Heavy drinking in early adulthood and outcomes at mid life

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ABSTRACT

Background Heavy drinking in early adulthood among Blacks, but not Whites, has been found to be associated with more deleterious health outcomes, lower labor market success and lower educational attainment at mid-life. This study analysed psychosocial pathways underlying racial differences in the impact of heavy alcohol use on occupational and educational attainment at mid-life.

Methods Outcomes in labor market participation, occupational prestige and educational attainment were measured in early and mid-adulthood. A mixture model was used to identify psychosocial classes that explain how race-specific differences in the relationship between drinking in early adulthood and occupational outcomes at mid-life operate. Data came from Coronary Artery Risk Development in Young Adults, a longitudinal epidemiologic study.

Results Especially for Blacks, heavy drinking in early adulthood was associated with a lower probability of being employed in mid-life. Among employed persons, there was a link between heavy drinking for both Whites and Blacks and decreased occupational attainment at mid-life. We grouped individuals into three distinct distress classes based on external stressors and indicators of internally generated stress. Blacks were more likely to belong to the higher distressed classes as were heavy drinkers in early adulthood. Stratifying the data by distress class, relationships between heavy drinking, race and heavy drinking—race interactions were overall weaker than in the pooled analysis.

Conclusions Disproportionate intensification of life stresses in Blacks renders them more vulnerable to long-term effects of heavy drinking.

Heavy alcohol consumption in early adulthood can have negative consequences on health1,2 and health behaviours3-10 in later life. Heavy drinking can also adversely affect subsequent work productivity and employment outcomes11-15 and occupational attainment indirectly through its detrimental effect on educational attainment and successful social relationships.14 15

A factor leading to negative life consequences of heavy drinking is race. Whites drink more, on average, than Blacks.16-18 However, heavy-drinking Blacks experience higher levels of alcohol-related problems than do heavy-drinking Whites, measured by alcohol dependence,19 20 social and financial problems20 and heart-disease risk.21 Braun et al21 used data from the first 10 years of Coronary Artery Risk Development in Young Adults (CARDIA), finding that heavy daily drinking in young adult-

METHOD

Sample

CARDIA is designed to assess antecedents of cardiovascular disease risk. CARDIA has collected data on employment, physical measurements, personal activities, personal and family histories and psychological and physiological variables.

During 1985-1986, 5115 persons aged 18-31 were recruited from four US cities—Birmingham, Chicago, Minneapolis and Oakland, CA. At baseline, the study population was balanced by age (18-24, ≥25), sex, race (Black/White) and educational attainment. Participants were reexamined in 1987-1988 (retention rate 90.5%), 1990-1991 (90.8%), 1992-1993 (90.6%), 1995-1996 (78.5%) and 2000-2001 (73.6%). Retention rates did not differ by alcohol or illicit substance use.23
By year 15, retention was 73.6% from inception. Men and Blacks were more likely to have died (p<0.001) and less likely to participate at follow-up (p<0.001). There were no differences in attrition by baseline drinking status.

Analytic approach
We analysed three dependent variables, all for year 15: non-employed (non-employed=1; employed=0); occupational prestige conditional on being employed (range 17–86); and years of schooling completed (range 7–20).

Occupational prestige was measured by a National Opinion Research Centre (NORC) scale. The NORC scale is non-continuous, with scores from 17 for food preparation to 86 for physicians. Higher scores correspond to occupations with increased social standing and (typically) higher salaries.

Explanatory variables were demographic characteristics—Black race, male sex and age; heavy drinking; heavy drinking interacted with Black race; non-employment status and educational attainment. Alcohol consumption was ascertained by requesting information on the number of drinks consumed weekly. We defined heavy drinking at baseline as consumption of ≥21 alcoholic beverages weekly for men and ≥14 for women.3

Latent class analysis
We applied Latent class analysis25 to define plausible classes of psychological distress. A mixture model evaluates the proposition that ≥2 underlying populations are “mixed” in the sample. We hypothesised that there are specific “types” measured by psychosocial and stress variables which differ qualitatively in their problem drinking patterns, beyond what could be predicted by the individual component measures.

The latent classes, selected on the basis of a sample-size-adjusted Bayesian Information Criterion, were compared to drinking behaviour. These classes were then incorporated into the analysis of associations between drinking behaviour and occupational attainment by stratifying the sample according to the inferred psychosocial distress level. Our approach permitted an assessment of whether associations between drinking, race and educational or occupational outcomes are similar within groups defined by psychosocial distress level. The psychosocial variables used in the Latent Class Analysis came from the six CARDIA interview waves. We measured stress, anxiety, depressive symptoms, anger-in, personal control and optimism with instruments administered by CARDIA. Some variables were only measured once. When there was ≥1 measurement, we treated each as a separate variable. We used the Mplus statistical package.26

We measured external stressors from the Life Events Questionnaire, administered in Years 0 and 2, derived from the Psychiatric Epidemiology Rating Interview Life Events Questionnaire.27 The original 102 events, each assigned a weight indicating stress magnitude, were reduced to 67 items by CARDIA. Yes/no responses were elicited for such items as “had problem in school or training program,” “fired from a job” and “started a love affair.” The life stress score was a sum of weights for life events.

We performed multinomial logistic regression analysis to analyse non-employment and ordinary least squares for analysis of occupational prestige and educational attainment. In the analysis of non-employment and occupational prestige, we used two specifications: specification (I) included educational attainment at Year 0; specification (II) included the full set of regressors. To determine the influence the explanatory variables on latent class membership, we regressed group membership on the covariates used in the multinomial logistic analysis. Finally, we repeated the analysis, this time stratifying by latent class membership. The final statistical analyses were conducted using STATA V8.2 (STATA, College Station, Texas, USA).

RESULTS
Nearly 10% of sample persons were not employed at Year 15 (Table 1). Mean occupational prestige was 48.8, roughly
was no statistically significant interaction between race and

was 14.9. At baseline, 6.1% were heavy drinkers and 2.9% were

Years

were lower levels of occupational

experienced lower occupational prestige at Year 15. With

baseline heavy drinkers at Year 15 than did Whites. Black heavy drinkers were

not more likely than White heavy drinkers at baseline to have

experienced lower occupational prestige at Year 15. With

baseline education excluded, both White and Black heavy

drinkers at baseline had lower occupational prestige at Year 15.

However, with baseline education, the parameter estimate on

being a heavy drinker at Year 0

was 24.8. Blacks were

more likely not to be employed at Year 15 (table 2). Heavy­

drinkers at year

were much more likely to be non­

employed at Year 15. However, for Whites, heavy

drinking at baseline was not associated with being non­

employed at Year 15. Blacks had lower levels of occupational

prestige at Year 15 than did Whites. Black heavy drinkers were

not more likely than White heavy drinkers at baseline to have

experienced lower occupational prestige at Year 15. With

baseline education excluded, both White and Black heavy

drinkers at baseline had lower occupational prestige at Year 15.

However, with baseline education, the parameter estimate on

being a heavy drinker, although positive, was not statistically

significant. Heavy drinking at baseline was associated with

lower educational attainment at Year 15 for both races. There

was no statistically significant interaction between race and

heavy drinking at baseline in the analysis of educational

attainment at Year 15. Overall, there is partial support for

a stronger relationship between heavy drinking in young

adulthood and reduced labor market success in mid-life for

Blacks than for Whites.

Latent class analysis

The information criteria (principally the sample-size-adjusted

Bayesian Information Criterion) indicated that a three-class

model was preferred. Three classes yielded a better fit than 2,

albeit at the loss of some statistical power. We retained the

three-class solution (table 3).

The within-class means for each indicator were scaled such that

higher scores indicated greater distress. We assigned the person

to the class for which the probability of membership was highest.

We labeled the first class the “low distress” class, judging from

mean scores on the psychosocial indicators, except for John

Henryism. The “moderate distress” class exhibited mean scores

substantially above all-sample means on all indicators except

John Henryism. The “high distress” class exhibited very high

values relative to the all-sample means for all variables, again

except for John Henryism; 49.7%, 40.4% and 9.9% were in the

low-, moderate- and high-distress classes, respectively.

Differences in mean values among distress groups tend to be

larger for the internal than for the external measures. When

there were values of the same measure from different CARDIA

sets of interviews, patterns were similar but not identical.

Multinominal logit analysis of class membership shows that

baseline heavy drinkers were much more likely to be in the

moderate- than in the low-distress class, the omitted reference

group (table 4). Blacks were much more likely to be in the

moderate and high than in the low-distress group with no

statistically significant interaction between Black race and heavy

drinking.

We further investigated associations between heavy drinking,

race and the interaction of these two characteristics within each

of the three psychosocial distress classes by stratifying the

sample according to psychosocial distress level (table 5). By

stratifying the sample, we could determine whether relationships

between heavy drinking at baseline, race and educational and

labor market outcomes differed when the data were grouped into

relatively homogeneous categories in terms of external and

internal stress.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Summary statistics at Year 0 and Year 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Year 0 Mean</td>
</tr>
<tr>
<td>Heavy drinking</td>
<td>6.1%</td>
</tr>
<tr>
<td>Black</td>
<td>52%</td>
</tr>
<tr>
<td>Black×heavy drinking</td>
<td>2.9%</td>
</tr>
<tr>
<td>Black×non-heavy drinking</td>
<td>49%</td>
</tr>
<tr>
<td>White×heavy drinking</td>
<td>3.2%</td>
</tr>
<tr>
<td>White×non-heavy drinking</td>
<td>45%</td>
</tr>
<tr>
<td>Non-employment</td>
<td>30%</td>
</tr>
<tr>
<td>Years of education at</td>
<td>13.8</td>
</tr>
<tr>
<td>(2.19)</td>
<td>(2.54)</td>
</tr>
<tr>
<td>Occupational prestige</td>
<td>48.8</td>
</tr>
<tr>
<td>Men</td>
<td>46%</td>
</tr>
<tr>
<td>Age at year 0</td>
<td>24.8</td>
</tr>
<tr>
<td>(3.63)</td>
<td>(3.60)</td>
</tr>
<tr>
<td>Observations</td>
<td>5115</td>
</tr>
</tbody>
</table>

When the variable is binary, the mean value is a per cent. Age, occupational prestige and years of education are continuous variables expressed as mean (SD).

*The sample size for Year 0 exceeds that for Year 15 because of sample attrition in the intervening years.

attainments are equivalent to a real-estate agent, sheriff or an insurance

underwriter; mean number of years of schooling completed

was 14.9. At baseline, 6.1% were heavy drinkers and 2.9% were

both Black and heavy drinkers. Mean age was 24.8. Blacks were

more likely not to be employed at Year 15 (table 2). Heavy­

drinker Blacks at baseline were much less likely to be employed

at Year 15 than other Blacks. However, for Whites, heavy

drinking at baseline was not associated with being non­

employed at Year 15. Blacks had lower levels of occupational

prestige at Year 15 than did Whites. Black heavy drinkers were

not more likely than White heavy drinkers at baseline to have

experienced lower occupational prestige at Year 15. With

baseline education excluded, both White and Black heavy

drinkers at baseline had lower occupational prestige at Year 15.

However, with baseline education, the parameter estimate on

being a heavy drinker, although positive, was not statistically

significant. Heavy drinking at baseline was associated with

lower educational attainment at Year 15 for both races. There

was no statistically significant interaction between race and

heavy drinking at baseline in the analysis of educational

Table 2 | Ordinary least squares and multinomial logit analysis of the relationship between educational and labor market outcomes at Year 15 and being a heavy drinker at Year 0 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory variables</td>
<td>Non-employment</td>
<td></td>
<td>Occupational prestige</td>
</tr>
<tr>
<td>Specification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy drinking</td>
<td>1.049</td>
<td>0.995</td>
<td></td>
</tr>
<tr>
<td>(0.474 to 2.330)</td>
<td>(0.450 to 2.202)</td>
<td></td>
<td>(1.18)</td>
</tr>
<tr>
<td>Black</td>
<td>1.693***</td>
<td>1.466**</td>
<td></td>
</tr>
<tr>
<td>(1.298 to 2.210)</td>
<td>(1.120 to 1.919)</td>
<td></td>
<td>(0.51)</td>
</tr>
<tr>
<td>Black×heavy drinking</td>
<td>2.812*</td>
<td>2.632*</td>
<td></td>
</tr>
<tr>
<td>(1.106 to 7.147)</td>
<td>(1.032 to 6.714)</td>
<td></td>
<td>(1.90)</td>
</tr>
<tr>
<td>Non-employment at Year 0</td>
<td>2.247***</td>
<td>2.131***</td>
<td></td>
</tr>
<tr>
<td>(1.757 to 2.874)</td>
<td>(1.864 to 2.728)</td>
<td></td>
<td>(0.584)</td>
</tr>
<tr>
<td>Years of education at Year 0</td>
<td>0.878***</td>
<td>0.822***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.822 to 0.938)</td>
<td></td>
<td>(0.07)</td>
</tr>
<tr>
<td>Men</td>
<td>0.681*</td>
<td>0.677**</td>
<td></td>
</tr>
<tr>
<td>(0.535 to 0.868)</td>
<td>(0.531 to 0.864)</td>
<td></td>
<td>(0.48)</td>
</tr>
<tr>
<td>Age at year 0</td>
<td>0.993</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>(0.962 to 1.025)</td>
<td>(0.977 to 1.043)</td>
<td></td>
<td>(0.07)</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001.

Results shown in the table are the OR and associated 95% CIs (in parenthesis) for non-employment, and coefficient estimates and associated standard errors for occupational prestige and years of education.
Table 5 Multinomial logit and ordinary least squares analysis of non-employment, occupational prestige, and years of education at Year 15 by distress class

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Low-district class</th>
<th>Moderate-district class</th>
<th>High-district class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-employment</td>
<td>Occupational prestige</td>
<td>Years of education</td>
</tr>
<tr>
<td>Heavy drinking</td>
<td>1.644</td>
<td>-0.321</td>
<td>-0.169</td>
</tr>
<tr>
<td></td>
<td>(0.565 to 4.784)</td>
<td>(1.486)</td>
<td>(0.193)</td>
</tr>
<tr>
<td>Black</td>
<td>1.104</td>
<td>2.753***</td>
<td>-2.397***</td>
</tr>
<tr>
<td></td>
<td>(0.886 to 1.778)</td>
<td>(0.704)</td>
<td>(0.899)</td>
</tr>
<tr>
<td>Non-employment at Year 0</td>
<td>1.438</td>
<td>-1.579</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>(0.870 to 2.374)</td>
<td>(0.841)</td>
<td>(0.283)</td>
</tr>
<tr>
<td>Years of education at Year 0</td>
<td>1.015</td>
<td>2.767***</td>
<td>0.868***</td>
</tr>
<tr>
<td></td>
<td>(0.915 to 1.126)</td>
<td>(0.012)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Men</td>
<td>0.384***</td>
<td>-0.342</td>
<td>-0.097</td>
</tr>
<tr>
<td></td>
<td>(0.234 to 0.631)</td>
<td>(0.081)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>Age at Year 0</td>
<td>0.991</td>
<td>-0.612***</td>
<td>-0.157***</td>
</tr>
<tr>
<td></td>
<td>(0.933 to 1.053)</td>
<td>(0.096)</td>
<td>(0.012)</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001.

Results shown in this table are the OR and associated 95% CIs (in parenthesis) for Non-Employment, and coefficients and associated standard errors for Occupational Prestige and Years of Education. The number of persons assigned to the low distress, moderate distress, and high distress classes are 2547, 2105, and 442, respectively.
Heavy drinking at baseline decreased educational attainment at Year 15, but heavy drinking is only negative and statistically significant for the moderate distress class in table 5 and, for this class, about the same in magnitude as in table 2.

In comparing the stratified with non-stratified outcomes between tables 2 and 5, it appears that some of the association between racial differences in early-life alcohol consumption and attainment in mid-life is channeled by the disproportionate membership of Blacks in the moderate and high-distress psychosocial classes. After stratification, some disadvantage of Blacks relative to Whites remains, but stratification largely eliminates the disadvantage of Black heavy drinking and heavy drinking more generally at baseline on occupational and educational outcomes at mid-life.

**DISCUSSION**

Our analysis yielded several important findings. First, especially for Blacks, early-adult heavy drinking was associated with a lower probability of being employed in mid-life. Conditional on being employed, there was a link between Black race and decreased occupational prestige at mid-life, even after controlling for educational attainment at baseline. For educational attainment by mid-life, there were associations between heavy youthful drinking and Black race and diminished educational attainment. However, there were no race-specific differences in the association between heavy drinking in early adulthood and lower subsequent educational attainment.

Second, individuals could be grouped into three distinct distress classes based on both external and internal stressors. Blacks were more likely to belong to higher distressed classes. Mixture modeling yielded groups of individuals that were relatively homogeneous in terms their degree of distress.

Third, stratifying by distress class, relationships between heavy drinking and heavy drinking—race interactions became weaker overall. Although Black race still placed a person at a disadvantage in occupational and educational attainment at mid-life, the associations were not as strong in the stratified analysis.

The nature of the mediating or cause-effect relationships is subject to alternative interpretations. First, heavy drinking at Year 0 may actually increase the likelihood that an individual subsequently entered the moderate distress class. A second interpretation is that early-adult heavy drinking does not change a person’s distress level, but a previously high level of distress may cause heavy drinking in early adulthood, may be correlated with distress at mid-life and directly affect labor market outcomes at mid-life. If so, heavy drinking at Year 0 is a compensating mechanism for psychosocial distress already operating at Year 0. If there is a unique long-term heavy-drinking disadvantage for Blacks, it probably reflects greater exposure of Blacks to stressful life conditions.

Our study has several strengths: use of longitudinal data; balanced samples of Whites and Blacks; sampling of persons in four geographic locations in different US regions and use of mixture modeling.

We acknowledge several study limitations. First, we assumed that several psychosocial variables were person-specific and time invariant. For those few measures for which there were several measurements, there was similarity in mean values from different interviews which supports the time invariant assumption. Second, we only measured alcohol consumption. Other behaviors (e.g., drug abuse) may have importantly influenced outcomes at mid-life. Various comorbidities (e.g., various forms of mental illness) may be correlated with alcohol consumption early in life. Although by including covariates for comorbidities at baseline, one might over-adjust for these other factors, by excluding such variables, we may have under-adjusted for their influence. However, it is not clear that these comorbidities would affect the relative importance of early alcohol consumption as related to mid-life outcomes for Blacks as opposed to Whites.

Third, while having a 15-year follow-up is important, many pertinent events plausibly occurred between the baseline year and Year 15. Further, our analysis was not structured to examine changes in drinking behaviour. Future trajectory-oriented analyses may permit additional inferences.

Fourth, CARDIA is not strictly nationally representative. Fifth, given the small size of the high-distress class, there was insufficient power to draw firm conclusions regarding the relationship between early heavy drinking and subsequent outcomes among such persons. This class was disproportionately comprised of Black women who exhibited relatively lower rates of drinking. When coupled with the greater likelihood of all women to simultaneously function as caretakers and breadwinners, this raises the possibility that Black women differ from other high distress class race-sex groups in alcohol consumption and psychosocial distress.

In sum, heavy drinkers in early adulthood are at risk of achieving lower labor market success at mid-life, and overall, the relationships seem to be stronger for Blacks than for Whites. Although drinking patterns are related to external and internal distress, causal pathways among distress, heavy alcohol use and labor market outcomes remain to be documented.

**What this study adds**

Heavy drinking in early adulthood has been linked to lower educational attainment at mid-life for Blacks but not for Whites. This study shows that Blacks are more subject to psychosocial stress early in the adult life course than are Whites, and at least part of the difference in the longitudinal relationships between heavy drinking and subsequent life outcomes is attributable to greater psychosocial distress among Blacks.

**REFERENCES**


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Alcohol worksites.

Adults (CARDIA)


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