Published in final edited form as:
J Psychoactive Drugs. 2013 ; 45(3): 249–257.

Developmental Trajectories of Alcohol Use Among Monoracial and Biracial Black Adolescents and Adults

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Abstract

Objective—The present study investigates developmental trajectories of alcohol use from early adolescence to adulthood by age and race/ethnicity among White, Black, Black-American Indian, Black-Hispanic, and Black-White individuals and associated sociodemograhphic correlates.

Method—We used a subsample of nationally representative data obtained from the National Longitudinal Study of Adolescent Health (Add Health). The analytic sample consisted of 15,278 individuals in Wave 1 (ages 11 to 21 years). The sample consists of adolescents who were in Grades 7 – 12 at wave one and who were followed across four waves of data collection into adulthood. Respondents could report more than one race/ethnicity.

Results—We find distinct alcohol trajectories among monoracial and biracial/ethnic Blacks with all groups showing a cross-over or catch-up effect. Black-White adults demonstrated a cross-over effect by surpassing the alcohol drinking rates of Whites in adulthood, Black-American Indians showed a within-group catch-up effect by surpassing the alcohol drinking rates of monoracial and biracial/ethnic Blacks in adulthood, and monoracial Blacks were most likely to be nondrinkers in adulthood. We also show gender, socioeconomic status, and household structure differences in impact on alcohol use among monoracial and biracial/ethnic Blacks.

Conclusions—Significant heterogeneity is observed regarding alcohol trajectories between monoracial and biracial/ethnic Blacks.

Keywords

drinking; substance use; patterns; racial; ethnicity; multiracial; alcohol use; alcohol trajectory

Heavy alcohol consumption by adolescents and young adults is associated with a number of health risks, including increased risk of later alcohol use and abuse (Gruber et al. 1996; Kosterman et al. 2000), automobile accidents and related deaths (Chassin, Pitts & Prost 2002; Hill et al. 2000), and sexual behaviors that increase risk for sexually transmitted infections (STIs) and HIV (Anderson et al. 2009). Because of their smaller physical size, children and adolescents are more vulnerable to the effects of alcohol than are adults. In addition, adolescents may be more prone to the consumption of large quantities of alcohol because of their inexperience with assessing and regulating their alcohol consumption as

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well as the incomplete development of the prefrontal cortex, which is the region of the brain responsible for decision making (Stano 2011).

Tracing the developmental trajectories of substance use enables researchers to track substance use across multiple time points and to determine variations in the timing and intensity of that use. In studying substance use, developmental trajectories can be useful for determining the origins and consequences of alcohol problems, facilitating early identification of problem alcohol use, and guiding the development of prevention programs (Maggs & Schulenberg 2004). The purpose of the current study is to examine the developmental trajectories of substance use among monoracial and biracial Black adolescents and young adults.

Alcohol use has systematic age-related trends with peak consumption and abuse occurring in emerging adulthood (18 to 25 years; Chassin et al. 2002; Maggs & Schulenburg 2004). These trends include alcohol use initiation during early adolescence, an increase in alcohol use in adolescence and emerging adulthood, and a decrease in alcohol use during adulthood as individuals assume adult roles and responsibilities (Bachanas et al. 2002; Bachman et al. 2002). For some adolescents, the patterns of use (or nonuse) that develop during adolescence are indicative of later drinking behaviors. For example, using mixture modeling, Chassin et al. (2002) identified three trajectory groups of binge drinkers: (a) early onset/high frequency, (b) later onset/moderate frequency, and (c) infrequent binge drinkers; A fourth category was identified for nonbinge drinkers. The early onset/high frequency trajectory group had the greatest risk for diagnosis of drug abuse and dependence during emerging adulthood, with an increased risk for males. The nonbinge drinkers had the lowest risk for later diagnosis of drug use and dependence.

Variations in timing and intensity of alcohol consumption are correlated with several sociodemographic variables. Research has indicated that individuals who are heavy drinkers during emerging adulthood are more likely to report early heavy drinking, have parents with greater alcohol use or alcoholism, be male, and not live with both biological parents (Caswell, Pledger & Pratap 2002; Chassin et al. 2002; Hill et al. 2000; Schulenberg et al. 1996; White, Johnson & Buyske 2000). Given the findings of racial/ethnic differences in alcohol use and consequences of use, researchers have begun to examine racial/ethnic differences in trajectories of alcohol use. The current study extends previous research by examining antecedents and patterns of use across multiple racial groups as well as a large sample of biracial adolescents.

Cross-sectional studies of alcohol use have found that African American adolescents had lower alcohol use than White adolescents (Hawkins, Catalano & Miller 1992; Wallace & Muroff 2002). Examinations of developmental trajectories of alcohol use have not only revealed differences in patterns of alcohol use for White and African American adolescents but also substantial within-group variation (Flory et al. 2006). Flory et al. found that African American adolescents were more likely to be categorized in later onset (initiation of use in the 8^{th} or 9^{th} grade that increased over time) and abstinence groups. The researchers found that early onset of alcohol use (6^{th} or 7^{th} grade) was associated with the highest alcohol consumption by age 20 for both African Americans and Whites. African American and White adolescents in the late onset groups also demonstrated similar patterns of use by age 20.

In an examination of substance use trajectories of Black and White young men, Lee et al. (2010) found that young Black men were less likely to engage in alcohol use than young White men, with this gap increasing over time. The researchers also found that although the

Black participants reported fewer drinks on their drinking occasions, the Black participants' frequency of use increased at a more rapid rate than the White participants.

These findings appear somewhat contradictory; however the current body of literature on developmental trajectories of alcohol use creates challenges for drawing conclusions because of its varied use of control variables, population of study (i.e., men only vs. both genders), and examination of alcohol use pattern types. This suggests an increased need for understanding the onset, prevalence, and transitions in alcohol use across and among racially and ethnically diverse groups of adolescents. Given the disproportionate alcohol-related consequences experienced by Blacks, further study is warranted that examines alcohol use patterns among and within the Black population. Studies thus far have been limited by the use of racial comparison strategies that examine Black versus White differences and sample sizes that are too small to examine differences across and within multiple racial/ethnic groups including biracial individuals. Despite the growing population of biracial adolescents in the United States, few studies have examined alcohol use among biracial adolescents. Assumptions based on predominantly White samples of adolescents about the antecedents of alcohol use and nonuse may not apply to biracial and monoracial Black, Hispanic, American Indian, and Asian adolescents.

Research Aims

1. To describe patterns of alcohol use from early adolescence to adulthood by age and race/ethnicity among (a) White, (b) Black, (c) Black-American Indian, (d) Black-Asian, (e) Black-Hispanic, and (f) Black-Whites; and,
2. To identify sociodemographic correlates (i.e., family income, household structure) of alcohol-use trajectories among racial/ethnic groups.

Method

Study Design and Sample

Add Health is an ongoing nationally representative, longitudinal study of adolescent and young adult health in the United States. Add Health began with a stratified random sample of 80 U.S. high schools and 52 middle schools consisting of students in Grade 7 through Grade 12. The sample of schools was representative of U.S. schools with respect to region, urbanicity, race/ethnicity, school type, and size. Add Health followed students across four waves of data collection, from adolescence into young adulthood. Wave 1 data were collected in 1994–1995, Wave 2 in 1996, Wave 3 during 2001–2002, and Wave 4 during 2007–2008. Additional details of the Add Health study are available elsewhere (Harris et al. 2011). This study was approved by the University of North Carolina at Chapel Hill's institutional review board.

Analysis Sample

The analytic sample consisted of 15,278 individuals in Wave 1 (ages 11 to 21 years). Most of these respondents were followed from youth into young adulthood, contributing measures of alcohol use at all four waves. Wave 2 data were obtained from 10,939 of the sample individuals (ages 12 to 22 years); Wave 3 data were obtained from 11,320 of the sample (ages 18 to 28 years), and Wave 4 data were obtained from 11,902 of the sample (ages 24 to 35 years). Among Wave 1 respondents, 48.8% of the sample was male and the gender ratio was similar across all the waves. Among Wave 1 respondents, 4,391 respondents self-identified as Black, 85 self-identified as Black-American Indian, 26 self-identified as Black-Asian, 154 self-identified as Black-Hispanic, 135 self-identified as Black-White, and 10,487 self-identified as White.

Measurement of Dependent Variables

Drinking—In all four waves of the Add Health survey, participants responded to an item that assessed the number of days they drank alcohol during the past 12 months. Participants had to choose one of the following seven response options: *none; 1or 2 days; once a month or less; 2 or 3 days a month; 1 or 2 days a week; 3 to 5 days a week*; or *every day or almost every day*. Thus, the dependent variable was an ordinal variable that measured the self-assessed number of days in the previous year that each respondent drank alcohol.

Measurement of Independent Variables

Race/ethnicity—Participants' race/ethnicity identification was assessed using self-reports for an item asked in Waves 1 and 3. We used the Wave 3 measure of race/ethnicity for all individuals interviewed in Wave 3, and the Wave 1 measure for individuals who were not interviewed again at Wave 3. Respondents were able to choose multiple racial/ethnic categories, and we created categories for biracial identifications. For example, we created a variable that allowed us to observe respondents who identified as *Black alone* (i.e., monoracial Black) and respondents who identified as *Black and another race/ethnicity*. We considered monoracial Black and monoracial White categories and four major biracial categories: Black-Asian, Black-American Indian, Black-Hispanic, and Black-White. To avoid confusion, we refer to biracial identification with hyphenated categories in text, such as Black-White.

Socioeconomic background—We examined the effect of family socioeconomic status (SES) at Wave 1. SES was measured by the total reported parental income at Wave 1, which was assessed through the parent questionnaire. Family income was divided into four categories: (a) lower income ($0–$15,999); (b) lower middle-income ($16,000–$34,999); (c) upper middle-income ($35,000–$60,000); and (d) upper income (incomes above $60,000). This variable had a large number of missing observations because many respondents did not have a parent or guardian complete the parent survey. These observations are grouped in another category of SES denoting nonresponse, and SES is treated as a five-category nominal variable in the logistic regressions.

Age and Gender—Age was computed by taking the difference between the adolescent birth date and the interview date in each wave, rounded to the nearest whole number. For example, the highest age value was 34.6, which was rounded to 35 years. As with race/ethnicity and SES, we did not allow discrepancies across the waves regarding the reported birth date and gender; therefore, we used the birth date and gender reported in the latest wave in which the respondent was interviewed.

Household structure—The household structure question assessed whether the respondent lived with two biological parents. The variable was coded based on the respondent's household roster as reported in Wave 1.

Controls—The variables for *wave fixed effects, region* (West, Midwest, South, and Northeast)*, community type* (urban, suburban, and rural)*, household size,* and *immigrant* (whether the respondent was born in the United States) were used as controls in all statistical models and were assessed at Wave 1. In the statistical models, the data were pooled and individual dummy variables were included for each wave (excluding Wave 1 as a reference category) to remove the global temporal variation in the data.

Statistical Analysis

All analyses were computed using Stata version 11.0. The first statistical analysis examined patterns of alcohol use and the ways in which those patterns are influenced by race/ethnicity and gender. Because the explanandum is an ordinal variable, we used an ordinal logistic regression in which the main predictor was race/ethnicity interacted with age and other social demographic predictors. We controlled for wave fixed effects. Stata 11 was unable to estimate levels of drinking for the Black-Asian group because of the small sample size. Hence, this racial category is omitted.

Results

Alcohol Patterns by Biracial Categories

To develop a substantive understanding of the effect of the interactive terms, Figures 1 through 5 graph patterns of alcohol use coded as a seven category variable. In substantive terms, these figures graph the probability of individuals from each racial category being in each of the seven categories of alcohol use.

Figure 1 presents a graph of patterns of alcohol use by age and race/ethnicity coded as a six category variable. Unsurprisingly, alcohol use increases with age for all race/ethnicities; however, differences in the patterns of alcohol use with age emerge across race/ethnicities. For all age categories, Whites are the least likely racial/ethnic group to be nondrinkers (i.e., zero days of drinking). In contrast, Black-American Indians are the most likely to be nondrinkers up to age 25 years, at which point their nondrinker status is surpassed by monoracial Blacks. At age 25 years, Blacks are more likely to be nondrinkers than other racial/ethnic groups. Moreover, between ages 25 and 35 years, Blacks have the highest probability of all racial/ethnic groups of being nondrinkers. At age 35 years, all race/ethnicities, with the exception of Whites, are more likely to be nondrinkers than Black-American Indians. In addition, Black-Hispanics of all ages are more likely to be nondrinkers than Black-Whites but less likely to be nondrinkers than Blacks.

A similar pattern emerged for the probability of being heavy drinkers, which is defined by self-reports of drinking alcohol every day or drinking 3 to 5 days a week. Respondents who identified as Black-American Indian were the least likely to be in either of the two categories of heavy drinkers between 11 and 17 years of age. However, among 17 to 35 year olds, Blacks were the least likely to be heavy drinkers, whereas Black-American Indians were the second least likely racial/ethnic group to be heavy drinkers. Whites at all ages were the most likely to report drinking 3 to 5 days a week. Black-Whites between 27 and 35 years of age had the highest probability of all racial/ethnic groups of drinking every day. Whites and Black-Whites were the most likely racial/ethnic groups to report heavy drinking, with Whites being more likely to be heavy drinkers when young. The racial/ethnic groups that were least likely to be heavy drinkers were Blacks, followed by Black-American Indians. Black-Hispanics fell in the middle of the continuum.

Gender

Figures 2 and 3 illustrate drinking trajectories across race and gender. No clear differences in alcohol trajectories across gender emerge before 19 years of age. After age 19, the differences between males' and females' alcohol use continue to grow with males in each racial/ethnic category being more likely to drink every day than their female counterparts. We found a similar age and gender trend among nondrinkers. After age 19 years, females in all racial/ethnic categories were more likely than males to be nondrinkers. Among males, Black-White males rates of drinking increased over time and increased at a greater rate than other racial groups between ages of 23 and 35. At 35 years, a Black-White male has a .25

probability of drinking every day of the month whereas a White male has a .16 probability of drinking every day of the month. By comparison, at 35 years of age Black-American Indians have a .07 probability of drinking every day of the month, and Black males have a .05 probability, which was the lowest probability of daily alcohol consumption.

Family Income

Interesting patterns emerged when we examined the interaction of race/ethnicity with family income (see Figure 4). First, the amount of alcohol use increases among Whites at higher income levels. The probability that a White respondent was a nondrinker decreased at each higher level of income. Similarly, among Whites, the probability of heavy drinking increased as the household income level increased. Blacks follow a similar pattern of increased drinking at higher income status. For Blacks with incomes of less than $16, 000, the probability of being a nondrinker was .61, whereas for Blacks with incomes greater than $60,000 that probability decreased to .46. Likewise, a Black respondent's probability of drinking every day increased from .006 to .012 when income rose from the lowest level (< $16,000) to the highest income level (>$60,000).

In contrast, Black-American Indians showed the highest levels of alcohol consumption at lower income levels. A Black-American Indian respondent with income of less than $16,000 had a .37 probability of being a nondrinker whereas a Black-American Indian respondent at the highest income level had a .67 probability of being a nondrinker. Similarly, for Black-American Indians the probability of drinking decreases from .023 at the lowest income level to .005 at the highest income level. Interestingly, Black-Hispanics display a curvilinear relationship between level of income and drinking habits. Thus, Black-Hispanics are most likely to be nondrinkers at both the lowest and highest levels of family income. Similarly, Black-Hispanics at the lowest and highest income levels are least likely to report heavy drinking.

Family Household Structure

Last, we examined the interaction of race/ethnicity with family structure. As illustrated in Figure 5, the results of this interaction present a mixed picture. The variable for *living with two biological parents* had a statistically significant effect (95% confidence) on drinking behavior for Black-Whites respondents only, indicating that Black-White respondents who lived with both parents were less likely to drink. A Black-White adolescent who lived with both biological parents has a .6 probability of being a nondrinker as compared with the .32 probability of his Black-White counterparts who did not live with both biological parents. A similar effect was found for heavy drinking. Black-White adolescents who lived with two biological parents had a .03 probability of drinking 3 to 5 days a week and a .008 probability of drinking daily. For Black-White respondents who did not live with two biological parents, the probability of drinking 3 to 5 days a week was .09 and the probability of daily drinking was .03.

Discussion

Researchers have established that racial/ethnic differences exist in the prevalence of alcohol use. However, we know less about developmental patterns of alcohol use among Black adolescents and how such patterns differ from those of adolescents in other racial/ethnic groups. Further, because most research has focused on monoracial/ethnic groups, we know even less about the developmental trajectories of alcohol use among biracial populations. The current study is one of the first efforts that describe patterns and sociodemographic correlates of alcohol use from early adolescence to adulthood among White, Black, Black-American Indian, Black-Hispanic, and Black-White youth.

Consistent with previous research, we found that alcohol use increases with age for all monoracial and biracial groups (Substance Abuse and Mental Health Services Administration [SAMHSA] 2011). This study extends previous research with findings that distinguish the ways in which alcohol patterns differ over time among specific monoracial and biracial groups. Our findings were consistent with those of other researchers who have examined patterns of substance use among Blacks and found that although substance use was lower among Black adolescents as compared with White adolescents, the rates of substance use among Blacks surpassed the rates of Whites during young adulthood (Geronimus, Neidert & Bound 1993; Kandel et al. 2011). Geronimus & colleagues (1993) labeled this phenomenon the *catch-up* or *cross-over effect*. We also found that only the alcohol consumption of Black-White individuals surpassed drinking rates of Whites in adulthood while all other groups approached but did not surpass Whites' rates of alcohol use. Interestingly, Black-American Indians were the racial/ethnic group that was the most likely to be nondrinkers during adolescence and young adulthood up to age 25 years when they gradually became most likely to be drinkers than all other racial/ethnic groups with the exception of Whites, thus demonstrating a *within group crossover effect.* It is possible that the patterns of alcohol use are affected by the blending of cultures. For example, perhaps adolescents who identify as Black-American Indian drink less during adolescence, which is typical of Black adolescents and drink more in adulthood, which is typical of American Indians. An alternative explanation of the observed within group cross-over effect is that this phenomenon has existed in previous studies and has influenced the cross-over and catch-up effects that other researchers (e.g., Geronimus et al.1993; Kandel et al. 2011) have observed and reported for aggregated Blacks. (Further study is warranted to clarify developmental trajectories and define drinking phenotypes among monoracial and biracial populations.)

We also found that monoracial Blacks were most likely to be nondrinkers in adulthood. This finding has important implications for the interpretation of research findings because, too frequently, researchers aggregate Black study samples (as well as other racial/ethnic groups) with the assumption that Blacks (and other racial/ethnic groups) can be treated as a monoracial group. However, this study has shown that substantial differences can exist among a Black study sample composed of biracial subgroups. Further, researchers should seek to understand and decipher the puzzle of the catch-up and cross-over effect among Blacks by continuing to examine within group heterogeneity.

We found that Whites and Black-Whites had significantly higher probabilities of being heavy drinkers than Blacks, Black-American Indians, and Black Hispanics. The higher probability of Whites being heavy drinkers is consistent with previous research (e.g., SAMHSA 2011). However, the finding that Black-Whites had the second highest probability of heavy drinking differed somewhat from previous findings that reported multiracial individuals had the third highest probability of heavy drinking and American Indians had the second highest probability of heavy drinking (SAMHSA 2011). Nevertheless, the current study extends previous research, including SAMHSA's findings on racial/ethnic differences in heavy drinking, because our finding distinguish among the multiracial groups that may be at higher risk of heavy drinking. Specifically, we found Black-White respondents were more likely to report heavy drinking than monoracial Blacks, or biracial Black-American Indians or Black-Hispanics. In general, given that our findings indicate that Black-White adults were the only group to surpass the drinking rates of White adults and our findings indicate that Black-White adults were more likely to report heavy drinking than monoracial or biracial Blacks. Our findings suggest that Black-White adolescents and adults may be at greatest risk of alcohol use. Given the small biracial sample size of the current study, these findings are preliminary and should be replicated with a larger sample size. Further study is also warranted to understand the prevalence and sequale of alcohol use among Black-White populations. Consistent with findings of alcohol

use during the past 30 days, we found that monoracial Blacks were least likely to be heavy drinkers during adulthood. In addition, our findings were also consistent with findings of alcohol use during the past 30 days that showed Black-American Indians were least likely to be heavy drinkers during adolescence. Contrary to alcohol use findings, Black-American Indians continue to have a lower prevalence of heavy drinking during adulthood. The present study has several salient strengths, including its developmental approach and focus on monoracial and biracial Blacks. In addition, we used Add Health data, a national study that used a stratified randomized sample and followed a racially and ethnically diverse sample of adolescents across four waves of data collection into adulthood. Further, Add Health allowed respondents to self-identify race/ethnicity and to select as many races/ethnicities as they wished. As a result, most biracial categories contain enough observations to conduct statistical inference.

Notwithstanding these strengths, our study has limitations. We aggregated Hispanics (e.g., Cubans, Puerto Ricans), Blacks (e.g., African Americans, Afro-Caribbeans), and Asians (e.g., Koreans, Chinese) into single categories despite their diversity because of sample size issues. In addition, although individuals were allowed to self-report their race/ethnicity, an additional method of triangulating race would have been to pose a question asking respondents to report the race/ethnicity of each biological parent. Our power estimates revealed that we had low power for some comparisons (i.e., Black-Asians) and high power for other comparisons. Therefore, these findings should be considered preliminary and replicated with a larger sample size. We also relied solely on adolescent self-reports and did not validate the alcohol drinking data with biochemical screening tests. In addition, we focused on sociodemographic correlates of alcohol patterns. An important next step would be to assess process variables such as family closeness and quality of relationships with family members in relation to alcohol trajectories.

Despite these limitations, these results highlight the importance of considering racial/ethnic heterogeneity, particularly substance use onset and growth over time in biracial populations. Our findings raise several important questions about the epidemiology and etiology of substance use among monoracial and biracial Blacks that suggest a need for further study. An important next step is to identify the risk and protective factors underlying these differences in alcohol trajectories. Future studies should also explore racial/ethnic group heterogeneity by examining heterogeneity in substance use trajectory categories among youth and variables that may be associated with trajectory category membership. Given the racial/ethnic differences found in the present study and findings that suggest that multiracial individuals are at elevated risk for engaging in problem behaviors, further study is warranted to gain a better understanding of this population, which should enable researchers and practitioners to better target interventions.

Acknowledgments

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

This study was supported by a Junior Faculty Development Award, Office of the Executive Vice Chancellor and Provost, University of North Carolina at Chapel Hill and a University Research Council Research Grant, Office of the Vice Chancellor for Research and Economic Development, University of North Carolina at Chapel Hill awarded to the first author of this article.

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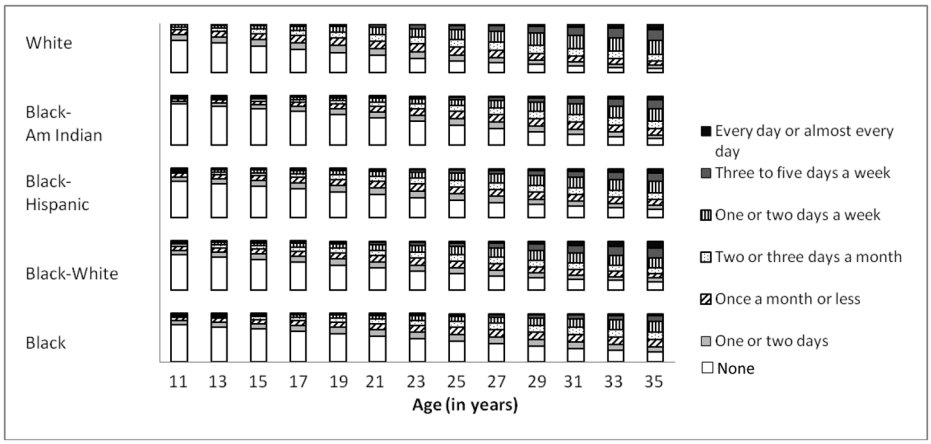

Figure 1.

Relationship between race, age and drinking habits.

Note: The figure graphs the probability of being in each of the seven categories (i.e., number of days of alcohol use in the last 12 months) at different ages.

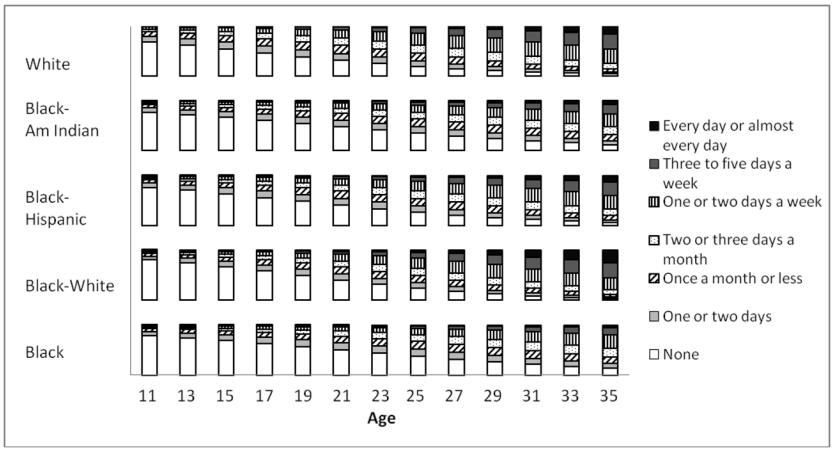

Figure 2.

Relationship between race, age and drinking habits among males.

Note: The figure graphs the probability of being in each of the seven categories (i.e., number of days of alcohol use in the last 12 months) at different ages.

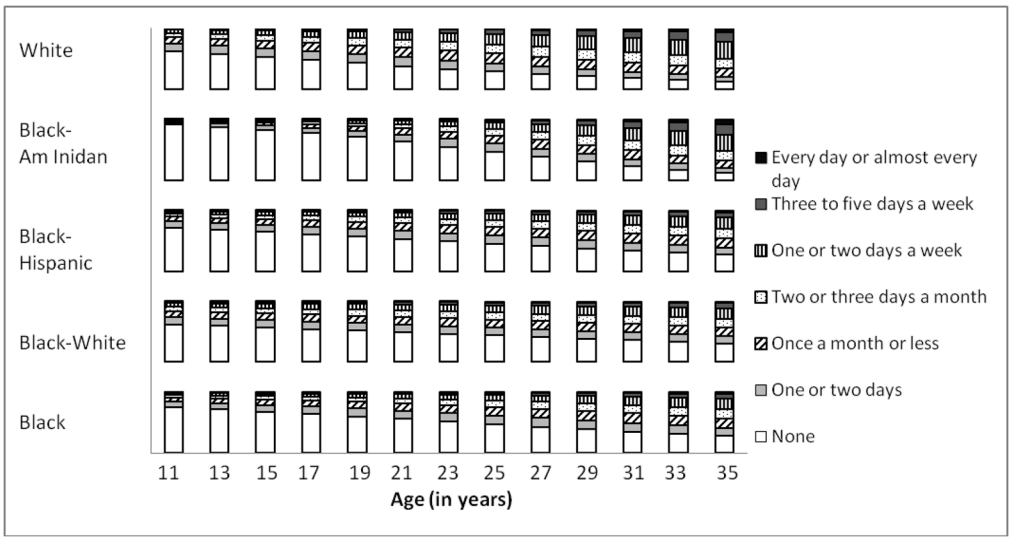

Figure 3.
Relationship between race, age and drinking habits among females.
Note: The figure graphs the probability of being in each of the seven categories (i.e., number of days of alcohol use in the last 12 months) at different ages.

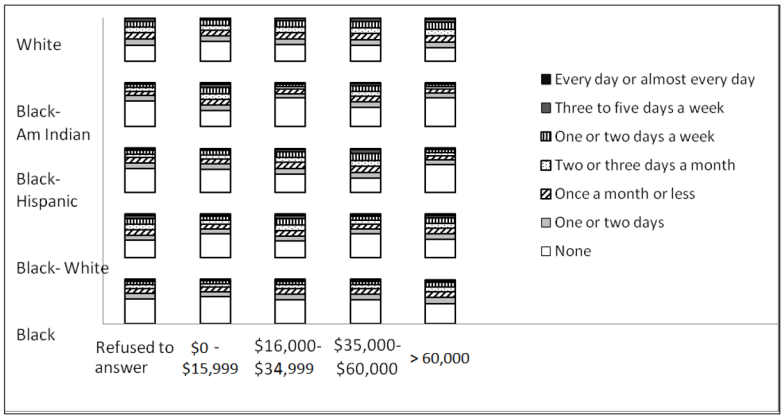

Figure 4.

Relationship between race, social economic status and drinking habits.

Note: The figure graphs the probability of being in each of the seven categories (i.e., number of days of alcohol use in the last 12 months) at different ages.

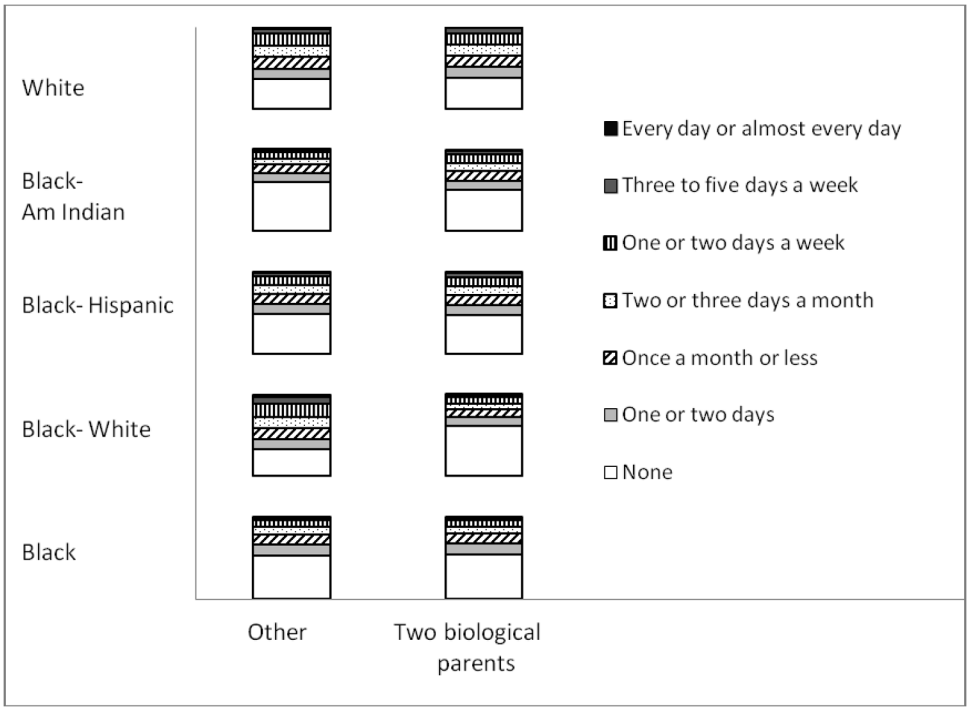

Figure 5.
Relationship between race, family structure and drinking habits.
Note: The figure graphs the probability of being in each of the seven categories (i.e., number of days of alcohol use in the last 12 months) at different ages.