Racial/Ethnic Differences in Life-course Heavy Drinking from Adolescence to Midlife

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Abstract

Information on heavy drinking over the life course might help to explain racial/ethnic disparities in alcohol-related problems, morbidity and mortality. Using data from the 2009–10 U.S. National Alcohol Survey (*n*=3026), we analyzed retrospective decades-based measures of heavy drinking during respondents' teens, 20s, 30s, and 40s. Results indicate that Latino men and Black women have greater risk for persistent-high (vs. declining) heavy drinking trajectories than White men and women, and that socioeconomic disadvantage partly accounts for this disparity in women. Prospective longitudinal studies are needed to confirm these results and to elucidate the relationship of lifecourse heavy drinking patterns with health-related outcomes, and disparities in these.

Keywords

racial/ethnic disparities; lifecourse heavy drinking; socioeconomic disadvantage; alcohol problems

INTRODUCTION

Recent longitudinal research based on the U.S. National Epidemiologic Survey of Alcohol Related Conditions (NESARC) finds an increased risk for alcohol use disorder (AUD) onset and persistence in middle-aged Black women and middle-aged US-born Latino men and women compared to Whites (Grant et al., 2012). These disparities in AUD persistence suggest that there may be racial/ethnic differences in the duration of heavy drinking, which could provide a lens for understanding disparities in alcohol-attributable diseases and mortality from chronic and acute causes (Chartier & Caetano, 2010). The latter include Black-White disparities in deaths from alcohol-related mental and behavioral disorders, alcoholic cardiomyopathy, and cancers of the oral cavity-pharynx (Polednak, 2008), and Latino-White disparities in liver cirrhosis and alcohol-related motor vehicle crashes (Yoon, Yi, & Thompson, 2011).

Some have noted that racial/ethnic disparities in AUD and alcohol-related morbidity and mortality are "paradoxical" (Godette, Headen, & Ford, 2006; Keyes & Cerdá, 2013; Zapolski, Pedersen, McCarthy, & Smith, 2014) considering that Blacks and Latinos have higher rates of abstinence compared to Whites, and lower or similar levels of overall alcohol

consumption and rates of heavy drinking (Kerr, Mulia, & Zemore, 2014 - see also online supplemental Table S1; Substance Abuse and Mental Health Services Administration, 2011). However, this inconsistency may arise, in part, from a common focus on current (twelve-month) drinking patterns. Although the latter reflects the scarcity of available, longitudinal consumption data, particularly at the national level, many alcohol-related problems occur after years of sustained heavy drinking. Analyzing drinking behaviors that are contemporaneous with such outcomes may therefore not be optimal if current drinking differs substantially from an individuals' long-term consumption patterns. Thus, the paradox between racial/ethnic differences in current drinking behaviors and alcohol-related problems raises the question of whether there are racial/ethnic differences in lifecourse heavy drinking that might help to explain disparities in alcohol problems emerging at mid-life and beyond.

Research on lifecourse drinking patterns finds that heavy drinking tends to increase rapidly during emerging adulthood, a period of exploration and role transitions from the late teens through the mid-20s (Arnett, 2000), and decline quickly thereafter (K. Chen & Kandel, 1995; P. Chen & Jacobson, 2012) often without alcohol treatment (White & Jackson, 2004–2005). This normative "maturing out" phenomenon (Vergés et al., 2012) occurs at an age when individuals increasingly take on adult roles and obligations such as employment, marriage, and childrearing, which are thought to limit or discourage heavy drinking and drunkenness (Brodbeck, Bachmann, Croudace, & Brown, 2013; O'Malley, 2004/2005). To the extent that individuals continue to engage in frequent heavy drinking, negative social consequences due to work and family responsibilities may ensue. Moreover, adverse health consequences are more likely to occur with on-going heavy drinking (Rehm et al., 2003). We are therefore particularly interested in knowing whether racial/ethnic minorities are more likely to continue to drink heavily at older ages; for instance, as a means of coping with chronic and cumulative stress that they may experience (Hatch, 2005).

Although research in this area is sparse, there have been a few indications that Blacks and Latinos are more likely than Whites to continue heavy drinking beyond early adulthood and for longer periods of time. Age-specific prevalence data show that Blacks have lower rates of heavy drinking than Whites at younger ages, but after the mid-20s White rates decline rapidly while Black rates tend to flatten out (Godette, et al., 2006; Watt, 2008). Additionally, a 1992 follow-up to the 1984 U.S. National Alcohol Survey showed greater stability in the frequent heavy drinking of Black and Latino men compared to White men who decreased their heavy drinking over time. Although numbers were small, a similar pattern of more stable heavy drinking among Black women, compared to White, was also observed (Caetano & Kaskutas, 1995). By contrast, a recent analysis of the National Longitudinal Study of Adolescent Health (Add Health) data collected from 1995 to 2008 found little evidence that Black men and women exceeded White men and women's levels of risky drinking, or that the two racial groups even converged in alcohol quantity and frequency indicators (Keyes et al., 2015). However, as the study examined drinking behaviors only through age 29 on average, the authors recognized the need to assess differences at older ages, particularly among men, given a potential trend toward convergent risky drinking by the end of the observation period. In the current study, we capitalized on available retrospective data to examine heavy drinking trajectories across four decades, including respondents' teens,

twenties, thirties and forties, thus allowing us to capture racial/ethnic differences in drinking trajectories over a longer period that goes beyond young adulthood.

A second important question investigated in this study concerns the role of socioeconomic disadvantage, which is closely entwined with minority race/ethnicity in the U.S. Compared to Whites, Blacks and Hispanics have higher rates of poverty, lower educational attainment, and lower earnings at a given level of education (Williams, Mohammed, Leavell, & Collins, 2010), and racial/ethnic differences in cumulative lifetime exposure to socioeconomic disadvantage are striking (Rank, 2009). Such stark inequalities are considered to be a primary driver of many health disparities (Diderichsen, Evans, & Whitehead, 2001). Studies suggest that chronic stress and sustained, effortful coping (such as occur with repeated social and economic disadvantage) can take a toll on physical health by adversely affecting the cardiovascular, metabolic and immune systems (McEwen & Seeman, 1999), and through unhealthy coping behaviors such as excessive alcohol use, smoking, and over-eating (Boardman & Alexander, 2011). Bridging these mechanisms, very recent work suggests that chronic stress can dysregulate the body's physiological stress response system that facilitates adaptation or coping, and that excessive alcohol use can exacerbate this dysregulation and potentially amplify the adverse health consequences of stress (Obasi et al., 2015).

While studies often control for socioeconomic status (SES) when assessing racial/ethnic differences in health outcomes (Adler, Bush, & Pantell, 2012), doing so can be problematic if the purpose is to estimate the magnitude of racial/ethnic health disparities and SES is a likely mediator of the effects of race/ethnicity. Indeed, some alcohol disparities research, including the NESARC investigation of racial/ethnic differences in AUD onset and persistence by Grant et al., (2012) noted above, have avoided statistical adjustments for SES. An alternative approach taken here is to assess the magnitude of the racial/ethnic disparity and, separately, examine the potential contribution of SES to a given health disparity.

The primary goal of the present study is to examine racial/ethnic differences in lifecourse heavy drinking, an understudied aspect of drinking behavior in disparities research. We are particularly interested in assessing differential risk for persistent heavy drinking beyond early adulthood, as this might shed light on disparities in alcohol-related health (and social) problems occurring in middle age and later. We use gender-specific models to examine this question given recent indications that racial disparities alcohol problems vary by gender (Witbrodt, Mulia, Zemore, & Kerr, 2014). A secondary aim is to assess whether cumulative socioeconomic disadvantage experienced across the life course contributes to racial/ethnic differences in persistent heavy drinking.

METHODS

Data Source and Sample

Data are from the 2009–10 U.S. National Alcohol Survey (NAS), a cross-sectional, Computer-Assisted Telephone Interview (CATI) survey of the U.S. adult population aged 18 and older (*N*=7,969) using random digit dialing with a sampling frame of all 50 states and the District of Columbia. The NAS includes an oversample of Blacks and Latinos and low-population states, as well as a cell phone sample, and was conducted in English and Spanish.

The cooperation rate was 52% for the overall sample and 50% for the landline sample, which, although lower than face-to-face surveys, is consistent with cooperation rates from major, landline telephone surveys (Curtin, Presser, & Singer, 2005). While cooperation rates have dropped in recent decades, this has not necessarily led to biased population estimates (Keeter, Kennedy, Dimock, Best, & Craighill, 2006). Extensive analysis of the NAS telephone surveys indicates no significant bias in alcohol estimates associated with this level of response when compared with NAS replicate subsamples having differing response rates, and with NAS face-to-face surveys with higher response rates (e.g., see Midanik & Greenfield, 2003). Recent analysis of 2009–10 NAS data further suggests no correlation between response rate and respondent demographics or estimates of alcohol consumption and problems (data available upon request).

In order to model and evaluate heavy drinking trajectories across four decades from the teens through the forties, we excluded the following respondents from the study: 1) those younger than age 40 (25%) or missing on age (3%); 2) lifetime abstainers (12%); 3) cell phone respondents (the abridged cell phone survey lacked essential items for this analysis) (6%); 4) those whose first drinking onset was at age 30 or later (4%); and 5) those missing two or more of four decades-drinking items (12%). Blacks and Latinos were more likely than whites to be excluded due to lifetime abstention (16%, 18% vs. 8.5%, respectively), and Blacks were more likely to be missing on 2 or more decades-drinking items (20% vs. 11% White and 8% Latino); there were no racial/ethnic differences in onset of drinking at age 30 or later. The final sample (n=3,026) was comprised as follows: White men (1013), Black men (218), Latino men (216), White women (1,131), Black women (273), and Latina women (175). (Respondents of "other" race/ethnicity were excluded because their small numbers precluded gender-specific analyses.) Compared to the final analytic sample, respondents who were excluded due to older age at first drink and missing decades-drinking data (n=1228) were more likely to be female (72% vs. 41%, p<.001), older (47% vs. 31% were aged 60+, p<.001), poorer (35% vs. 23% had incomes below $20,000, p<.001), and without a family history of alcoholism (70% vs. 63%, p<.01). There were no differences in education, lifetime public assistance, or lifetime homelessness.

Measures

Retrospective Measures of Decades-based Heavy Drinking—In the 2009–10 NAS, current and former drinkers were asked, "How often did you have five or more drinks on one occasion during your [teens/20's/30's/40's]?" They were asked about a specific decade if their age at first drink occurred prior to, or during, that decade. Responses included: (1) "every day or nearly every day", (2) "at least once a week", (3) "at least once a month [but less than 1/week]", (4) "at least once a year [but less than 1/month]", or (5) "never". To assess the reliability and validity of these retrospective heavy drinking measures, Greenfield et al. (2014) conducted a test-retest study of these items in the 2009–10 NAS, with an average of 2.7-years between baseline measurement and follow-up. The test-retest cumulative heavy drinking days derived from these items was correlated (ρ=0.61, R^2=0.37, p<0.001), with no differences in reliability by race/ethnicity, or age (at/above vs. below age 50). Recall of monthly 5+ drinking during the teens was also highly similar across the two age groups (consistently reported by 73.2% and 72.5% of older and younger respondents,

respectively), which helps to alleviate concerns about older respondents' recall of drinking habits long ago. Further, lifetime heavy drinking days predicted current (12-month) alcohol use disorder and negative drinking consequences, even after controlling for current heavy drinking, thus supporting the validity of these retrospective data. In this analysis, we used the dichotomous decades-based measure of monthly heavy drinking to indicate regular heavy drinking (yes/no).

Cumulative Socioeconomic Disadvantage (SED)—To capture different aspects of socioeconomic hardship occurring over the life course, we created an index of socioeconomic disadvantage (SED) reflecting exposure (yes/no) to childhood, current, and repeated socioeconomic hardships which have been shown to be associated with heavy and problem drinking in adulthood (Caldwell, Rodgers, Clark, Jefferis, & Stansfeld, 2008; Karlamangla, Zhou, Reuben, Greendale, & Moore, 2006; Mulia & Karriker-Jaffe, 2012; Yang et al., 2007). These included: (1) low educational attainment (did not graduate from high school=1); (2) low household income (less than $20,000=1), and (3) current unemployment (=1, employed/out of the labor force=0). Three additional items captured the number of times that respondents: (4) experienced economic difficulties in childhood, (5) applied for public assistance, and (6) were homeless. Response categories (never, once, more than once) were dichotomized to indicate 2+ occurrences of each. We had considered a cutoff at 1+ occurrences, but found stronger inter-item correlations among the SED variables using the 2+ cutoff.

Next, an exploratory factor analysis was conducted on the six SED variables using Mplus (Muthén & Muthén, 2013). A strong first dimension was produced, with weak support for a second dimension. Factor loadings on the first factor ranged from 0.65 – 0.80 for four variables (low educational attainment, low household income, public assistance, and homelessness) with lower loadings for childhood economic difficulties (0.50), and current unemployment (0.33). Based on this, we treated this variable as unidimensional and summed across items to create an SED index, with range 0–6. (The correlation between the factor score and the unweighted sum of the 6 dichotomous SED variables was 0.99.) This SED index was associated with measures of current self-rated health (Pearson correlation = −0.36, p<.01) and current psychological distress (r= 0.33, p<.01) in the 2009–10 NAS.

Missing data—Twelve percent of respondents were missing data for an item in the SED index, most commonly household income. This level of missingness should not significantly bias results, especially as these items are used in a composite measure. For respondents missing exactly one item, we computed the within-individual average SED score across the five non-missing SED items and substituted this mean value for the missing item. The additional 1.0% of the sample missing two items (32 cases) or three items (1 case) were excluded from the analysis.

Demographics and Covariates—We analyzed race/ethnicity (self-reported group that best describes the respondent's family origin), sex, age, and family history of alcoholism (defined as having a parent or sibling with alcoholism or alcohol problems); the latter has been associated with trajectories of heavier drinking (Maggs & Schulenberg, 2004/2005). In this sample, White women were slightly older than Black and Latina women (56, 54 and 52

on average, respectively, p=.001; no significant age differences were found among White, Black and Latino men whose average ages were 56, 53, and 53, respectively). Family history of alcoholism was more prevalent among Latino men, followed by White and Black men (46.7%, 31.5%, and 28.3%, respectively, p=.031).

Analytic Approach

We conducted latent class analysis (LCA) of repeated measures (Lanza & Collins, 2006; McCutcheon, 1987; Nylund, Asparouhov, & Muthén, 2007) using Mplus (Muthén & Muthén, 2013) to identify different lifecourse patterns of heavy drinking. Based on the developmental literature, we expected one class to indicate a prominent peak and decline during young adulthood (P. Chen & Jacobson, 2012; Karlamangla, et al., 2006; White & Jackson, 2004–2005). Using four dichotomous indicators of monthly heavy drinking over four decades limited the results to three-class solutions at most. To select the best fitting model, we examined the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC) and the sample size adjusted BIC (aBIC) where lower AIC, BIC and aBIC indicate better fit; entropy values to assess classification qualities across models; and interpretability of the models. We also performed the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) to assess the improvement in fit between nested latent class models, comparing k- and k-1 class models; a p-value less than 0.05 suggests a statistically significant improvement in fit (Nylund, et al., 2007). We did not use the bootstrapped likelihood ratio test (BLRT, (McLachlan & Peel, 2000)) as this is not available for LCA with sampling weights. After the model with best fit was identified, we examined the prevalence of each class and compared item endorsement probabilities within each class to identify general patterns in heavy drinking over the decades.

Using the LCA results, we created an outcome variable indicating heavy drinking class membership (in persistent-high, declining, and stable-low classes) and assessed racial/ethnic differences in heavy drinking classes using multinomial logistic regression and STATA Version 13 (Stata Corp., 2013). We also assessed SED as a predictor of heavy drinking class membership, controlling for other covariates (race/ethnicity, age and family history of alcoholism). Our key outcome was the relative risk of *persistent-high* vs. *declining* heavy drinking (the latter considered normative), but we also examined disparities in persistent-high vs. stable-low heavy drinking. All models were gender-stratified. Finally, to formally test the contribution of SED to racial/ethnic disparities, we evaluated a mediation path model based on the same gender-stratified multinomial logistic regression above (including the same outcome, cumulative SED as a mediator of race/ethnicity, and covariates) using Mplus.

Sampling weights that adjust for the probability of selection during the sampling design, and accounting for the number of adults in the household and oversampling of ethnic minorities, were used in all analyses. Post-stratification weights were also incorporated to generalize to the US population on gender, age, race/ethnicity, education and state population.

RESULTS

Racial/Ethnic Differences in Lifecourse Heavy Drinking

Table 1 shows summary model fit statistics for latent class models of 1 to 3 class solutions. The reduction in AIC, BIC and aBIC values as the number of classes in the model increases suggested consistent improvement in model fit from 1- to 3- class models. The LMR test (p=0.0004) rejected a two-class solution in favor of a 3-class model. The entropy values indicated medium to good classification and did not differ between the 2- and 3-class models. Endorsement rates for the LCA indicators in the overall sample were 0.42, 0.62, 0.44, and 0.29 for monthly heavy drinking in the teens, 20s, 30s, and 40s, respectively. Figure 1 shows the item endorsement probabilities for each class in the three-class solution. Two classes showed a similar probability of frequent heavy drinking occurring in the teens that peaks in the 20s. Thereafter the groups diverge, with one class markedly reducing the frequency of heavy drinking ("declining class", 36.1% of the overall sample) and the other class persisting in frequent heavy drinking beyond early adulthood ("persistent-high", 36.4%). A third class was characterized by a stable and very low probability of heavy drinking at least monthly across the four decades ("stable-low", 27.5%).

As shown in Table 2, the declining pattern of heavy drinking was the most prevalent in White and Black men (characterizing 43% and 41%, respectively), while the persistent-high pattern was the most common in Latino men (43%). Table 3 shows the results of multinomial logistic regression models comparing minority and White men, adjusting for age and family history of alcoholism. There were no Black-White differences observed among men. However, Latino men were at marginally greater risk for persistent-high (vs. declining) heavy drinking compared to White men (RRR=1.70, 95% CI: 0.98–2.96, *p*=.061). In all three groups of men, the stable-low pattern of heavy drinking was the least common, exhibited by 25% of White and Black men, and 22% of Latino men (Table 2). There were no racial/ethnic differences in the relative risk of persistent-high (vs. stable-low) heavy drinking (Table 3).

Among women, the stable-low pattern of heavy drinking was the most prevalent and equally common in all three racial/ethnic groups (54% of White and Latina women, 53% of Black), yet White women were more likely to reduce, rather than persist in, frequent heavy drinking over time (31% vs. 16%, respectively). By contrast, Black and Latina women were nearly as likely to reduce their heavy drinking (23% and 24% of Black and Latina women, respectively) as they were to persist (25% and 21%). Multivariate models showed the relative risk of persistent-high (vs. declining) heavy drinking to be two times greater among Black women than White women (RRR=2.65, 95% CI:1.44–4.89, *p*=.002, Model 1); there was a trend among Latinas towards greater persistent-high (vs. declining) heavy drinking compared to White women (RRR=1.80, 95% CI: 0.78–4.17, *p*=0.17). Similar to men, there were no racial/ethnic differences in the relative risk of persistent-high vs. stable-low heavy drinking among women.

The Role of Socioeconomic Disadvantage

We next examined the association of cumulative SED with these heavy drinking trajectories. Among men, SED was not related to the risk of persistent-high (vs. declining) heavy drinking (Table 2, Model 2), nor did its inclusion in the model have an impact on the estimated Latino-White male disparity in persistent-high heavy drinking. Among women, however, cumulative SED was strongly associated with persistent-high (vs. declining) heavy drinking (RRR=1.43, p=.001), and controlling for SED reduced the Black-White female disparity in persistent-high heavy drinking (from RRR=2.65, p=.002 to RRR=1.95, p=.029). Also unique to women, having a family history of alcoholism was associated with two times greater risk for persistent-high (vs. stable-low) heavy drinking (RRR= 1.99, p=.001). The effect of family alcoholism was diminished after adjusting for cumulative SED (RRR=1.56, p=.036), which was strongly associated with persistent-high heavy drinking (RRR=1.50, p<. 001).

To formally test whether cumulative SED helps to explain the Black-White female disparity in the relative risk for persistent-high (vs. declining) heavy drinking, we conducted mediation analysis with sampling weights using Mplus. Results for women indicated a significant indirect pathway from Black race/ethnicity (vs. White) to persistent-high (vs. declining) heavy drinking through cumulative SED. The indirect effect estimate was 0.253 (p<.0001); cumulative SED accounted for 44% of the total effect of Black race/ethnicity. There was no indirect effect for Latina (vs. White) women, nor for Black or Latino men on persistent-high (vs. declining) heavy drinking.

In an effort to better understand why SED appears to contribute to the racial/ethnic disparity among women but not among men, we examined the patterning of SED exposures across groups. We found that Black women had much higher rates than White women on five of the six SED indicators (see Table 4). By comparison, there were fewer differences between Latino and White men. In addition, post-hoc multivariate analyses revealed that none of the individual SED indicators were significantly associated with persistent-high (vs. declining) heavy drinking in men overall, whereas four of the six SED indicators were significant predictors among women.

DISCUSSION

Studies of lifecourse heavy drinking have the potential to illuminate population differences in long-term patterns of risky and harmful drinking, and may therefore shed light on disparities in alcohol-related problems emerging at midlife and beyond. Historical drinking patterns are particularly relevant when trying to make sense of disparities in alcohol-related problems that often manifest after years of sustained heavy drinking. The present study assessed racial/ethnic disparities in the persistence of heavy drinking across four decades, and whether socioeconomic disadvantage plays a role in such disparities. We found that compared to Whites, Black women were significantly more likely, and Latino men marginally more likely, to have persistent-high heavy drinking trajectories rather than the decreasing trajectory often seen in young adults. Cumulative socioeconomic disadvantage appears to contribute to the Black-White disparity among women, but not to the Latino-White disparity among men.

Some of our study findings depart from prior research. As noted earlier, Caetano and Kaskutas' 1992 NAS follow-up to the 1984 NAS documented more persistent ("stable") heavy drinking in *both* Black and Latino men compared to White; similar to our findings, their results suggested more persistent heavy drinking in Black women compared to White. By contrast, the AddHealth study of Black and White young persons by Keyes et al. (2015) indicated that Black men and women had *lower* alcohol use quantity and frequency on nearly all indicators when compared to Whites. These mixed findings across studies may be the result of sample, design and measurement differences. The 1992 NAS follow-up study analyzed *5+ weekly* drinking at two time points in an adult sample aged 18 and older, while the more recent AddHealth study followed a sample from adolescence through the twenties, on average (from 1995 to 2008), and examined *at-risk drinking* which is a lower threshold (defined as *any occasion of 5+/4+* drinking in the past year or, *14+/7+ drinks per week* on average for men/women). Our study based on the 2009–10 NAS analyzed retrospective data on *monthly 5+* drinking during respondents' teens, twenties, thirties and forties.

Importantly, the findings from the current study cohere with recent research on alcohol-related problems. As noted, a recent longitudinal analysis based on Waves 1 and 2 from the National Epidemiologic Survey of Alcohol Related Conditions (NESARC) found US-born Latino men aged 40 and older to have greater risk for incident and persistent alcohol use disorder (AUD) than young, White men aged 18–29 (Grant, et al., 2012). Similarly elevated risk was reported for middle-aged, US-born Latina and especially middle-aged Black women, relative to young White women. Considering that AUD rates are highest among young adults in general (Esser et al., 2014) and that middle-aged Whites had lower AUD risk than young Whites in the NESARC study, Grant et al.'s findings suggest sizeable racial/ethnic disparities in the risk of AUD onset and persistence during the forties and later.

The results from our 2009–10 NAS analysis offer one possible explanation for the heightened risk of middle-aged Latino men and Black women. Namely, these two groups persist in regular heavy drinking over longer periods of the life course compared to White men and women. In addition, they are drinking heavily for sustained periods after young adulthood, a time when health is generally more robust. To the extent that health "weathering" (Geronimus, Hicken, Keene, & Bound, 2006) begins to accelerate after young adulthood and at a faster rate for racial/ethnic minorities and socioeconomically disadvantaged groups, persistent heavy drinking beyond young adulthood might amplify risks for alcohol-related health problems and contribute to the emergence of alcohol-related health disparities at midlife and later.

Also, while we did not find strong Latino-White disparities (marginally significant among men, and a trend among women), it bears mentioning that we were unable to disaggregate our small sample of Latino men and women by US nativity status as in the NESARC study. Our estimated Latino-White disparities in persistent heavy drinking may therefore be conservative, since there is some evidence that US-born and highly acculturated Latinos tend to drink more heavily and are more susceptible to alcohol dependence than their foreign-born, less acculturated counterparts (Alegría, Canino, Stinson, & Grant, 2006; Grant, et al., 2012; Zemore, 2007).

The present results also suggest a possible explanation for recent NAS findings indicating that Black women and Latino men, compared to White women and men, have greater odds of current (12-month) alcohol dependence at low and moderate levels of current heavy drinking (Witbrodt, et al., 2014). Such findings are plausible if the risk of alcohol dependence posed by longterm, frequent heavy drinking is cumulative and not easily altered by temporary (past-year) reductions in heavy drinking. Future research should endeavor to account for both historical and current drinking when trying to understand racial/ethnic disparities in alcohol-related health and social problems.

The other major findings from this study relate to cumulative socioeconomic disadvantage experienced across the life course. Unexpectedly, we saw that this contributes to racial/ ethnic disparities in persistent heavy drinking in women, but not in men. On further inspection, we found greater differences in socioeconomic disadvantage between Black and White women (than between Latino and White men), and significant associations of disadvantage with our key outcome only in women. This suggests that differences in cumulative exposure to socioeconomic disadvantage may be an important factor underlying the observed Black-White disparity in persistent heavy drinking among women.

The lack of similar findings for men was unexpected and raises questions about additional factors that may influence men's heavy drinking trajectories. Drinking norms are one possibility. These tend to be more liberal among men than women, and more permissive towards men's drinking (Greenfield & Room, 1997). While recent birth cohorts show evidence of a gender convergence in heavy drinking and thus, presumably, also in drinking norms (Keyes, Grant, & Hasin, 2008), ours is a study of older adults whose average age is in the mid-50s. It is therefore plausible that in this study, men's (vs. women's) heavy drinking is driven to a greater degree by norms supportive of heavy drinking. In addition, differences in ethnic drinking cultures might also shape the racial/ethnic patterning of heavy drinking observed among men (Cook & Caetano, 2014). Future studies should explore potential influences on the lifecourse heavy drinking patterns of men and women and racial/ethnic groups in order to better understand divergent drinking patterns of population subgroups.

The present results should be interpreted in light of several study limitations, such as the use of retrospective measures of average heavy drinking frequency. These, like all lifetime assessments, are subject to recall (and reporting) bias. As Greenfield and colleagues (2014) point out, it is often assumed that retrospective drinking measures are biased downward, yet some research has found that they can be highly similar to prospective measures (e.g., drinking onset) or even biased upward (e.g., mean quantity-frequency index) (Koenig, Jacob, & Haber, 2009). The NAS retrospective heavy drinking measures have reasonable reliability and face validity, as noted above. Cumulative heavy drinking frequency based on these items is associated with duration of subsequent health harms (Greenfield & Rogers, 1997) and current alcohol use disorder, even when controlling for current heavy drinking (Greenfield, et al., 2014). This is particularly relevant, as our study was motivated by the question of whether there are differences in lifecourse heavy drinking that might shed light on disparities in alcohol problems emerging at midlife and beyond. However, studies utilizing prospective longitudinal data are needed to confirm the observed patterns. To our knowledge there is only one U.S. national survey, the National Longitudinal Study of Youth (NLSY) (Bureau of

Labor Statistics, 2016) that assesses frequency of heavy drinking from adolescence to mid-life. The NLSY is an on-going study following individuals who were 14 to 21 years old when initially recruited in 1979. Although the NLSY uses a higher threshold measure for heavy drinking (6+ drinks/occasion for men and women) that exceeds U.S. national guidelines, and does not have alcohol data at all survey waves, it could provide another important perspective.

Our study results might also have been affected by the use of a dichotomous measure of monthly heavy drinking, which lends itself to greater interpretability in a latent class analysis and which has been used in many prior studies. While our use of the monthly threshold was partly motivated by the need to have sufficient cases of regular heavy drinking (weekly 5+ would have been too high a threshold), some of our racial/ethnic comparisons might nevertheless be underpowered; for example, the non-significant finding that Latinas (the smallest racial-gender subgroup in the study with N=175) have 80% greater odds of persistent high vs. declining heavy drinking compared to White women (OR =1.80, 95% CI: 0.78–4.17). In addition, studies have often identified four types of alcohol trajectories (stable high, stable low, increasing, and decreasing) (Sher, Jackson, & Steinley, 2011), but our use of dichotomous variables with only four "time points" precluded a four-class solution and could miss an "increasing" class.

The current study excluded respondents who initiated drinking during their 30s or 40s, or who were missing data for two or more heavy drinking measures. As noted, racial/ethnic groups did not differ in late drinking onset (at age 30 or older), and although Blacks were more likely to be excluded due to missing data, the excluded group was more likely to be female, older, poorer, and without a family history of alcoholism. We believe these differences are not likely to bias the male disparity results because income and family history were not associated with our key outcome in men, nor did age vary among men. Among women, age, income, and family history were positively associated with persistent (vs. declining) heavy drinking. As the sample's White female respondents were older and minority female respondents were poorer, the net effect of the exclusion criteria on the female disparity results is unclear.

An additional limitation is our inability to (retrospectively) assess lifecourse differences in average quantity consumed on *heavier* drinking occasions. NAS data from 1984 and 1992 showed higher (unadjusted) mean volume among Black (vs. White) men who were heavy drinkers, and mixed findings for women heavy drinkers (Caetano & Kaskutas, 1995). AddHealth data revealed higher consumption per drinking occasion among young White male and female drinkers compared to Black (Keyes, et al., 2015). These inconsistencies across studies could be due in part to age, survey years, and/or adjustment for demographic characteristics such as SES. The average volume consumed on heavy drinking occasions is another piece of the puzzle of differential risk for alcohol-related harm. Finally, our study was unable to establish the temporal ordering of repeated socioeconomic hardships in relation to heavy drinking and therefore we cannot rule out the possibility that persistent heavy drinking led to repeated hardships. Despite these limitations, the study has several strengths, such as the use of national survey data to investigate racial/ethnic differences in lifecourse heavy drinking from adolescence to middle age. Most studies of heavy drinking

trajectories end in early adulthood, yet many alcohol-related health problems (including alcohol use disorder) occur after this developmental period and following sustained heavy drinking. Attending to persistent heavy drinking over a longer time span is an important contribution of this study. Analysis of gender-stratified models is another notable feature. Although research on alcohol use trajectories often does not specify gender-specific models, we do so here because ultimately we are concerned with understanding racial/ethnic disparities in alcohol-related problems and such disparities have been shown to vary by gender (Witbrodt, et al., 2014). Finally, our investigation of cumulative socioeconomic disadvantage in relation to racial/ethnic disparities in long-term heavy drinking is an important extension of the literature, recognizing that health disparities reflect, in part, population differences in the cumulation of salutary and deleterious exposures across time (Hatch, 2005). To inform future prevention and intervention efforts, research is needed to confirm the current findings and investigate the role of persistent heavy drinking in racial/ethnic disparities in alcohol-related problems.

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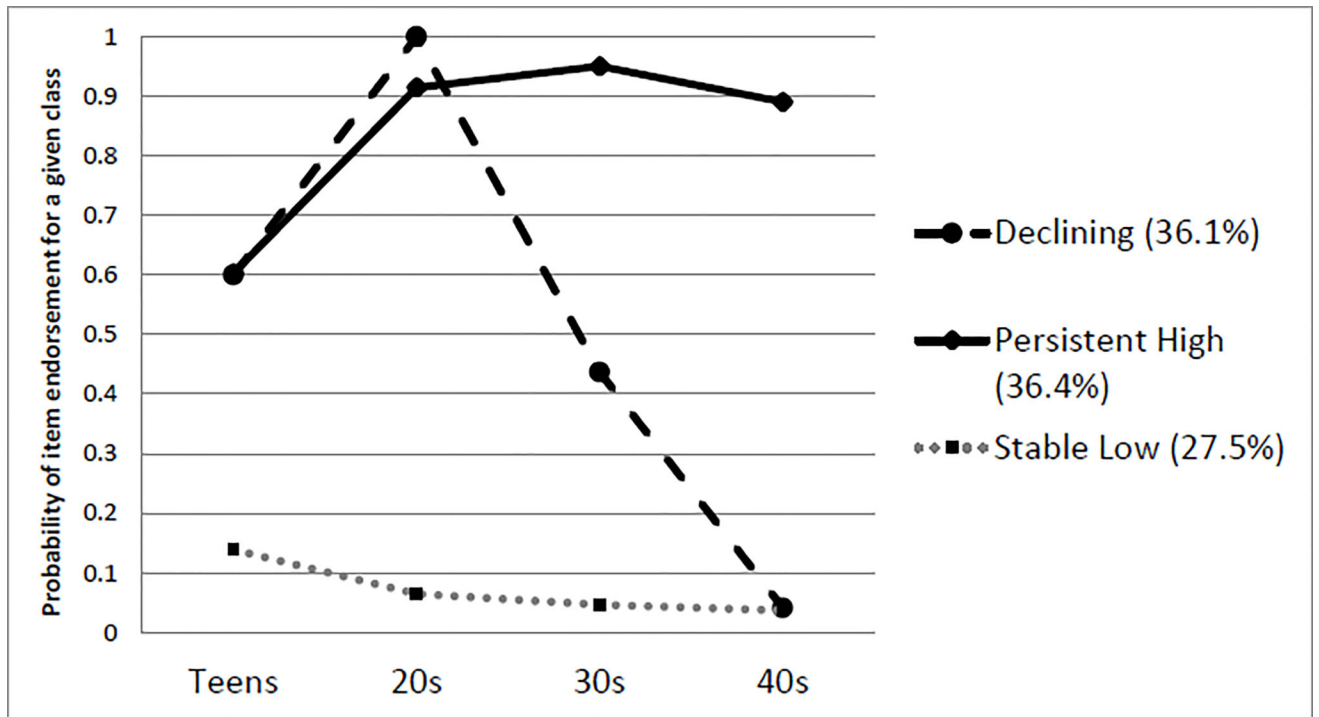
Figure 1.
Latent Classes of Frequent Heavy Drinking from the Teens to the Forties

Table 1

Indicators of Fit for the Latent Class Models

Model	AIC	BIC	aBIC	LMR test p-value	Entropy
1-Class	15820.339	15844.399	15831.689	---	---
2-Class	13500.166	13554.301	13525.704	<0.001	0.801
3-Class	**13223.926**	**13308.136**	**13263.652**	**0.0004**	**0.805**

aBIC = Sample-size adjusted Bayesian Information Criterion

LMR test = Lo-Mendell-Rubin adjusted likelihood ratio test

Table 2

Descriptive Statistics for the Heavy Drinking Classes (%)

	Stable Low	Declining	Persistent High	p-value
MEN	**(n=434)**	**(n=529)**	**(n=484)**	
White	25.1	42.8	32.1	NS
Black	24.5	41.4	34.1	
Latino	22.4	35.0	42.6	
Heavy drinking in teens	9.2	47.9	42.9	<.001
Heavy drinking in 20s	0	56.1	43.9	<.001
Heavy drinking in 30s	1.6	38.0	60.4	<.001
Heavy drinking in 40s	3.1	0	96.9	<.001
WOMEN	**(n=898)**	**(n=432)**	**(n=249)**	
White	53.5	30.5	16.0	NS
Black	52.5	22.6	25.0	
Latino	54.3	24.3	21.3	
Heavy drinking in teens	19.4	50.0	30.6	<.001
Heavy drinking in 20s	0	64.5	35.6	<.001
Heavy drinking in 30s	10.9	35.2	53.9	<.001
Heavy drinking in 40s	9.5	0	90.5	<.001

Note. Weighted, row percentages shown; unweighted Ns.

Table 3

Multinomial Logistic Regression Models of Heavy Drinking Class Membership

	MEN (n=1447)		WOMEN (n=1579)	
	Persistent High vs. Declining		Persistent High vs. Declining	
	Model 1	Model 2	Model 1	Model 2
Race/ethnicity (ref=White)				
Black	1.15 (0.62–2.13)	1.09 (0.57–2.07)	2.65 (1.44–4.89)**	1.95 (1.07–3.53)*
Latino	1.70 (0.98–2.96)†	1.67 (0.95–2.91)†	1.80 (0.78–4.17)	1.59 (0.70–3.63)
Age	1.02 (1.00–1.03)*	1.02 (1.00–1.03)*	1.03 (1.01–1.05)*	1.03 (1.01–1.05)**
Family history of alcoholism (y/n)	1.20 (0.81–1.76)	1.15 (0.77–1.70)	1.31 (0.84–2.05)	1.08 (0.69–1.68)
Cumulative SED (range: 0–6)		1.05 (0.89–1.25)		1.43 (1.17–1.76)***
	Persistent High vs. Stable Low		Persistent High vs. Stable Low	
Race/ethnicity (ref=White)				
Black	1.09 (0.54–2.19)	0.90 (0.46–1.76)	1.57 (0.87–2.83)	1.14 (0.64–2.02)
Latino	1.38 (0.76–2.53)	1.19 (0.63–2.25)	1.07 (0.51–2.24)	0.93 (0.44–1.99)
Age	0.98 (0.97–1.00)*	0.98 (0.96–1.00)*	0.98 (0.96–1.00)*	0.98 (0.96–1.00)*
Family history of alcoholism (y/n)	1.37 (0.86–2.19)	1.21 (0.77–1.92)	1.99 (1.31–3.03)***	1.56 (1.03–2.37)*
Cumulative SED (range: 0–6)		1.23 (0.96–1.58)		1.50 (1.25–1.79)***

Notes. Relative risk ratios shown. SED = socioeconomic disadvantage.

† p<.10,

* p<.05,

** p<.01,

*** p .001.

Table 4

Socioeconomic Disadvantage: Racial/ethnic Differences and Associations with Persistent-High Heavy Drinking Class Membership

	White	Black	Latino	p-value	Persistent High vs. Declining HD RRR (95% CI)	Persistent High vs. Stable Low HD RRR (95% CI)
MEN	**(n=1,013)**	**(n=218)**	**(n=216)**			
Cumulative SED: mean (s.e.)	0.70 (0.04)	1.41 (0.15)	1.45 (0.12)	<.001	1.05 (0.89–1.25)	1.23 (0.96–1.58)
Indicators of SED (%)						
Childhood economic difficulties	25.1	36.5	35.9	NS	0.90 (0.57–1.41)	1.06 (0.64–1.75)
Low education	9.49	27.1	41.8	<.001	0.98 (0.54–1.77)	2.07 (0.87–4.93)
Currently unemployed	6.29	10.4	9.17	NS	1.19 (0.56–2.55)	0.80 (0.28–2.27)
Current income < $20,000	14.0	38.8	41.1	<.001	1.44 (0.86–2.41)	2.39 (1.40–4.09)**
Sought public assistance	11.4	25.1	11.7	.009	1.26 (0.69–2.32)	1.01 (0.50–2.03)
Homelessness	4.14	4.22	8.03	NS	0.70 (0.29–1.71)	1.78 (0.63–5.03)
WOMEN	**(n=1,131)**	**(n=273)**	**(n=175)**			
Cumulative SED: mean (s.e.)	0.75 (0.05)	1.56 (0.18)	1.13 (0.18)	<.001	1.43 (1.17–1.76)***	1.50 (1.25–1.79)***
Indicators of SED (%)						
Childhood economic difficulties	26.5	32.9	33.8	NS	1.36 (0.84–2.21)	1.66 (1.06–2.60)*
Low education	9.63	18.7	18.1	.014	2.12 (1.0–4.53)*	1.98 (1.0–3.93)*
Currently unemployed	5.67	19.3	11.0	<.001	3.96 (1.84–8.54)***	2.53 (1.22–5.28)*
Current income < $20,000	18.9	48.5	26.5	<.001	1.69 (0.99–2.87)*	1.61 (1.01–2.57)*
Sought public assistance	11.7	27.6	19.5	<.001	2.65 (1.54–4.57)***	3.79 (2.22–6.47)***
Homelessness	4.01	10.5	3.47	.029	1.97 (0.82–4.74)	3.37 (1.32–8.62)*

Notes. RRR: Relative risk ratio adjusted for race/ethnicity, age, and family history of alcoholism.

*
p .05,

***
p .001