.7 (3.3)	15.5	11.1
High ($n = 421$)	137 (109)	54 (76)	14.4 (6.2)	48.5	43.8

Means and standard deviations shown for heavy drinking indicators.

and social disadvantage among African Americans and Hispanics in relation to whites.

Logistic regression analyses were conducted to identify racial differences in the risk of problems at each of 3 levels of heavy drinking (none/low, moderate, and high). Because racial/ethnic differences in heavy drinking indicators were observed even within certain levels of heavy drinking, we further adjusted for these differences by entering the heavy drinking factor score in a separate model, and in a third model, we controlled for demographics (gender, age, education, marital status, employment). To assess the role of social disadvantage, 3 additional models were developed, each including 1 indicator (poverty, unfair treatment, or racial/ethnic stigma). These 3 models were compared to the base model to see whether the inclusion of a given social disadvantage indicator reduced the estimated adjusted odds ratio (AOR) for race/ethnicity.

RESULTS

Racial/Ethnic Differences in Alcohol-Related Problems and Heavy Drinking

Table 2 summarizes racial/ethnic differences in alcohol-related problems, current drinking, and heavy drinking among whites, African Americans, and Hispanics. In the overall sample including current drinkers and nondrinkers, African Americans and whites had similar rates of alcohol problems. In contrast, Hispanics were marginally more likely than whites to report social consequences of drinking (8.2% vs. 6.4%), and significantly more likely to report 2 or more dependence symptoms (6.6% vs. 4.5%). Given the greater abstinence of African Americans and Hispanics, further comparisons were made in the subsample of current drinkers (shown in lower half of Table 2). Disparities in alcohol problems rates became much more apparent when nondrinkers were excluded: African American drinkers reported significantly higher rates of social consequences and alcohol dependence symptoms compared to whites (13.4% vs. 8.8% reporting consequences, and 10.8% vs. 6.2% reporting dependence symptoms), and among Hispanic drinkers, problem rates were nearly 2 times greater than those of whites (14.8% and 11.8% of Hispanics reported consequences and dependence symptoms, respectively). When alcohol dependence was operationalized according to DSM-IV criteria, thus providing a more stringent measure of dependence, we observed an even greater disparity in dependence. African Americans were 2 times more likely, and Hispanics nearly 3 times more likely than whites to report DSM-IV alcohol dependence. Given our interest in elucidating alcohol problems among those who currently drink, thereby addressing the ambiguity introduced by differential rates of abstention, remaining analyses were conducted with the sample of current drinkers.

Table 2. Alcohol-Related Problems and Heavy Drinking in the Past 12 Months, by Racial/Ethnic Group

	Whites (N = 3,967)	Blacks (N = 1,054)	Hispanics (N = 1,610)
Alcohol problems and current drinking, overall sample			
1+ social consequences (%)	6.4	6.9	8.2†
2+ dependence symptoms (%)	4.5	5.5	6.6^{b}
DSM-IV alcohol dependence (%)	2.1	3.0	4.4^{bbb}
Current drinker (%)	72.3	51.1^{aaa}	55.6^{bbb}
	(N = 2,810)	(N = 766)	(N = 504)
Alcohol problems and heavy drinking, current drinker sample			
1+ social consequences (%)	8.8	13.4^{aa}	14.8^{bbb}
2+ dependence symptoms (%)	6.2	10.8^{aa}	11.8^{bbb}
DSM-IV alcohol dependence (%)	2.9	5.9^{aa}	8.0^{bbb}
Days of 5 or more drinks, mean	15.3	17.3	20.2†
Days of drunkenness, mean	8.3	10.6	7.8
Maximum no. of drinks in a day, mean	4.8	3.7^{aaa}	5.8^{bb}
Heavy drinking factor score, mean	−0.001	0.001	0.092^{b}

$^{aa}p < 0.01$, $^{aaa}p < 0.001$ (pair-wise test between blacks and whites).
$^{b}p < 0.05$, $^{bb}p < 0.01$, $^{bbb}p < 0.001$ (pair-wise test between Hispanics and whites).
$^{\dagger}p < 0.10$ (pair-wise test between Hispanics and whites).

A basic question pursued in this study was whether or not racial disparities in alcohol-related problems are explained by heavy consumption and drinking patterns. As shown in Table 2, it appeared that Hispanic-white differences in alcohol problems could possibly be attributed to heavier drinking among Hispanics. On average, Hispanic drinkers had a marginally higher, average number of heavy drinking days, a higher mean, maximum volume consumed in a single day, and a higher mean heavy drinking score. The same could not be said of black drinkers, whose heavy drinking appeared to be roughly similar to that of whites.

Racial/Ethnic Disparities in the Risk for Alcohol Problems at Different Levels of Heavy Drinking

Table 3 shows differences in the risk of problems among African Americans and Hispanics, relative to whites, at various levels of heavy drinking (shown in the left and right panels of Table 3, respectively). Using our composite measure of heavy drinking, we stratified the sample to assess the odds ratios (ORs) for social consequences and dependence symptoms at no/low, moderate and high levels of heavy drinking. Models 1 through 3 present the crude ORs for race/ethnicity, ORs adjusted for heavy drinking factor score, and ORs additionally adjusted for gender, age, education, marital status, and employment status.

Among those reporting little or no heavy drinking, we found pronounced black-white differences in the odds of alcohol-related problems (see left panel, Table 3). The crude ORs indicated that black drinkers have a 3-fold greater risk for social consequences, and 5-fold greater risk for dependence symptoms. This elevated risk remained after adjusting

Table 3. Racial/Ethnic Differences in the Odds of Alcohol-Related Problems by Heavy Drinking Level, Current Drinkers Only

	Black-White comparisons			Hispanic-White comparisons		
Heavy drinking level	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
1+ Social consequences						
None/low (n = 2,770)	3.66 (1.92–7.00)**	4.39 (2.22–8.69)**	3.52 (1.62–7.67)**	3.91 (2.09–7.31)**	3.91 (2.09–7.31)**	3.67 (1.74–7.77)**
Moderate (n = 832)	1.81 (0.88–3.72)	2.01 (0.98–4.12)†	1.47 (0.74–2.91)	1.59 (0.92–2.77)	1.50 (0.84–2.66)	1.47 (0.81–2.69)
High (n = 405)	1.53 (0.74–3.17)	1.38 (0.65–2.92)	1.60 (0.72–3.59)	0.73 (0.41–1.30)	0.79 (0.43–1.46)	0.85 (0.44–1.64)
2+ Dependence symptoms						
None/low (n = 2,770)	5.53 (1.87–16.3)**	7.00 (2.27–21.6)**	5.73 (1.25–26.2)*	4.80 (1.73–13.1)**	4.64 (1.63–13.2)**	3.51 (1.23–10.0)*
Moderate (n = 832)	4.10 (1.95–8.58)**	5.07 (2.32–11.1)**	4.72 (2.06–10.8)**	2.24 (1.15–4.36)*	2.11 (1.05–4.25)*	2.33 (1.13–4.79)*
High (n = 405)	1.30 (0.63–2.68)	1.09 (0.51–2.36)	1.07 (0.44–2.58)	1.04 (0.58–1.86)	1.24 (0.67–2.30)	1.06 (0.53–2.09)

ORs and 95% confidence intervals shown for blacks, and Hispanics, vs. whites (ref).
Model 1: crude OR, no controls.
Model 2: adjusting for heavy drinking score.
Model 3: adjusting for heavy drinking score + demographics (gender, age, education, marital and employment status).
†$p < 0.1$, *$p < 0.05$, **$p < 0.01$.

for both heavy drinking factor score and demographic characteristics (Model 3 AORs = 3.52 and 5.73 for consequences and dependence symptoms, respectively). Among "moderate" heavy drinkers, blacks again appeared to be at greater risk for alcohol dependence symptoms (AOR = 4.72, Model 3). Their risk for social consequences, while elevated, was not significantly different from that of whites (AOR = 1.47, Model 3). At the highest level of heavy drinking, black-white differences in both social consequences and dependence symptoms were statistically nonsignificant.

This pattern of diminishing disparities at higher levels of heavy drinking was also observed in our comparisons of Hispanic and white drinkers (see Table 3, right panel). The greatest ethnic gap occurred among those with little or no heavy drinking. Controlling for heavy drinking score and demographics, Hispanics had a 3-fold greater odds of alcohol-related problems compared to whites (Model 3 AOR = 3.67 for social consequences; AOR = 3.51 for dependence symptoms). At successively higher levels of heavy drinking, the ethnic differential narrowed so that there were no longer significant differences in risk among the heaviest drinkers (AOR = 0.85 for social consequences; AOR = 1.06 for dependence symptoms).

The Role of Social Disadvantage in Explaining Disparities in Alcohol Problems

We next considered whether poverty, unfair treatment, and racial/ethnic stigma contributed to these disparities. In preliminary analyses, we first confirmed that exposure to these forms of social disadvantage varied across black, white, and Hispanic drinkers (see Table 4). As expected, racial/ethnic minorities were more likely than whites to be living in poverty, and to report unfair treatment and high levels of racial/ethnic stigma. Our previous study further showed that *within* each racial/ethnic group, high exposure to social disadvantage corresponded to greater problem drinking, a pattern that held across African Americans, Hispanics, and whites (Mulia et al., 2008).

Table 4. Social Disadvantage by Racial/Ethnic Group, Current Drinkers Only

	Whites (N = 2,810)	Blacks (N = 766)	Hispanics (N = 504)
Income as a percentage of the federal poverty level		($p < 0.001$)	($p < 0.001$)
>200%	80.7	59.3	60.8
100 to 200%	12.9	22.2	17.2
<100%	6.4	18.5	22.0
Frequency of unfair treatment		($p < 0.001$)	($p < 0.001$)
Never/seldom	77.5	58.2	67.4
Sometimes	18.5	30.5	26.0
Often/very often	4.1	11.2	6.6
Racial/ethnic stigma consciousness		($p < 0.001$)	($p < 0.001$)
Low	77.5	29.1	50.2
Medium	19.5	41.5	38.5
High	3.0	29.5	11.3

p-values shown for chi-square tests comparing blacks, and Hispanics, to whites.

In Table 5, models 1 through 3 present the AORs associated with race/ethnicity after poverty, unfair treatment, and racial/ethnic stigma were added, separately, to a base model that controls for heavy drinking score and demographic characteristics. Comparing the AORs for race/ethnicity in these expanded models with the AOR in the base model allowed us to assess whether these factors help to account for disparities, as denoted by a reduction in the AOR for race/ethnicity in any of the expanded models.

Table 5 indicates that the elevated risk for alcohol problems among black and Hispanic drinkers is reduced most when racial/ethnic stigma is taken into consideration. That is, the AORs in model 3 (when stigma is included) appear to be lower than the AORs in the base model, and this reduction in the odds ratios is generally observed across all 3 levels of heavy drinking. The risk for alcohol dependence symptoms is particularly affected, as the odds ratios reduce to nonsignificance or marginal significance in 3 instances.

Table 5. Role of Social Disadvantage in Racial/Ethnic Differences in the Odds of Alcohol-Related Problems, Current Drinkers Only

Heavy drinking level	Black-white differences				Hispanic-white differences			
	Base model	Model 1	Model 2	Model 3	Base model	Model 1	Model 2	Model 3
1+ Social consequences								
None/low (n = 2,770)	3.52 (1.62–7.67)**	3.54 (1.59–7.84)**	3.43 (1.56–7.57)**	3.45 (1.54–7.70)**	3.67 (1.74–7.77)**	3.78 (1.78–8.02)**	3.84 (1.76–8.39)**	2.92 (1.38–6.19)**
Moderate (n = 832)	1.47 (0.74–2.91)	1.48 (0.71–3.09)	1.28 (0.60–2.71)	1.17 (0.54–2.51)	1.47 (0.81–2.69)	1.41 (0.73–2.72)	1.40 (0.74–2.64)	1.26 (0.68–2.34)
High (n = 405)	1.60 (0.72–3.59)	1.47 (0.64–3.40)	1.55 (0.67–3.58)	0.96 (0.39–2.38)	0.85 (0.44–1.64)	0.92 (0.46–1.86)	0.88 (0.44–1.76)	0.73 (0.36–1.47)
2+ Dependence symptoms								
None/low (n = 2,770)	5.73 (1.25–26.2)*	4.36 (0.70–27.0)	4.52 (1.02–20.0)*	3.24 (0.66–15.9)	3.51 (1.23–10.0)*	2.36 (0.85–6.58)†	4.41 (1.05–18.5)*	2.80 (0.88–8.91)†
Moderate (n = 832)	4.72 (2.06–10.8)**	4.88 (2.05–11.6)**	4.36 (1.82–10.4)**	3.72 (1.38–10.0)**	2.33 (1.13–4.79)*	2.34 (1.07–5.10)*	2.19 (1.01–4.75)*	1.87 (0.82–4.31)
High (n = 405)	1.07 (0.44–2.58)	1.09 (0.43–2.80)	0.90 (0.37–2.18)	0.60 (0.23–1.60)	1.06 (0.53–2.09)	1.10 (0.54–2.26)	1.04 (0.52–2.09)	0.90 (0.44–1.83)

AORs and 95% confidence intervals shown for blacks, and Hispanics, vs. whites (ref)
Base model: adjusting for heavy drinking score + demographics (gender, age, education, marital and employment status).
Model 1: adjusting for heavy drinking score + demographics + poverty.
Model 2: adjusting for heavy drinking score + demographics + unfair treatment.
Model 3: adjusting for heavy drinking score + demographics + racial/ethnic stigma.
† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Including unfair treatment in the model (model 2) brought about some reductions in black-white differences in social consequences and dependence symptoms, but these were relatively modest. There was generally little effect observed for poverty (model 1). One exception related to the risk for dependence among those reporting little or no heavy drinking. Table 5 shows that when poverty was added to the base model, black drinkers' elevated risk for dependence was substantially reduced (from an AOR of 5.73 in the base model to 4.36 in model 1), and a similar reduction was seen for Hispanics (AOR decreased from 3.51 to 2.36). We viewed this finding with caution, however, as 12% of the current drinker sample were missing income data, and were thus excluded from our analyses of the role of poverty. A sensitivity analysis was performed to re-estimate the AOR for race/ethnicity in the base model after excluding all cases missing on poverty. The new estimates based on this truncated sample did not affect our results for black-white differences. That is, poverty still appeared to partially account for the black-white gap in the risk for dependence symptoms. However, the Hispanic-white difference was no longer explained, in part, by poverty because the newly estimated Hispanic-white difference was smaller, and changed little when poverty was included in the model (new AOR = 2.72 in base model, AOR = 2.36 when poverty was included). Additional sensitivity analyses were performed to assess whether any other results were affected by missing data, and showed that no other results were affected.

DISCUSSION

Although racial/ethnic disparities in alcohol-related health conditions have been documented, research has produced mixed findings on disparities in alcohol-related social and dependence problems. In some respects, this is not surprising. Social problems due to drinking reflect not only drinking behavior, but social network, cultural, and societal conditions (Kuendig et al., 2008; Room, 1998). Inconsistent findings regarding alcohol dependence are perhaps more perplexing, given the association between dependence and alcohol-related health problems. The current study was motivated by these seeming contradictions and discrepant reports based on prior national surveys, and has attempted to address some of the methodological issues that might have contributed to the present ambiguity.

Our findings from the 2005 NAS indicate that there are racial/ethnic differences in alcohol-related problems among current drinkers. Specifically, black and Hispanic drinkers are approximately 1.5 times more likely than whites to report 1 or more social consequences of drinking and multiple dependence symptoms. Racial/ethnic differences in dependence are even greater when DSM-IV criteria are used to operationalize alcohol dependence. These findings depart from those based on the 2001–2 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), which indicate higher overall rates of alcohol abuse among whites, and roughly

similar rates of dependence across whites, blacks, and Hispanics (Grant et al., 2004). Importantly, however, the NESARC rates pertain to the overall population of drinkers and nondrinkers and do not take into account racial/ethnic differences in abstinence. NAS findings for alcohol dependence in the overall sample (including nondrinkers) are more in keeping with NESARC results, given that black-white differences are relatively small and Hispanics show, overall, a higher rate of dependence than whites.

Yet our finding that blacks and Hispanics have equivalent or marginally higher rates of social consequences even in the overall population is at odds with NESARC findings, and might reflect measurement differences across the 2 surveys. Consistent with its focus on diagnosable mental disorders, the NESARC assesses alcohol abuse, a designation requiring that at least 1 of 4 DSM-IV criteria be met (i.e., concerning recurring problems with role obligations, relationships, hazardous drinking, and the law), and which is conditional on the absence of a concurrent diagnosis of alcohol dependence. By contrast, the NAS measure of social consequences is not mutually exclusive of alcohol dependence, and reflects a broad concern with social problems. Both measurement approaches are valuable, but perhaps better suited to different purposes. If the primary question is whether groups are differentially impacted by social problems due to drinking, it may be best to use nondiagnostic measures that do not hinge upon dependence status.

A second concern of the current study was whether disparities in problems occur independently of consumption and drinking pattern, and where, specifically, across a range of drinking levels are disparities most apparent. Here, we report 2 important findings. First, even after rigorously adjusting for differences in heavy episodic consumption and pattern, racial/ethnic disparities in alcohol-related problems are still apparent. The current study thus replicates earlier findings by Herd, Jones-Webb and others, and suggests that racial disparities in alcohol-related problems are robust over time. Second, we observed that disparities in alcohol-related problems were greatest among those reporting little or no heavy drinking. These findings are similar to those of Jones-Webb and colleagues, but differ from Herd's observation of a widening racial gap in consequences and dependence symptoms at higher frequencies of heavy drinking. Given that Herd's results are based on data collected more than 2 decades ago, it could be that temporal shifts in drinking behavior and attitudes account for these differences. It has been suggested that the movement towards a "drier" drinking culture in the U.S., together with the growth of alcohol prevention programs since the 1980s, might have fostered greater awareness and recognition of drinking problems at all levels of consumption, even at levels that historically were deemed nonproblematic (Midanik and Clark, 1995).

The third question we investigated concerns the extent to which social disadvantage helps to explain racial/ethnic disparities in alcohol-related problems. We found that social disadvantage played a relatively modest role in explaining disparities in problems. Racial/ethnic stigma appears to have greatest relevance, followed by poverty, which contributes to black-white differences in dependence symptoms among low-level heavy drinkers. We were surprised that perceived unfair treatment did not play a stronger role, since we had previously found it to be a strong predictor of alcohol problems within racial/ethnic groups, and it was more often reported by minorities (Mulia et al., 2008). We suspect that because our measure of unfair treatment does not specify an attribution to race/ethnicity per se, the potential mediating effects of unfair treatment based on minority status could have been diluted. We believe that the measure of racial/ethnic stigma better captures experiences of minority status, since it asks more directly about perceived social inequalities based on race/ethnicity. Notably, racial/ethnic stigma varied widely across minority status, and had the largest and most consistent effects for reducing racial/ethnic disparities in problems.

When evaluating these results, it is important to bear in mind the study's limitations. Studies have shown that long-term and neighborhood-level poverty are important predictors of heavy drinking and alcohol problems (Boardman et al., 2001; Mossakowski, 2008). Given that low-income minorities are more likely to live in poorer neighborhoods than low-income whites (Jargowsky, 2003), and to experience longer durations of poverty (Cellini et al., 2008), our small effects for poverty might reflect the lack of data on these important variables. Our findings for poverty and unfair treatment, discussed above, should therefore not be interpreted as conclusive. Additional research is warranted using more comprehensive and specific measures of poverty and racial discrimination.

Other limitations pertain to the cross-sectional nature of this study, and sample size constraints. Given the lack of information on temporal order, we could not assess the directionality of effects. Also, despite relatively large oversamples of African Americans and Hispanics in the 2005 NAS, we did not have sufficient statistical power to examine DSM-IV alcohol dependence as an outcome in our multivariate models, nor to disaggregate analyses by gender, and by types of social consequences and dependence symptoms.

The results presented here do not generalize to the overall population, since nondrinkers were excluded from our core analyses. By restricting the analyses thus, we adjust for the disproportionately high rates of abstinence among African Americans and Hispanics. Were we to include abstainers, this would likely result in the artificial deflation of disparities at the no/low level of heavy drinking, since this is where abstainers would be grouped; we would expect little impact on the multivariate results for moderate and high levels of heavy drinking.

The key findings of this study—that racial disparities in alcohol problems persist even after rigorously controlling for heavy drinking, and that they appear greatest among those who seldom drink heavily, if at all—raise intriguing questions for future research. One question is whether these findings reflect, in part, group differences in drink size reporting, as observed in recent methodological studies by Kerr and

colleagues. In one such study, the volume of participants' typical home drinks was measured using calibrated vessels and compared to participants' self-reported drink size; results indicated that African American men were more likely than white men to underestimate the amount of alcohol consumed (Kerr et al., 2008). Additionally, a study of drink size in bar settings suggested that spirits drinks had a higher alcohol content in bars that catered mostly to African Americans (Kerr, Patterson, and Greenfield, unpublished data). The underestimation of alcohol consumption might help to explain our findings that African Americans experience greater problems at lower levels of heavy drinking. However, subjective drunkenness was factored into our composite measure of heavy drinking, and thus should help to offset this potential problem.

Assuming that differences in heavy drinking were truly controlled, our findings indicate that heavy episodic consumption and pattern do not fully explain racial disparities in alcohol problems. This implies that public health efforts must do more than focus on reducing heavy drinking in order to eliminate these disparities. One area for future work concerns drinking to cope with social and environmental stressors. As noted earlier, drinking to cope may be an important link between experiences of chronic material hardship, minority status (i.e., racial stigma and discrimination), and alcohol problems. Notably, drinking to cope has been associated with alcohol abuse and dependence symptoms independent of alcohol consumption (Cooper et al., 1995), and thus, even at low levels of heavy drinking, could result in problems.

Another area pertains to social and cultural context; that is, how drinking culture, the social status of racial/ethnic groups, and the places where people live might affect vulnerability to problems. Given the relatively "drier" culture of African Americans and conservative attitudes towards Latina drinking (Caetano, 1984), persons exhibiting nonconventional drinking behavior within these cultures could encounter problems even at moderate levels of consumption (see arguments by Herd, 1994). It is also possible that racial/ethnic minorities are subject to greater societal scrutiny and stigma on account of their drinking. Research has shown, for instance, that blacks and Hispanics are far more likely than whites to be arrested for drunk driving, despite their comparable or even lower rates of driving while drunk (Caetano and Clark, 2000; Herd, 1994). Similarly, compared to their white counterparts, highly educated African American men have reported much higher rates of alcohol-related problems despite their low rates of heavy drinking (Barr et al., 1993). Such findings may reflect the closer police monitoring of poor and minority neighborhoods, or minority visibility in predominantly white middle-class settings (Barr et al., 1993; Herd, 1994; Jones-Webb et al., 1997a).

The reduction of racial disparities in alcohol-related problems may thus require efforts that address both individual drinking motives and behaviors, as well as broader social and environmental contexts that give rise to problems. In order that specific recommendations for prevention policy can be developed, research must first pinpoint the particular types of problems that racial/ethnic minorities are more prone to experiencing, and determine whether their origins lie more in drinking behavior, or are shaped as well by social and cultural factors (Kuendig et al., 2008). By attending more closely to the nature of problems, we can begin to work more effectively to address them.

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