Racial/Ethnic Differences in the Relationship Between Parental Education and Substance Use Among U.S. 8th-, 10th-, and 12th-Grade Students: Findings From the Monitoring the Future Project*

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ABSTRACT. Objective: Secondary school students' rates of substance use vary significantly by race/ethnicity and by their parents' level of education (a proxy for socioeconomic status). The relationship between students' substance use and race/ethnicity is, however, potentially confounded because parental education also differs substantially by race/ethnicity. This report disentangles the confounding by examining White, African American, and Hispanic students separately, showing how parental education relates to cigarette smoking, heavy drinking, and illicit drug use. **Method:** Data are from the 1999-2008 Monitoring the Future nationally representative in-school surveys of more than 360,000 students in Grades 8, 10, and 12. **Results:** (a) High proportions of Hispanic students have parents with the lowest level of education, and the relatively low levels of substance use by these students complicates total sample data linking parental education and substance use. (b) There

are clear interactions: Compared with White students, substance use rates among African American and Hispanic students are less strongly linked with parental education (and are lower overall). (c) Among White students, 8th and 10th graders show strong negative relations between parental education and substance use, whereas by 12th grade their heavy drinking and marijuana use are not correlated with parental education. **Conclusions:** Low parental education appears to be much more of a risk factor for White students than for Hispanic or African American students. Therefore, in studies of substance use epidemiology, findings based on predominantly White samples are not equally applicable to other racial/ethnic subgroups. Conversely, the large proportions of minority students in the lowest parental education category can mask or weaken findings that are clearer among White students alone. (*J. Stud. Alcohol Drugs*, 72, 279-285, 2011)

A GROWING BODY OF RESEARCH finds that there are important demographic differences in the prevalence of substance use among U.S. adolescents (Child Trends, 2010; Galea et al., 2004). Two demographic factors for which these differences have been found include race/ethnicity and socioeconomic status. Research on the largest U.S. racial/ethnic groups consistently finds that substance use is lower among African American youth than among White and Hispanic youth (Delva et al., 2005; Galea et al., 2004; Substance Abuse and Mental Health Services Administration, 2009; Wallace et al., 2009). Similarly, research on the relationship between socioeconomic status and substance use finds that young people from more advantaged families are generally less likely to use substances than their less advantaged peers (Galea et al., 2004; Substance Abuse and Mental Health Services Administration, 2004; see Luthar and Goldstein, 2008, for an alternative view). In light of the consistent findings of racial/ethnic and socioeconomic status differences in substance use, and the strong correlation between race/ethnicity

and socioeconomic status, the broad question that motivates the present study is: to what extent are socioeconomic status and racial/ethnic differences in drug use confounded? Below, we highlight past findings from the Monitoring the Future (MTF) project that bear on this question.

MTF reports annually on levels and trends in self-reported substance use by secondary school students (e.g., Johnston et al., 2009). These reports include subgroup comparisons and have revealed substantial differences among racial/ethnic groups, as well as differences linked to parental education (as the available socioeconomic status indicator). These comparisons are complicated by the substantial differences in racial/ethnic composition across levels of parental education. The present article explores the potential confounding of race/ethnicity with parental education by examining the three largest racial/ethnic groups separately, showing and comparing how parental education is related to three common forms of substance use among adolescents.

Understanding how substance use varies as a function of sociodemographic characteristics is essential for advances in substance use epidemiology, etiology, and prevention. MTF has long examined how substance use during adolescence varies as a function of race/ethnicity and socioeconomic status. In addition to the annual reports cited above, there have been a number of articles over the years presenting MTF findings on racial/ethnic subgroups. The first of these

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was Bachman et al. (1991), reporting differences in smoking, drinking, and illicit drug use among high school seniors in the classes of 1976-1989; a later report by Wallace et al. (2002) extended the coverage to the senior classes of 1976-2000; another report (Wallace et al., 2003) expanded coverage further, to include 8th and 10th graders as well as seniors. Wallace and Muroff (2002) examined a wide range of risk factors for substance use and found that, among 12th graders, African Americans were more likely than Whites to experience economic deprivation, but economic disadvantage was a stronger predictor of substance use among Whites. Wallace and Bachman (1991) also examined background factors, including parental education, as potential explanations of racial/ethnic differences in adolescent drug use; they concluded that controlling for background alone did not account for most such differences. A recent report by Wallace et al. (2009) examined a number of socioeconomic status indicators as they related to smoking among 8th-grade girls and found that parental education was a particularly strong predictor of smoking. The present article focuses on a single indicator of socioeconomic status (parental education) and extends coverage to include both genders, all three grades covered by MTF in-school surveys (8th, 10th, and 12th), and the use of cigarettes, alcohol, and illicit drugs. Most important, as urged by Wallace and Muroff (2002), the present analyses are "race specific," examining patterns separately for African American, Hispanic, and White students.

Method

Samples

To provide sufficiently large numbers of cases for race-specific analysis, we combined findings across the 10 most recent available MTF surveys of 8th-, 10th-, and 12th-grade students (1999-2008). An earlier more detailed report (Bachman et al., 2010) showed that the patterns of relationship reported here did not shift markedly during that period, nor did they differ appreciably for males and females (thus permitting this report to combine data across time and gender).

MTF sampling and data collection methods are described in detail elsewhere (Bachman et al., 2006; Johnston et al., 2009). Briefly, the study uses a multistage sampling procedure to obtain nationally representative samples of 8th, 10th, and 12th graders from the 48 contiguous states. Stage 1 is the selection of geographic region; Stage 2 is the selection of specific schools—approximately 420 each year; and Stage 3 is the selection of students within each school. This sampling strategy has been used to collect data annually from high school seniors since 1975 and from 8th and 10th graders since 1991. Sample weights are assigned to each student to take into account differential probabilities of selection; these weights average very slightly less than 1.0, and actual numbers of observations are quite close to the weighted *ns*

reported here. Students complete self-administered, machine-readable questionnaires during a normal class period. Student response rates average about 90% for 8th graders, 86% for 10th graders, and 84% for 12th graders. Absence on the day of data collection is the primary reason that students are missed; it is estimated that less than 1% of students refuse to complete a questionnaire.

Measures of race/ethnicity and parental education

These measures are described in greater detail in Johnston et al. (2009, pp. 497-498).

Race/ethnicity. In the early MTF surveys, respondents were presented with a list of various racial/ethnic categories. General instructions told the respondents to mark only one answer. In 2005 a random half of the respondents were presented with the list of racial/ethnic categories and instructed to "select one or more responses"; relatively few respondents (about 6%) selected more than one category. In 2006 and thereafter, the revised instruction was used in all forms. For the original question, respondents were assigned to the racial/ethnic group specified in their response. For the revised question, those checking only White and no other racial/ethnic group were categorized as White; those checking Black or African American and no other racial/ethnic group were categorized as African American; and those checking Mexican American or Chicano, Cuban American, Puerto Rican, or other Hispanic or Latino and no other racial/ethnic group were categorized as Hispanic. Those checking multiple racial/ethnic groups or one of the other specified groups are omitted here from the race/ethnic-specific analyses because of the small numbers of cases.

Parental education. This is an average of two variables, mother's education and father's education, based on the respondent's answers about the highest level of education achieved by each parent, using the following scale: 1 = completed grade school or less, 2 = some high school, 3 = completed high school, 4 = some college, 5 = completed college, 6 = graduate or professional school after college. Missing data were allowed on one of the two variables. The respondent was instructed, "If you were raised mostly by foster parents, stepparents, or others, answer for them. For example, if you have both a stepfather and a natural father, answer for the one that was most important in raising you."

Measures of substance use. Two dichotomous measures are shown in the figures reporting substance use prevalence: any use of cigarettes during the past 30 days and consumption of five or more alcoholic drinks in a row at least once during the past 2 weeks. Detailed data on the use of marijuana, and use of other illicit drugs, are provided in Bachman et al. (2010).

Analysis approach. Our reporting here is descriptive. We provide figures showing prevalence rates (percentages reporting use) at each of five levels of parental education,

with patterns shown separately for total samples and for three subgroups (White, African American, and Hispanic). The figures also include unstandardized linear regression coefficients, with any that fall short of significance at the .05 level (two tailed) indicated as *ns*. The calculations were done with the SURVEYREG procedure in SAS Version 9 (SAS Institute Inc., Cary, NC), and *p* values incorporated appropriate adjustments for clustered sample designs.

Results

First, it must be kept in mind that the findings reported here are based on *students*, not total age groups. There are differences among the three subgroups in school retention, especially at the upper grade levels. Moreover, school retention rates are poorer among students with less-educated parents. That said, it is reassuring that the data show a good deal of consistency in findings across grades, especially in 8th and 10th grades, before most dropping out occurs.

Table 1 presents numbers of (weighted) cases by race/ethnicity and parental education, and clearly indicates that the parents of Hispanic students have average educational levels much lower than the total population. The row percentages show that 29%-33% of Hispanic respondents had parents in the lowest education category, in contrast with only 8%-9% of African American respondents and less than 5% of White respondents. The column percentages show that 42%-46% of all students with parents in the bottom category of parental education are Hispanic, about 32% are White, and 12%-13% are African American, with the remaining 10%-13% spread across all other racial/ethnic subgroups. The table also shows that Whites comprise fully two thirds of the 8th graders—and nearly three quarters of the 10th and 12th graders—with parents in the top two categories of educational attainment.

The next subsections show how this heavy proportion of Hispanic students and relatively low proportion of White students in the bottom category of parental education can produce somewhat misleading patterns of drug use findings

TABLE 1. Race/ethnicity and parental education: Numbers of weighted cases^a and percentages

Variable	Parental education ^b					Total
	(low) 1.0-2.0	2.5-3.0	3.5-4.0	4.5-5.0	(high) 5.5-6.0	
8th grade						
White						
Frequency	4,158	19,453	23,256	26,804	15,177	88,848
Row percentage	4.7	21.9	26.2	30.2	17.1	100.0
Column percentage	32.5	58.6	62.9	67.7	67.1	61.2
African American						
Frequency	1,530	5,074	5,337	5,024	2,409	19,374
Row percentage	7.9	26.2	27.6	25.9	12.4	100.0
Column percentage	12.0	15.3	14.4	12.7	10.7	13.3
Hispanic						
Frequency	5,395	4,817	3,925	2,766	1,518	18,421
Row percentage	29.3	26.2	21.3	15.0	8.2	100.0
Column percentage	42.2	14.5	10.6	7.0	6.7	12.7
Asian						
Frequency	467	742	926	1,598	1,578	5,311
Row percentage	8.8	14.0	17.4	30.1	29.7	100.0
Column percentage	3.7	2.2	2.5	4.0	7.0	3.7
Other						
Frequency	1,230	3,103	3,506	3,412	1,947	13,197
Row percentage	9.3	23.5	26.6	25.9	14.8	100.0
Column percentage	9.6	9.4	9.5	8.6	8.6	9.1
Total						
Frequency	12,779	33,189	36,950	39,604	22,629	145,151
Percentage	8.8	22.9	25.5	27.3	15.6	100.0
10th grade						
White						
Frequency	3,814	20,444	26,544	28,263	14,749	93,814
Row percentage	4.1	21.8	28.3	30.1	15.7	100.0
Column percentage	32.0	63.3	67.7	73.4	73.2	66.0
African American						
Frequency	1,386	4,632	5,543	4,329	1,716	17,607
Row percentage	7.9	26.3	31.5	24.6	9.8	100.0
Column percentage	11.6	14.3	14.1	11.3	8.5	12.4
Hispanic						
Frequency	5,484	4,322	3,661	2,217	971	16,655
Row percentage	32.9	26.0	22.0	13.3	5.8	100.0
Column percentage	46.0	13.4	9.3	5.8	4.8	11.7

Continued

TABLE 1. *Continued*

Variable	Parental education ^b					Total
	(low) 1.0-2.0	2.5-3.0	3.5-4.0	4.5-5.0	(high) 5.5-6.0	
Asian						
Frequency	380	722	842	1,296	1,329	4,570
Row percentage	8.3	15.8	18.4	28.4	29.1	100.0
Column percentage	3.2	2.2	2.2	3.4	6.6	3.2
Other						
Frequency	870	2,184	2,638	2,379	1,399	9,470
Row percentage	9.2	23.1	27.9	25.1	14.8	100.0
Column percentage	7.3	6.8	6.7	6.2	6.9	6.7
Total						
Frequency	11,934	32,305	39,229	38,483	20,164	142,115
Percentage	8.4	22.7	27.6	27.1	14.2	100.0
12th grade						
White						
Frequency	3,289	19,977	26,559	24,669	12,885	87,379
Row percentage	3.8	22.9	30.4	28.2	14.8	100.0
Column percentage	31.8	65.3	70.0	74.8	74.5	67.7
African American						
Frequency	1,390	4,542	5,049	3,145	1,186	15,313
Row percentage	9.1	29.7	33.0	20.5	7.8	100.0
Column percentage	13.5	14.8	13.3	9.5	6.9	11.9
Hispanic						
Frequency	4,494	3,713	3,266	1,995	987	14,454
Row percentage	31.1	25.7	22.6	13.8	6.8	100.0
Column percentage	43.5	12.1	8.6	6.1	5.7	11.2
Asian						
Frequency	495	766	1,021	1,426	1,285	4,993
Row percentage	9.9	15.3	20.5	28.6	25.7	100.0
Column percentage	4.8	2.5	2.7	4.3	7.4	3.9
Other						
Frequency	664	1,614	2,043	1,732	961	7,013
Row percentage	9.5	23.0	29.1	24.7	13.7	100.0
Column percentage	6.4	5.3	5.4	5.3	5.6	5.4
Total						
Frequency	10,332	30,611	37,939	32,967	17,304	129,153
Percentage	8.0	23.7	29.4	25.5	13.4	100.0

^aUnweighted total *ns* are 146,939 for 8th grade, 143,905 for 10th grade, and 130,340 for 12th grade; ^bthis is an average of two variables, mother's education and father's education, based on the respondent's answers about the highest level of education achieved by each parent, using the following scale: 1 = *completed grade school or less*, 2 = *some high school*, 3 = *completed high school*, 4 = *some college*, 5 = *completed college*, 6 = *graduate or professional school after college*. Missing data were allowed on one of the two variables.

when students from all racial/ethnic subgroups are combined. For each class of substance use, we first examined links with parental education for all students combined; then we examined the links separately to unmask the differences between White, African American, and Hispanic students.

Cigarette use

Figure 1 presents prevalence of cigarette use (percentage reporting any use in the last 30 days) for 8th-, 10th-, and 12th-grade students, as a function of parental education levels. For the total sample of 8th graders, there is a fairly strong negative linear relationship, with smoking declining as parental education level increases. Among 10th graders, the relationship is similar but weaker, with no appreciable difference between the bottom two categories of parental

education. Among 12th graders, the pattern clearly departs from linearity, with those in the lowest category of parental education showing lower percentages of smokers than those in the next lowest categories.

Figure 1 also presents results for the three racial/ethnic subgroups separately, and these show pronounced disparities. Among White students, there are strong and largely linear negative relations. Among African American students, smoking prevalence is a great deal lower overall, and there are only small negative relations with parental education. Among Hispanic students, smoking prevalence rates among those with the least educated parents are generally quite low and not appreciably different from the rates for African American students. At the higher levels of parental education, the prevalence rates for Hispanic students are somewhat higher than those for African American students.

FIGURE 1. Cigarettes: 30-day use by race/ethnicity and parental education 1999-2008. ^aParental education is an average of two variables, mother's education and father's education, based on the respondent's answers about the highest level of education achieved by each parent, using the following scale: 1 = completed grade school or less, 2 = some high school, 3 = completed high school, 4 = some college, 5 = completed college, 6 = graduate or professional school after college. Missing data were allowed on one of the two variables. ns = not significant.

In sum, Figure 1 shows that it is only among White students that clear negative relations appear between parental education levels and smoking. Among African Americans, such a pattern is far weaker and not entirely consistent, and, among Hispanic students, the pattern is mostly irregular across grades. But because the proportions of students with less-educated parents are much higher in the minority subgroups, especially Hispanic students, the regression coefficients for the total samples, included in Figure 1, are distinctly weaker than those for White students.

Heavy drinking

Figure 2 shows that for the total samples, instances of heavy drinking (five or more drinks in a row at least once in the past 2 weeks) are much less likely among 8th-grade students with highly educated parents, compared with those having the least educated parents. By 10th grade, this overall relationship is greatly weakened, and, by 12th grade, it is actually slightly reversed, with instances of heavy drinking a bit less likely among those with the least educated parents.

The subgroup sample findings in Figure 2 again show a degree of unmasking—albeit not as pronounced as that for cigarette use. In 8th grade, instances of heavy drinking show a clear and largely linear negative relation with parental education among White students but very little relation among the minority subgroups. By 10th grade, the negative

relation among White students is weaker; by 12th grade, it has disappeared. Among African American and Hispanic students, the patterns are perhaps best described as irregular, with little consistency across grades (except, of course, for the often-noted finding that African American students report fewer instances of heavy drinking compared with the other groups). Among Hispanic 12th graders, there is even some suggestion of a positive relationship between parental education and instances of heavy drinking.

Illicit drug use

Detailed findings are provided in Bachman et al. (2010). For the total samples, annual marijuana use is two to three times as likely among 8th graders with the least educated parents, compared with those with the most educated parents. By 10th grade, the relationship is still negative but weaker. By 12th grade, the pattern is nearly flat. The subgroup findings for marijuana use bear some similarities to those shown here for cigarette use and heavy drinking: Negative links between parental education and marijuana use are strongest among White students, although by 12th grade the pattern for them is essentially flat. African American 8th and 10th graders also show significant negative relations but to a lesser extent. The patterns for Hispanic students are moderately (but significantly) negative among 8th graders, whereas among 10th and 12th graders, those with the least

FIGURE 2. Alcohol: Heavy drinking in past 2 weeks by race/ethnicity and parental education 1999-2008. "Parental education is an average of two variables, mother's education and father's education, based on the respondent's answers about the highest level of education achieved by each parent, using the following scale: 1 = completed grade school or less, 2 = some high school, 3 = completed high school, 4 = some college, 5 = completed college, 6 = graduate or professional school after college. Missing data were allowed on one of the two variables. ns = not significant.

educated parents show relatively low marijuana use. Results for the measure of illicit drug use other than marijuana are similar to those for marijuana, albeit somewhat weaker.

Discussion

The results clearly indicate the following: (a) High proportions of Hispanic students have parents at the bottom category of education, and their levels of substance use are, on average, distinctly lower than those of White students at that same bottom category of parental education. This contributes heavily to the departures from linearity in the total sample data linking parental education and substance use. (b) The patterns for the three subgroups show distinct differences—among African American and Hispanic students, overall levels of substance use are lower and are also linked less strongly and clearly with parental education levels (i.e., there are interaction effects). (c) The strong negative relations shown by White 8th and 10th graders are diminished among White 12th graders, especially with respect to instances of heavy drinking and marijuana use.

When Wallace and Bachman (1991) explored possible explanations of racial/ethnic differences in drug use among 12th graders, they employed a broad additive model that presumed that "background ... variables impact the drug use of

young people from different racial/ethnic subgroups in much the same way" (p. 348). The present findings clearly indicate that such a presumption is not valid. Low parental education appears to be a risk factor for White students, especially in 8th and 10th grades, whereas substance use among African American and Hispanic students is not strongly linked with parental education. Thus, it is not correct to assume that the patterns of relations shown within total samples that are predominantly White are equally applicable to other racial/ethnic subgroups.

Why do instances of heavy drinking and marijuana use show greater-than-average increases between 8th and 12th grade among students with well-educated parents? Other MTF analyses have shown some degree of "catching up" in alcohol and marijuana use among college-bound students (i.e., those with good grades and definite plans to obtain a college degree who, on average, also have better educated parents). This has been attributed to the greater likelihood of these students spending time with older friends and siblings already in college (Bachman et al., 2008; Johnston et al., 2009), as well as to anticipatory socialization (Schulenberg and Maggs, 2002). The heavy drinking data in Figure 2 illustrate this pattern clearly among White students with well-educated parents; there is also some suggestion of a similar pattern among Hispanic students but very little among Afri-

can American students. A similar phenomenon was found for illicit drug use—again most pronounced for White students (see Bachman et al., 2010, for details).

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