Epidemiology of Drug Use among Biracial/Ethnic Youth and Young Adults: Results from a U.S. Population-Based Survey

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Abstract

This study estimates the prevalence of cigarette, alcohol, and marijuana use in a nationally representative sample of monoracial/ethnic and biracial/ethnic youth and young adults. The authors consider 16 racial/ethnic categories and used four waves of data from the National Longitudinal Study of Adolescent Health. The analysis sample consists of 20,745 individuals in Wave 1. The primary statistical methodology used in the present study is logistic regression with sample weights. Findings suggest that participants who self-report two races/ethnicities have prevalence rates that are intermediate to those of the two corresponding monoracial/ethnic rates. For example, Black-American Indians reported cigarette smoking rates that were significantly lower than rates reported by American Indians but significantly higher than rates reported by Blacks. Groups with the highest prevalence of cigarette smoking at Wave 1 were American Indian, White-American Indian, White, and Multiracial (people reporting three or more races/ethnicities). Groups with the highest prevalence of alcohol drinking at Wave 1 were White-American Indian, Multiracial, Hispanic, White, and White-Hispanic. Groups with the highest prevalence of marijuana smoking at Wave 1 were Black-Asian and American Indian. The authors found an interaction effect between race/ethnicity and socioeconomic status. Lower-class SES status may serve as a risk factor for biracial/ethnic adolescents while upper-class SES may serve as a protective factor for these youth. In general, biracial/ethnic individuals have prevalence rates that are intermediate to those of the two corresponding monoracial/ethnic rates.

Keywords

adolescents; biracial/ethnic; minority; substance use

The prevalence of drug use varies in the United States by race/ethnicity. For instance, in 2009, among individuals aged 12 or older, Whites were more likely to report current alcohol use (57%) than were individuals who identified as two or more races/ethnicities (48%), Black (43%), Hispanic (42%), Asian (38%), or American Indian or Alaska Native (37%;

Substance Abuse and Mental Health Services Administration [SAMHSA] 2010). Moreover, the consequences of drug use vary by race/ethnicity such that minorities are more likely to experience adverse drug-related health and social consequences as compared with Whites. For example, American Indians/Alaska Natives had an alcohol-induced mortality rate of 43.0 per 100,000 persons compared with 7.0 per 100,000 persons across all others in the United States in 2005 (Indian Health Service 2006). In addition, despite lower substance use prevalence rates, Blacks tend to experience more adverse substance use and misuse-related social and health consequences, such as higher criminal justice involvement and HIV/AIDS than Whites (Ellickson & Morton 1999; Wallace & Muroff 2002).

Despite the nation's growing demographic diversity (Marcera, Armstead & Anderson 2001), the prevalence and sequelae of drug use among multiracial and ethnic groups are poorly understood. Given that racial/ethnic minorities, notably Hispanics, are projected to be the U.S. majority population by 2050, obtaining national estimates of the prevalence of drug use among monoracial/ethnic and biracial/ethnic individuals is warranted. Multiracial individuals have unique experiences and challenges that continue to be unaddressed (Center for the Study of Biracial Children 2011). Multiracial youth often face unique conflicts related to racial/ethnic identity, social marginality, educational and occupational aspirations, and defense mechanisms and coping strategies that are likely due to membership in more than one racial or ethnic group (Gibbs & Huang 1998). The literature further suggests that because of struggles with identity formation, which leads to low self-esteem and social isolation, multiracial individuals may be at high risk of emotional, health, and behavior problems (Root 1998; Lyles et al. 1985). A critical step toward identifying population groups that may be at elevated risk for drug use is the dissemination of findings that highlight the varying prevalence of drug use by monoracial/ethnic and biracial/ethnic groups. Such findings have potential important implications for the design of preventive interventions.

The purpose of this exploratory study is to estimate the prevalence of lifetime cigarette, alcohol, and marijuana use in a nationally representative sample of monoracial/ethnic and biracial/ethnic youth and young adults in the United States. To our knowledge, this is the first study to offer a national prevalence estimate of drug use comparing monoracial/ethnic and biracial/ethnic individuals. As compared with studies that use purposive and, typically, smaller sample sizes, population-based studies provide more accurate and representative prevalence estimates. We used the National Longitudinal Study of Adolescent Health (Add Health) data for this investigation and examined (a) similarities and differences in prevalence of lifetime cigarette, alcohol, and marijuana use among monoracial/ethnic and biracial/ ethnic individuals; and (b) whether the prevalence differs with socioeconomic status.

METHOD

Study Design and Sample

Add Health is a nationally representative, population-based longitudinal study of the health behaviors of adolescents and young adults in the United States. Add Health selected 80 U.S. high schools and 52 middle schools for study inclusion. These schools were selected through a stratified random sampling process that yielded a sample of schools that was representative

of U.S. schools with respect to region, urbanicity, race/ethnicity, school type, and size. A cohort of consenting adolescents were followed into young adulthood. In addition to written assent of participating minors, written parent/guardian consent forms were obtained for minors; only written consent forms were obtained for participating adults (18 years and older). Four waves of data were collected: Wave 1 in 1994–1995, Wave 2 in 1996, Wave 3 during 2001–2002, and Wave 4 during 2007–2008. Details of the Add Health study can be found elsewhere (Harris et al. 2009).

Analytic Sample

The analytic sample consists of 20,745 individuals in Wave 1. Many of these respondents were followed from youth into young adulthood, contributing measures of drug use at all four data waves. Wave 2 data were obtained from 14,738 of the sample individuals; Wave 3 data were obtained from 15,197 of the sample, and Wave 4 data were obtained from 15,701 of the sample. In Wave 1, nearly half (49.4%) the sample was male; in Wave 2, males represented 48.7% of respondents; in Wave 3, males represented 47.2% of respondents; and in Wave 4, males made up 46.8% of the sample.

Measurement of Dependent Variables

Drug use.—Participants responded to three items that assessed whether they had ever smoked cigarettes, consumed alcohol, or smoked marijuana. For example, one item asked, "Have you ever tried cigarette smoking, even just one or two puffs?" The alcohol item asked, "Have you had a drink of beer, wine, or liquor—not just a sip or taste of someone else's drink—more than 2 or 3 times in your life?" The marijuana item asked, "During your life, have you ever used marijuana?" All three measures are binary, where 1 indicates the subject has used the substance and 0 indicates that the subject has never used the substance.

In wave 2, all three questions are qualified to refer only to the time interval that has passed between the wave 2 and wave 1 interviews. The wave 2 variables are recoded to 1 if the wave 2 variable is 0, but the wave 1 variable is In addition, the drinking and marijuana variables refer to the time period that has passed since June 1995, which was during the middle of the wave 1 interviews. Like wave 2, wave 3 is recoded to 1 if the wave 1 variables are 1 and the wave 3 variables are 0. Whether or not the subject has ever used marijuana is asked directly in wave 4. In wave 1, the subject was asked their age when they first tried marijuana, with "never tried" as an option. The wave 1 variable is recoded so that never tried is 0 and every other response is 1.

Measurement of Independent Variables

Race/ethnicity.—We created categories for biracial/ethnic identifications. Respondents were able to self-identify with multiple racial/ethnic categories on the survey. For example, we were able to observe respondents who identified as *Asian alone* and respondents who identified as *Asian and another race*.

Race/ethnicity identification was asked of adolescents in Waves 1 and 3. We used the Wave 3 measures of race/ethnicity for all individuals interviewed in Wave 3, and we used the Wave 1 measures of race/ethnicity for all other individuals. We considered five major racial/ethnic

categories: White, Black, Hispanic, Asian, and American Indian. In addition, we considered the biracial/ethnic combinations of these categories. To avoid confusion, we refer to biracial/ethnic identification with hyphenated categories in text, such as White-Black or Hispanic-Asian. In total, we consider 16 categories: the 5 major categories, the 10 unique pairwise combinations of the racial/ethnic identifications, and an additional category, multiracial/multiethnicity, containing respondents who identified with either three or more races/ethnicities or none. Black-Asian and Asian-American Indian groups are excluded due to a lack of data. The frequency of each racial/ethnic group in each wave is reported in Table 1, as are the percentages of each group that positively reports that they have tried cigarettes, alcohol, and marijuana.

Socioeconomic background.—We examined socioeconomic status (SES) at Wave 1 to capture the conditions in which youth were raised. SES was measured by the total reported parental income at Wave 1, which was taken from the parent questionnaire. Family incomes were divided into four categories: lower class ($0–$16,000); lower middle-class ($16,000–$35,000); upper middle-class ($35,000–$60,000); and upper class (incomes above $60,000). This variable had 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.

Controls: Age, gender, wave.—Age and gender are used as controls in the statistical models. Age is computed by taking the difference between the reported birth date and the interview date in each wave. As with race/ethnicity and SES, we do not allow discrepancies across the waves in regards to the reported birth date and gender; therefore, the birth date and gender reported in the latest wave in which the respondent was interviewed are used. In the statistical models, the data are pooled and individual dummy variables are included for each wave (excluding Wave 1 as a reference category) to remove the global temporal variation in the data.

Statistical Analyses

The longitudinal survey weights provided by Add Health are used to adjust the regression results. The subjects who were not interviewed in Wave 4 have missing values for these weights, and we did not want to lose observations simply because they had no sample weight in Wave 4. To create reasonable weights for the whole sample, the missing longitudinal weights are multiple imputed using the cross-sectional weights for each wave. The imputation package used is ICE implemented in Stata 11, using 30 iterations. The mean value of the imputations of the longitudinal weight across the 30 iterations is used. We treat missing data in the remainder of the data by excluding partially observed observations.

The primary methodology used in the present study is logistic regression with sample weights. Although the data vary across individuals and over time, our chief concerns were cross-sectional effects. That is, our hypotheses called for the comparison of respondents with one another, not for the comparison of each respondent with himself or herself at different points in time. To control for the time variation in the data, individual binary indicators for

the data waves are included (Cameron & Trivedi 2005). These indicators remove the overall time trends from the longitudinal data and allow all of the estimated effects to be interpreted strictly as cross-sectional effects. The standard errors are clustered by individual in order to account for the repeated observations of each individual. The model used here can be represented as follows:

$$\log\frac{P(y_{it}=1)}{P(y_{it}=0)} = \alpha + \sum_{j=1}^{16} \beta_j \text{RACE/ETHNICITY}_{i,j}$$
$$+ \sum_{k=1}^{5} \delta_k \text{SES}_{i,k} + \sum_{j=1}^{16} \sum_{k=1}^{5} \gamma_{j,k} \text{RACE/ETHNICITY}_{i,j}$$
$$\times \text{SES}_{i,k} + \sum_{l=1}^{4} \lambda_l \text{WAVE}_{l,t} + \lambda_5 \text{AGE}_{i,t} + \lambda_6 \text{SEX}_i;$$

where i denotes respondents, and t denotes the wave. y_{it} refers to the 3 binary dependent variables. RACE/ETHNICITY, SES, and WAVE are all indexed to represent multiple indicator variables included in the equation. RACE/ETHNICITY refers to the 16 binary race/ethnicity variables and SES refers to the five binary SES variables. WAVE refers to four dummy variables indicating the four waves. These variables are mutually exclusive and exhaustive. To identify the coefficients of these variables, the coefficients for three indicators were set to zero: the indicator for the respondents who identified as White, the indicator for the respondents with missing SES, and the indicator for Wave 1.

For each respondent at each wave, the predicted probability of ever smoking cigarettes, drinking alcohol, and using marijuana was computed. Average marginal probabilities were computed for each racial/ethnic group and SES by assuming that every respondent belonged to the racial/ethnic and SES groups under consideration, deriving the predicted probabilities, and taking the average of these probabilities. This approach does not require that restrictive assumptions that control variables are set to any specific value. Thus, the predicted probabilities represent prevalences assuming the same distribution of the control variables (gender, wave, and age) as was present in the sample. Standard errors for these marginal probabilities are approximated using the delta method (Greene 2011). These probabilities are reported for each combination of race/ethnicity and SES in Figures 1, 2, and 3. In addition, simple hypotheses tests were conducted on the marginal probabilities to determine whether the prevalence within a biracial/ethnic and SES group was equal to the prevalence within a monoracial/ethnic group with the same SES. For example, people who identified as White-Black and upper middle-class were compared with people who identified as White or Black and identified as upper middle-class.

RESULTS

Figures 1, 2, and 3 display the marginal probabilities for each racial/ethnic group and SES of ever smoking cigarettes, drinking alcohol, and using marijuana, respectively. Also shown are the results of hypothesis tests comparing biracial/ethnic groups to monoracial/ethnic groups. The results from these figures are summarized for each biracial/ethnic group below. See Appendix for logistic regressions results.

White-Black

Across categories, White-Black respondents have significantly higher prevalences of smoking cigarettes, drinking alcohol, and using marijuana than Black respondents. However, the prevalence differences between White-Black and Black seem to be driven by differences in the lower middle-class SES class category. White-Black respondents generally have prevalence rates that are similar to respondents who are White. In only one instance does the White-Black group differ significantly from the White group: White-Black respondents with lower middle-class SES have a significantly higher probability of using marijuana than White respondents of lower middle-class SES.

White-Hispanic

Respondents who identify as White-Hispanic have significantly lower probabilities of smoking cigarettes, drinking alcohol, and using marijuana than respondents who identify as White. Further, these differences are more pronounced among lower SES classes. However, the White-Hispanic group does not significantly differ from the Hispanic group.

White-Asian

Members of the lower SES White-Asian group have significantly higher probabilities of using all three substances than either lower SES Whites or lower SES Asians. However, this conclusion should be drawn cautiously because only seven individuals were coded as lower SES White-Asian. The low standard errors in this group are a result of the positive responses provided by most of these respondents in all four data waves.

The White-Asian group has significantly higher prevalence rates of smoking cigarette, drinking alcohol, and using marijuana than the Asian group. In addition, the upper middle-class SES respondents who are White-Asian have a lower probability of drinking than upper middle-class SES Whites. The White-Asian group also has an overall higher prevalence of marijuana use than the White group.

White-American Indian

Relative to other racial/ethnic groups, the White-American Indian group is less consistently similar or dissimilar to the two monoracial/ethnic groups with which it is compared. This volatility may be due to the small number of respondents who identify as White-American Indian.

The results indicate interactions with race/ethnicity and class. In general, White-American Indians with lower and lower middle-class SES have significantly higher rates of smoking cigarettes, drinking alcohol, and using marijuana than those of similar SES in monoracial/ethnic groups. However, White-American Indians with upper-class SES had significantly lower rates of smoking cigarettes and marijuana than did respondents in the American Indian group.

Black-Hispanic

Compared to respondents who identify as Black, respondents who identified as Black-Hispanic, upper middle-class Black-Hispanics in particular, have a higher probability of

smoking cigarettes. Upper-class SES Black-Hispanics have lower rates of marijuana and alcohol use than upper-class respondents who identify only as Black, but upper middle-class Black-Hispanics have higher rates of marijuana use than upper middle-class Blacks. Upper middle-class SES Black-Hispanics also have higher rates of cigarette use than Hispanics, lower middle-class SES Black-Hispanics have lower rates of cigarette use than Hispanics, and upper-class SES Black-Hispanics have lower rates of marijuana use than Hispanics.

Black-American Indian

Overall, the Black-American Indian group is more likely than Blacks to smoke cigarettes and less likely than American Indians to smoke cigarettes or marijuana. Significant differences exist at specific SES levels, but there does not seem to be a systematic pattern to describe the moderating effect of SES on these comparisons.

Hispanic-Asian

The Hispanic-Asian group is largely indistinct from either the Hispanic or the Asian group. The lack of significant differences is influenced by the smaller sample sizes of the Hispanic and Hispanic-Asian groups. However, some significant differences exist in the upper-class SES category: upper-class SES members of the Hispanic-Asian group have a higher probability of drinking than members of the Asian group and a higher probability of smoking cigarettes than either the Hispanic or Asian groups.

Hispanic-American Indian

Members of the Hispanic-American Indian group are significantly less likely to smoke cigarettes, drink, or use marijuana than members of the American Indian group. These differences are most sharply pronounced in the lower middle-class SES category. No significant differences were found between respondents who identified as Hispanic and Hispanic-American Indian.

DISCUSSION

We were interested in examining whether drug use prevalence among adolescents and young adults of biracial/ethnic identification was divergent from or showed similarities to the prevalence rates of monoracial/ethnic counterparts. In addition, we examined whether SES (family income) also influenced drug use. Groups with the highest prevalence of cigarette smoking at Wave 1 were American Indian, White-American Indian, White, Multiracial (people reporting three or more races/ethnicities), Black-Hispanic, Hispanic, and White-Black, respectively. Groups with the highest prevalence of alcohol drinking at Wave 1 were White-American Indian, Multiracial, Hispanic, White, White-Hispanic, and Hispanic-American Indian, respectively. Groups with the highest prevalence of marijuana smoking at Wave 1 were Black-Asian and American Indian, respectively.

Overall, our evidence suggests that survey participants who self-reported two races/ethnicities have prevalence rates that are intermediate to those of the two corresponding monoracial/ethnic rates. For example, Black-American Indians reported cigarette smoking rates that were significantly lower than rates reported by American Indians but significantly

higher than rates reported by Blacks. Similar trends are observed with different groups across drug use (e.g., cigarette smoking rates in the White-Black group and drinking rates in the Hispanic-American Indian group), though these relationships were not statistically significant.

It is plausible that biracial/ethnic members experience pathways to drug use that are distinct from those experienced by monoracial/ethnic members. Different racial/ethnic groups may possess unique characteristics that simultaneously contribute to racial/ethnic drug use initiation or abstinence. For example, Black adolescents have lower rates of cigarette smoking than White adolescents (SAMHSA 2010), which may be attributed to protective effects of religiosity (Chatters, Taylor & Lincoln 1999). Relative to Whites, Black adolescents are significantly more religious and this characteristic is associated with lower drug use (Belgrave et al. 2010; Wallace et al. 2003). Biracial/ethnic adolescents may not experience the same protections afforded by religious participation as their Black counterparts due to the blend of Black and White familial, social, and peer environments. However, this blending of environments may also result in the lessening impact of unique risk factors found for White adolescent groups such as normative cigarette smoking trends and higher peer risk and influence (Simons-Morton & Haynie 2003). An exception to this "race/ethnicity intermediateness" phenomenon is observed with biracial/ethnic adolescents and marijuana use. Biracial/ethnic adolescents report higher rates of marijuana use than do youth who identify with one race/ethnicity. For example, White-Black adolescents with lower middle-class SES had higher prevalence rates of marijuana use than either White or Black adolescents. This same trend is found for White-Asian adolescents, who reported higher rates of marijuana use than either White or Asian adolescents. These findings are consistent with those reported by SAMHSA (2010), which indicated individuals (12 years and older) who reported two or more races/ethnicities had rates of illicit drug use (14%), including marijuana use, that were higher than rates reported by Blacks (10%), Whites (9%), Hispanics (8%), and Asians (4%). In the SAMSHA national sample, biracial/ethnic individuals trailed behind only American Indian rates of current illicit drug use (18%). One explanation may be that different racial/ethnic groups have clearly defined attitudes in abstaining from specific drugs. The Black adolescents may have stricter parental enforcement regarding adolescent cigarette smoking and Asian groups may have stricter controls on adolescent drinking. The ambiguity surrounding parental or cultural attitudes towards marijuana use may give rise to higher prevalence in the biracial/ethnic adolescent. More research is warranted to understand the appeal of marijuana for these groups.

In addition, the results suggest an interaction effect between race/ethnicity and SES that is explained by two potential mechanisms. First, lower-class SES status may serve as a risk factor for biracial/ethnic adolescents. For example, members of the White-Asian group with lower-class SES have higher general drug use than their counterparts in either the White or Asian groups. White-American Indians with lower middle-class SES have higher rates of cigarette smoking, drinking, and using marijuana than their SES counterparts in monoracial/ethnic groups. Second, upper-class SES status may serve as a protective factor for biracial/ethnic members. The results indicate that White-Asians with upper middle-class SES have a lower probability of drinking than Whites with upper middle-class SES. White-American

Indians with upper-class SES status have lower rates of cigarette smoking and marijuana than their American Indian counterparts.

Lower SES biracial/ethnic adolescents may experience higher rates of drug use than their monoracial/ethnic counterparts due to increased stressors that encompass (a) experiences of discrimination due to ethnic minority membership (Yo et al. 2010); and (b) experiences in negotiating their bicultural identity that may include acculturative stress (Zamboanga et al. 2009). Biracial/ethnic individuals of upper-class SES may be protected against drug use because they experience fewer stressors than their monoracial/ethnic minority counterparts. In addition, they are also equipped with the cultural protective factors found within ethnic cultural groups; that is, as compared with their monoracial minority counterparts, upper-class biracial/ethnic individuals may not only experience fewer risks but also experience more protective factors.

The volatility demonstrated by some middle-class groups did not allow for consistent interpretation. This volatility may be attributed to the curvilinear effect of SES on drug-use behavior. Some research suggests that the highest prevalence rates of drug use are found in those with middle-class SES (Mainous et al. 2001; Tuinstra et al. 1998). More research is needed to uncover possible curvilinear effects of SES on drug use; specifically research using different proxy variables, such as education, to aid in discovering consistent relationships.

Strengths and Limitations

The findings of this study should be considered in light of two limitations. First, because we examined a comprehensive listing of monoracial/ethnic and biracial/ethnic groups, we combined all Hispanics (e.g., Cubans, Puerto Ricans), Blacks (e.g., African Americans, Caribbean Black immigrants), and Asians (e.g., Koreans, Chinese) into single categories. Combining heterogeneous ethnicities may obscure the variability in the prevalence of drug use. Although examining within-group differences for each biracial/ethnic combination is beyond the scope of this article, such analysis is a logical next step.

This study has several important strengths. It is the first to estimate and compare the prevalence of cigarette, alcohol, and marijuana use among several groups of monoracial/ethnic and biracial/ethnic individuals. This study uses a large national sample of ethnically diverse individuals, which was selected through stratified sampling and followed across four waves of data collection. An additional strength of this study is that respondents were allowed to self-identify race/ethnicity and to select as many races/ethnicities as they wished. The large sample size helped to ensure that relatively uncommon categories contained enough observations to conduct statistical inference. In addition, we used SES as a moderator variable rather than as a control variable, providing clearer findings regarding potential disparities, which could be used for program and policy development. Our findings underscore the need for further research examining drug use among biracial/ethnic youth.

Acknowledgments

APPENDIX: Logistic Regression Results

logistic Regression	Have you ever smoked cigarettes?		Have you ever consumed alcohol?		Have you ever used marijuana?	
Race / Ethnicity						
Black	−0.960***	(−11.60)	−0.810***	(−9.54)	−0.433***	(−4.81)
Hispanic	−0.705***	(−3.63)	−0.426	(−1.94)	−0.0908	(−0.41)
Asian	−0.888***	(−6.70)	−0.929***	(−6.55)	−0.893***	(−5.88)
American Indian	0.225	(0.68)	−0.164	(−0.44)	0.954*	(2.47)
White—Black	−0.122	(−0.25)	0.582	(1.15)	0.575	(1.04)
White—Hispanic	−0.539***	(−4.43)	−0.238	(−1.75)	−0.332*	(−2.40)
White—Asian	−0.321	(−0.48)	0.512	(0.99)	0.729	(1.09)
White—American Indian	0.374	(1.22)	0.133	(0.36)	0.100	(0.32)
Black—Hispanic	−0.984**	(−3.20)	−0.555	(−1.69)	−0.0598	(−0.15)
Black—Asian	2.965***	(3.49)	−0.828	(−1.39)	1.260	(1.69)
Black—American Indian	−0.170	(−0.26)	−0.414	(−0.56)	−0.310	(−0.65)
Hispanic—Asian	−1.644**	(−3.07)	−1.317	(−1.79)	−0.664	(−0.92)
Hispanic—American Indian	−0.885***	(−4.02)	−0.755**	(−2.78)	−0.435	(−1.55)
Asian—American Indian	0.697***	(11.57)	. .		18.57***	(18.54)
Multiracial/ethnicity/Other race/ethnicity	−0.293	(−0.92)	−0.282	(−0.96)	0.637	(1.68)
SES						
SES L	0.0925	(0.91)	−0.114	(−1.19)	0.0978	(1.07)
SES LM	−0.0255	(−0.34)	0.0223	(0.30)	−0.0384	(−0.54)
SES UM	−0.150*	(−2.17)	0.0467	(0.69)	−0.0760	(−1.18)
SES U	−0.173*	(−2.49)	0.129	(1.87)	0.141*	(2.18)
Interaction terms						
Black: SES L	−0.0687	(−0.49)	−0.0825	(−0.54)	-0.110	(−0.72)
Black: SES LM	0.163	(1.29)	−0.0214	(−0.16)	0.175	(1.28)
Black: SES UM	0.0483	(0.36)	0.164	(0.72)	0.0631	(0.43)
Black: SES U	0.330*	(2.32)	0.378*	(2.44)	0.107	(0.68)
Hispanic: SES L	0.0384	(0.13)	0.0396	(0.12)	−0.343	(−0.98)
Hispanic: SES LM	0.565	(161)	0.289	(0.79)	−0.0219	(−0.06)
Hispanic: SES UM	0.0607	(0.12)	0.380	(0.77)	−0.0494	(−0.10)
Hispanic: SES U	0.138	(0.29)	−0.00239	(−0.00)	0.0973	(0.19)
Asian: SES L	−0.108	(−0.25)	−0.231	(−0.52)	−0.901	(−1.43)
Asian: SES LM	0.00243	(0.01)	0.432	(1.45)	0.381	(1.09)
Asian: SES UM	−0.0632	(−0.30)	0.244	(1.14)	0.615**	(2.73)

logistic Regression	Have you ever smoked cigarettes?		Have you ever consumed alcohol?		Have you ever used marijuana?	
Asian: SES U	0.411	(196)	0.709**	(3.17)	0.521*	(2.31)
American Indian: SES L	−0.339	(−0.72)	0.293	(0.50)	−0.654	(−1.22)
American Indian: SES LM	0.371	(0.68)	0.963	(1.70)	−0.233	(−0.41)
American Indian: SES UM	−0.155	(−0.22)	0.420	(0.60)	0.0686	(0.08)
American Indian: SES U	1.341	(1.92)	0.655	(1.08)	0.546	(0.66)
White-Black: SES L	−0.294	(−0.33)	−0.462	(−0.54)	−0.574	(−0.59)
White—Black: SES LM	0.282	(0.43)	−0.113	(−0.17)	0.637	(0.90)
White—Black: SES UM	−0.588	(−0.96)	−0.895	(−1.55)	−0.541	(−0.80)
White—Black: SES U	−0.00126	(−0.00)	−0.263	(−0.39)	−1.022	(−1.30)
White—Hispanic: SES L	−0.330*	(−1.63)	−0.508*	(−2.37)	−0.266	(−1.27)
White—Hispanic: SES LM	−0.6495	(−0.28)	−0.0672	(−0.33)	0.179	(0.93)
White—Hispanic: SES UM	0.208	(1.10)	0.0524	(0.25)	0.138	(0.69)
White—Hispanic: SES U	0.418	(1.66)	0.146	(0.51)	0.434	(1.94)
White—Asian: SES L	5.101***	(4.02)	0.973	(0.80)	1.439	(1.45)
White—Asian: SES LM	0.378	(0.41)	−0.861	(−1.20)	−0.309	(−0.37)
White—Asian: SES UM	−0.447	(−0.57)	−1.273*	(−2.03)	−0.618	(−0.77)
White—Asian: SES U	0.136	(0.19)	−0.328	(−0.52)	−0.155	(−0.21)
White—American Indian: SES L	1.407	(1.77)	−0.364	(−0.60)	0.00234	(0.00)
White–American Indian: SES LM	0.535	(1.20)	0.606	(1.33)	0.379	(0.98)
White–American Indian: SES UM	−0.787	(−1.75)	−0.561	(−0.97)	−0.478	(−1.05)
White–American Indian: SES U	−0.309	(−0.76)	−0.0734	(−0.16)	−0.235	(−0.56)
Black–Hispanic: SES L	0.395	(0.78)	0.476	(0.91)	−0.0284	(−0.05)
Black–Hispanic: SES LM	−0.236	(−0.43)	0.101	(0.21)	0.112	(0.19)
Black–Hispanic: SES UM	1.991**	(3.07)	0.752	(0.97)	1.249	(1.62)
Black–Hispanic: SES U	0.961	(1.23)	−1.457	(−1.72)	−2.026*	(−2.21)
Black–Asian: SES L						
Black–Asian: SES LM	−3.749***	(−3.86)	0.133	(0.18)	−2.213	(−1.65)
Black–Asian: SES UM	−3.790**	(−3.26)	1.059	(1.25)	−1.169	(−1.08)
Black–Asian: SES U						
Black–American Indian: SES L	−0.123	(−0.17)	−0.446	(−0.52)	−0.150	(−0.25)
Black–American Indian: SES LM	−1.419	(−1.51)	−0.162	(−0.14)	−0.448	(−0.65)
Black–American Indian: SES UM	0.566	(0.57)	0.119	(0.12)	−0.535	(−0.56)
Black–American Indian: SES U	0.192	(0.26)	1.666	(1.44)	0.197	(0.36)
Hispanic–Asian: SES L	0.949	(1.33)	0.759	(0.86)	0.172	(0.18)
Hispanic–Asian: SES LM	1.064	(1.28)	0.0791	(0.08)	−0.274	(−0.29)
Hispanic–Asian: SES UM	1.422	(1.84)	0.807	(0.96)	0.918	(1.05)
Hispanic–Asian: SES U	3.248**	(2.77)	2.561*	(2.07)	1.536	(1.23)
Hispanic–American Indian: SES L	0.311	(0.73)	0.985*	(2.03)	0.288	(0.61)
Hispanic–American Indian: SES LM	0.335	(1.01)	0.208	(0.60)	0.307	(0.80)
Hispanic–American Indian: SES UM	0.171	(0.45)	0.458	(1.06)	0.334	(0.78)
Hispanic–American Indian: SES U	1.085	(1.47)	0.897	(1.69)	0.759	(1.24)
Asian–American Indian: SES L	−1.661***	(−16.13)			−17.24***	(−17.16)
Asian–American Indian: SES LM	.	.	.	.	.	.
Asian–American Indian: SES UM	.	.	.	.	.	.
Asian–American Indian: SES U	.	.	.	.	.	.
Multiracial/ethnicity/Other race/ethnicity: SES L	0.0311	(0.06)	0.152	(0.27)	−0.227	(−0.37)

logistic Regression	Have you ever smoked cigarettes?		Have you ever consumed alcohol?		Have you ever used marijuana?	
Multiracial/ethnicity/Other race/ethnicity: SES LM	0.192	(0.39)	0.452	(0.85)	−0.192	(−0.31)
Multiracial/ethnicity/Other race/ethnicity: SES UM	0.818	(1.56)	0.959[*]	(2.09)	0.266	(0.49)
Multiracial/ethnicity/Other race/ethnicity: SES U	0.577	(1.07)	0.343	(0.64)	−0.0963	(−0.18)
Age	0.0805[***]	(7.98)	0.187[***]	(16.69)	0.0916[***]	(9.49)
Gender	−0.132[***]	(−3.77)	−0.0884[*]	(−2.46)	−0.266[***]	(−7.75)
Wave 2	0.246[***]	(12.90)	0.245[***]	(12.39)	0.345[***]	(16.25)
Wave 3	−0.323[***]	(−4.76)	0.377[***]	(5.28)	0.632[***]	(9.56)
Wave 4	−0.611[***]	(−4.67)	−1.171[***]	(−8.30)	0.0727	(0.57)
Intercept	−0.594[***]	(−3.39)	−2.500[***]	(−12.99)	−2.271[***]	(−13.80)
N	61237		61009		60460	
pseudo R^2	0.033		0.096		0.067	

t statistics in parentheses.

[*] $p < 0.05$

[**] $p < 0.01$

[***] $p < 0.001$.

Note: Standard errors are clustered by individual. "White, only" is the reference group for race/ethnicity, and non-reported is the reference category for SES. Results are weighted using the longitudinal survey weights provided by Add Health, imputed to include cases that dropped out before Wave 4.

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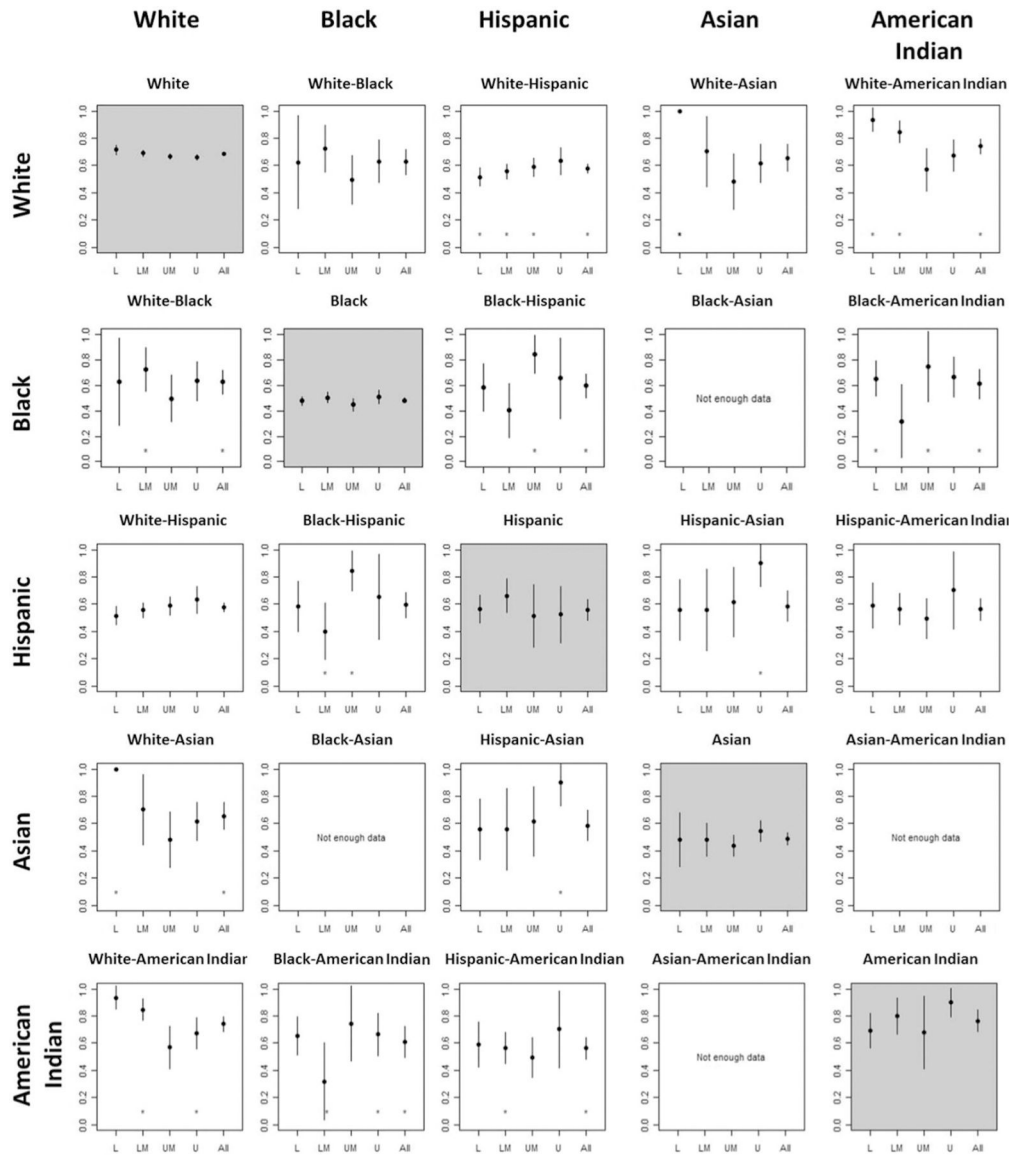
FIGURE 1.

Lifetime Cigarette Smoking Across Bi-Racial/Ethnic Groups and Socioeconomic Status Across Waves 1–4

Note: "L" = lower class; "LM" = lower middle-class; "UM" = upper middle-class; "U" = upper class; "All" = average probability across all SES levels. Dots represent the marginal probability of cigarette smoking for the given race/ethnicity and SES status, as derived from a logistic regression. The vertical line through each dot represents the 95% confidence interval for that marginal probability. Stars indicate the marginal probability for the biracial/ethnic group at that SES is significantly different from the single race/ethnicity group represented on that row, $p<.05$. The Add Health data did not contain enough observations of Asian and American Indians and Black and Asians to produce marginal probabilities for these groups.

FIGURE 2.

Lifetime Drinking Across Biracial/Ethnic Groups and Socioeconomic Status Across Waves 1–4

Note: "L" = lower class; "LM" = lower middle-class; "UM" = upper middle-class; "U" = upper class; "All" = average probability across all SES levels. Dots represent the marginal probability of drinking for the given race/ethnicity and SES status, as derived from a logistic regression. The vertical line through each dot represents the 95% confidence interval for that marginal probability. Stars indicate the marginal probability for the biracial/ethnic group at that SES is significantly different from the single race/ethnicity group represented on that row, $p<.05$. The Add Health data did not contain enough observations of Asian and American Indians and Black and Asians to produce marginal probabilities for these groups.
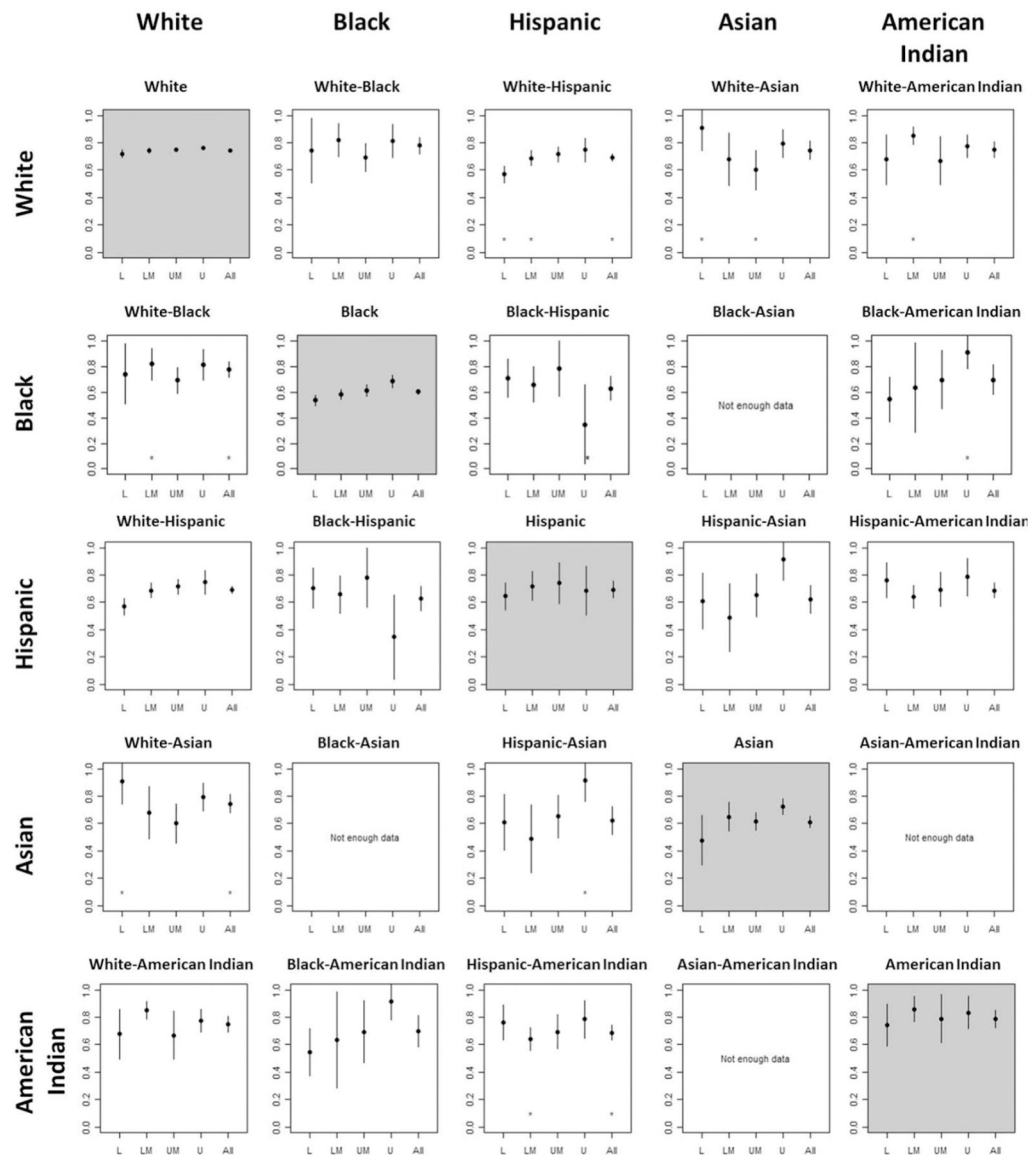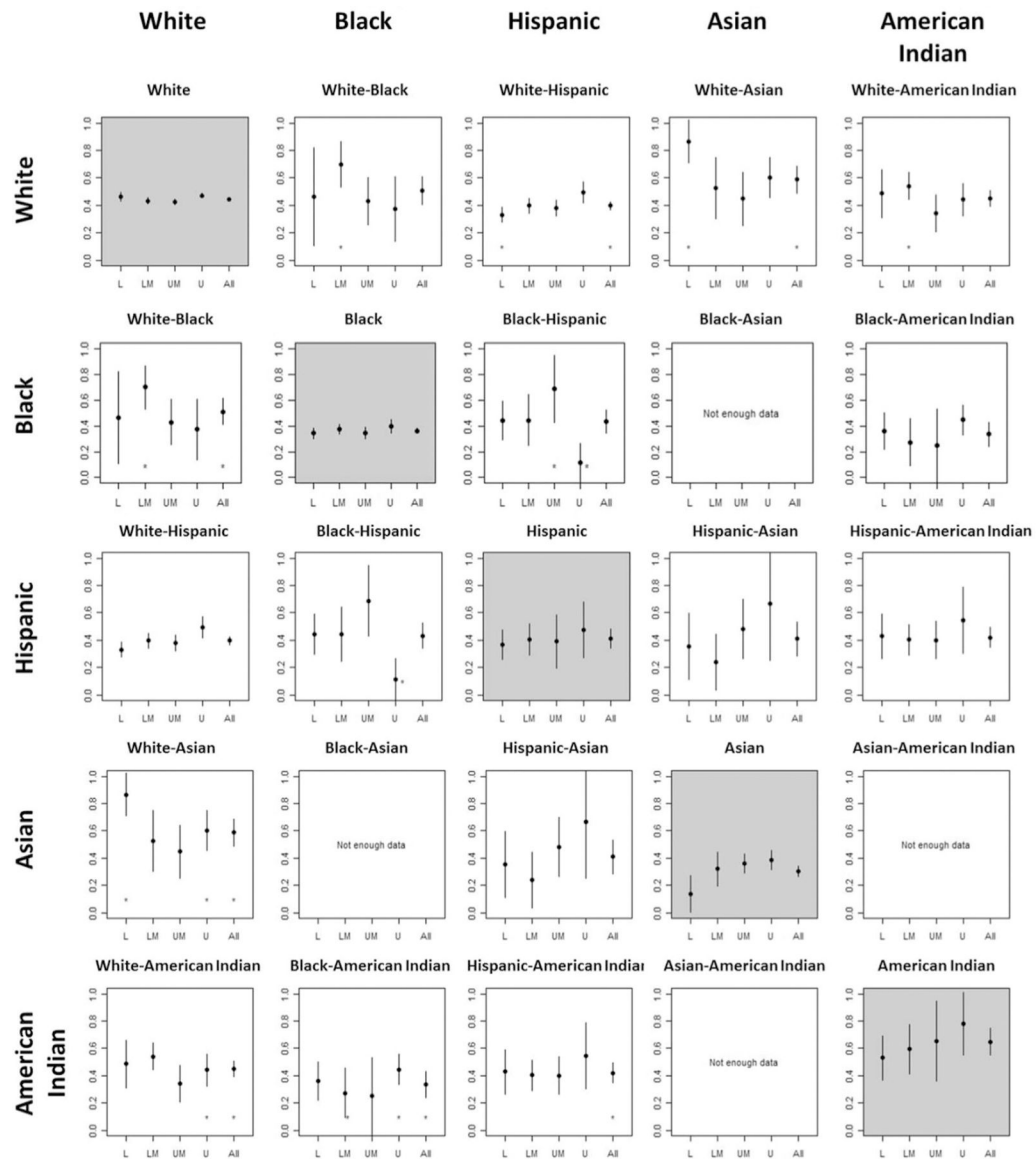
FIGURE 3.

Lifetime Marijuana Use Across Biracial/Ethnic Groups and Socioeconomic Status Across Waves 1–4

Note: "L" = lower class; "LM" = lower middle-class; "UM" = upper middle-class; "U" = upper class; "All" = average probability across all SES levels. Dots represent the marginal probability of using marijuana for the given race/ethnicity and SES status, as derived from a logistic regression. The vertical line through each dot represents the 95% confidence interval for that marginal probability. Stars indicate that the marginal probability for the biracial/ethnic group at that SES is significantly different from the single race/ethnicity group represented on that row, $p<.05$. There were not enough observations of Asian and American Indians and Black and Asians in the Add Health data to produce marginal probabilities for these groups.

Percentage Ever Having Used Cigarettes, Alcohol and Marijuana

Race/Ethnicity	Ever Use?	Percentage by Data Wave			
		1	2	3	4
White	Cigarettes	62.8	68.0	69.5	73.3
	Alcohol	60.6	68.1	89.8	85.6
	Marijuana	37.3	36.0	58.2	59.6
	N	10 487	7609	7898	8316
Black	Cigarettes	44.9	51.7	37.4	47.7
	Alcohol	46.6	54.6	74.4	67.5
	Marijuana	23.4	31.8	43.5	44.5
	N	4391	3046	3153	3291
Hispanic	Cigarettes	58.8	62.6	52.1	55.2
	Alcohol	61.5	69.6	83.0	71.6
	Marijuana	32.4	39.6	58.2	45.8
	N	611	364	142	317
Asian	Cigarettes	47.4	52.9	50.2	55.1
	Alcohol	46.7	54.8	82.6	74.5
	Marijuana	18.0	25.1	41.6	44.4
	N	1,321	897	1,002	871
American Indian	Cigarettes	69.9	71.8	57.8	65.3
	Alcohol	56.2	71.8	82.3	75.2
	Marijuana	46.1	56.4	66.4	56.0
	N	148	110	116	101
White-Black	Cigarettes	58.5	63.4	56.8	68.6
	Alcohol	52.6	63.4	95.0	86.3

Percentage by Data Wave

Race/Ethnicity	Ever Use?	1	2	3	4
	Marijuana	32.3	40.2	60.8	69.6
	N	135	94	81	102
White-Hispanic	Cigarettes	53.7	62.2	51.9	55.3
	Alcohol	60.1	68.3	85.9	74.0
	Marijuana	26.9	35.2	48.4	45.5
	N	2202	1598	1700	1642
White-Asian	Cigarettes	50.7	49.1	74.1	72.4
	Alcohol	57.6	57.5	86.1	87.6
	Marijuana	37.6	47.2	73.1	66.7
	N	145	106	108	105
White-American Indian	Cigarettes	68.1	72.6	74.9	79.6
	Alcohol	66.5	72.2	90.8	82.9
	Marijuana	32.1	42.2	59.1	63.3
	N	312	224	243	240
Black-Hispanic	Cigarettes	58.9	63.5	41.2	51.3
	Alcohol	51.0	56.5	78.8	75.7
	Marijuana	29.3	38.3	50.0	49.1
	N	154	115	120	116
Black-Asian	Cigarettes	50.0	45.0	55.6	50.0
	Alcohol	46.2	40.0	88.9	85.0
	Marijuana	46.2	35.0	55.6	40.0
	N	26	20	18	20
Black-American Indian	Cigarettes	54.1	55.6	46.9	66.1
	Alcohol	48.8	51.9	78.7	76.8

Race/Ethnicity	Ever Use?	Percentage by Data Wave			
		1	2	3	4
	Marijuana	27.7	29.6	55.3	55.4
	N	85	54	50	57
Hispanic-Asian	Cigarettes	55.8	63.3	43.0	61.2
	Alcohol	50.0	63.3	78.5	76.5
	Marijuana	27.8	41.1	49.5	52.9
	N	121	90	107	85
Hispanic-American Indian	Cigarettes	55.9	61.7	54.5	53.6
	Alcohol	58.6	67.1	84.4	74.4
	Marijuana	37.0	45.8	53.5	46.5
	N	355	256	323	274
Asian-American Indian	Cigarettes	100	100	0	50
	Alcohol	100	100	100	100
	Marijuana	100	100	100	50
	N	2	1	2	2
Multiracial/Ethnicity/Other race/ethnicity	Cigarettes	61.1	71.7	64.2	59.9
	Alcohol	64.1	72.2	90.0	78.3
	Marijuana	36.9	49.7	65.9	56.9
	N	250	154	134	162