Published in final edited form as:

Drug Alcohol Depend. 2009 October 1; 104(Suppl 1): S42–S49. doi:10.1016/j.drugalcdep.2009.06.007.

Race/Ethnicity, Socioeconomic Factors, and Smoking among Early Adolescent Girls in the United States

John M. Wallace Jr.,

University of Pittsburgh, School of Social Work, Center on Race and Social Problems, 2301 Cathedral of Learning, Pittsburgh, PA 15260

Michael G. Vaughn,

University of Saint Louis, School of Social Work, St. Louis University, Tegeler Hall, Rm. 312, 3550 Lindell Blvd, St. Louis, MO 63103

Jerald G. Bachman,

University of Michigan, Institute for Social Research, 426 Thompson Street, Ann Arbor, MI 48106

Patrick M. O'Malley,

University of Michigan, Institute for Social Research, 426 Thompson Street, Ann Arbor, MI 48106

Lloyd D. Johnston, and

University of Michigan, Institute for Social Research, 426 Thompson Street, Ann Arbor, MI 48106

John E. Schulenberg

University of Michigan, Department of Psychology, Institute for Social Research, 426 Thompson Street, Ann Arbor, MI 48106

Abstract

Background—This study uses large nationally representative samples of White, Black, Mexican American, Puerto Rican, Other Latina, Asian American, and American Indian 8th-grade girls to examine racial/ethnic differences and similarities in patterns, trends, and socioeconomic correlates of cigarette use.

Methods—The data are drawn from the University of Michigan's Monitoring the Future study. Prevalence and trend data (from 1991 to 2007) in girls' cigarette use were examined by racial/ethnic subgroup. Logistic regression analyses were conducted to determine the extent to which socioeconomic factors predict girls' cigarette use, and whether the relationships between socioeconomic status (SES) and smoking differed across racial/ethnic subgroup.

Results—Cigarette use was highest among American Indian girls; at an intermediate level among Mexican American, Puerto Rican, Other Latinas, and White girls; and lowest among Black and Asian American girls. Trend data show that cigarette use has declined for all racial/ethnic subgroups, and that small but consistent racial/ethnic differences in girls' cigarette use have persisted. Generally, girls who did not live in two-parent households, whose parents had lower levels of educational attainment, who attended lower SES schools, and who had more disposable income were more likely

© 2009 Elsevier Ireland Ltd. All rights reserved.

Ph: 412-624-6349, Fax: 412-624-6323, johnw@pitt.edu.

Conflict of Interest: All authors declare that there are no conflicts of interest.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

than their peers to smoke. That said, however, the relationships between smoking and parental education and school SES were, on average, stronger for White girls than for Black or Hispanic (Mexican American, Other Latina, Puerto Rican) girls.

Conclusions—Future research should seek to understand the mechanisms by which low SES impacts smoking.

Keywords

gender; race; ethnicity; tobacco use; socioeconomic status; adolescent

1. Introduction

1.1. *Impact of Tobacco Use on Women's Health*

Tobacco use is the leading preventable cause of mortality among women in the United States. More specifically, the use of tobacco accounts for more than 178,400 premature deaths, 2.2 million years of potential life lost, and more than \$30 billion in lost productivity among U.S. women each year (Centers for Disease Control and Prevention, 2005). Although trend data suggest that smoking among women (and men) in the United States has declined significantly over the past 40 years, it is estimated that nearly 20% of American women continue to smoke (Centers for Disease Control and Prevention, 2006). As a result of differences in tobacco use, health care utilization and access, and other social and environmental factors, substantial tobacco-related and other health disparities exist across key segments of the U.S. population (e.g., race/ethnicity, education, income, and region) (Galea et al., 2004; U.S. Department of Health and Human Services, 2000).

1.2. *Racial/Ethnic and Socioeconomic Differences in Women's Smoking*

Research that examines racial/ethnic differences in women's (age 18 and older) smoking reveals that current cigarette use is generally highest among American Indian and Alaskan Native women, somewhat lower among White and African American women, and lowest among Hispanic and Asian and Pacific Islander women (U.S. Department of Health and Human Services, 2001). Although women of color report smoking rates that are comparable to those of White women, research on tobacco-related morbidity and mortality suggest that the adverse impact of smoking is greater among non-White women (U.S. Department of Health and Human Services, 2001).

Because most racial and ethnic minority groups in the U.S. are economically disadvantaged relative to their White counterparts, and because smoking and its adverse health consequences impact poor women of color disproportionately, it is often difficult to disentangle racial/ethnic disparities from socioeconomic disparities in tobacco use and other health-related behaviors (Adler and Rehkopf, 2008; Centers for Disease Control and Prevention, 2004; U.S. Department of Health and Human Services, 2000). In light of the negative impact of smoking on women's health, growing racial/ethnic and SES disparities in health, the fact that most women who smoke begin doing so during adolescence, and studies that suggest that, "low socioeconomic status places girls at higher risk [of smoking] than boys" (U.S. Department of Health and Human Services, 2001, p. 471), it is critically important to examine the relationships between race/ethnicity, SES, and tobacco use among *girls*.

1.3. *Racial/Ethnic and Socioeconomic Differences in Girls' Smoking*

National studies that examine racial/ethnic differences in smoking among U.S. girls find that lifetime, current, and heavy cigarette use are, on average, most prevalent among American Indian girls, somewhat lower among White and Hispanic girls and lowest among Black and

Asian American girls (U.S. Department of Health and Human Services, 2001; Wallace et al., 2003). Trend data suggest these general patterns of racial/ethnic differences in smoking have existed over time (U.S. Department of Health and Human Services; 2001, Wallace et al., 2003).

To date, very little theory or empirical research has sought to explain the relationship between race/ethnicity, SES and smoking among girls. Recognizing this important limitation, a recent U.S. government report noted that, “[w]e need to understand how the interaction of gender, culture, race and ethnicity, and socioeconomic status affects women’s and girls’ use of tobacco products, perceptions of risk, and response to relevant health messages” (U.S. Department of Health and Human Services, 2004:1).

The conceptual framework that guides the present study builds upon past research and argues that girls’ smoking behavior is rooted in the socioeconomic conditions of their families and social and environmental conditions in which they are raised. For example, past research finds that households in which one or both parents are absent are poorer and have more smokers in them than do two parent households (King et al, 2009). Given that smoking is a learned behavior and that parents who smoke provide both modeling and access to cigarettes for their daughters, we expect that girls who live in single-parent families, or who do not live with either of their parents, will be more likely to smoke than girls who live with both parents.

Since other research finds that adults of low socioeconomic status (SES) are more likely than high-SES adults to smoke, we further hypothesize that smoking will be more prevalent among the daughters of low-SES parents. Similarly, we expect smoking to be higher among girls in low-SES environments compared to girls in high-SES environments, given findings from past research that low-SES families are more likely to live in economically disadvantaged “communities” (e.g., schools, neighborhoods) where smoking is more prevalent (O’Malley et al., 2006; U.S. Department of Health and Human Services, 2001).

Youths’ amount of disposable income is also related to parents’ SES and adolescent smoking. Past research finds that the children of low-SES parents have, on average, more disposable income than the children of higher SES parents (West et al., 2006). The reason for this paradox might be that poor parents are more likely to sacrifice to meet the needs and desires of their children (West et al., 2006). Unfortunately, the existing research suggests that young people with substantial amounts of disposable income (i.e., “premature affluence,” Bachman, 1983) may be inclined to use these resources to support behaviors like smoking (Scragg et al., 2002; Tyas and Pederson, 1998; Unger et al., 2007). In light of these findings, we hypothesize that girls from lower SES racial/ethnic groups will have more disposable income than their higher SES peers, and that cigarette use will be higher among girls who have more disposable income, irrespective of parents’ SES. (King et al., 2009; O’Malley et al., 2006).

1.4. The Present Study

Although numerous studies of adolescent cigarette use have examined the relationships between gender and smoking (U.S. Department of Health and Human Services, 2001; Wetherington and Roman, 1998), race/ethnicity and smoking (Bachman et al., 1991; Delva et al., 2005; Ellickson et al., 2004; Epstein et al., 1998; U.S. Department of Health and Human Services, 1998; Wallace et al., 2003), and SES and smoking (Galea et al., 2004; Soteriades and DiFranza, 2003; Tyas and Pederson, 1998), few studies have examined these relationships simultaneously (for exceptions see Barbeau et al., 2004; Kiefe et al., 2001), and few, if any, have explicitly focused on girls.

In an effort to begin to address these gaps in the literature, and to better understand racial and ethnic similarities and differences in girls’ tobacco use, the present study examines the

relationships between race/ethnicity, family SES, girls' disposable income, and school SES, controlling for urbanicity and region as key demographic correlates of SES and cigarette use among U.S. girls. More specifically, this study addresses the following four distinct, yet interrelated questions: First, what is the prevalence of cigarette use among U.S. girls, across racial/ethnic subgroups? Second, to what extent, if any, has the prevalence of girls' smoking changed over time and by race/ethnicity? Third, are SES measures identified in past research significant correlates of smoking among girls in the various racial/ethnic subgroups? And fourth, are there racial/ethnic differences in the strength of the relationships between SES measures and girls' smoking? We focus our analyses on early adolescence (8th grade), when experimentation with cigarettes begins.

2. Methods

2.1. Data Source

The data for this investigation are drawn from the University of Michigan's Monitoring the Future (MTF) study. The study design and methods are summarized briefly below; a detailed description is available elsewhere (see Johnston et al., 2008). MTF 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—about 400 each year; and Stage 3 is the selection of students within each school. This sampling strategy has been used to collect data annually from approximately 16,000 high school seniors since 1975 and from 18,000 eighth and 16,000 tenth graders since 1991. Sample weights were assigned to each student to take into account differential probabilities of selection.

Because MTF was designed primarily to provide data representative of the contiguous U.S., not data on gender or racial/ethnic differences, no special effort is made to oversample girls or any of the racial/ethnic subgroups. Because a number of the racial/ethnic subgroups are relatively small proportions of the total population, their numbers in the annual samples are also relatively small. In order to have sufficient numbers of cases to perform analyses on these subgroups, we combined five years of data (2003-2007). Because of the strong relationship between smoking, academic failure, and dropping out (see Bachman et al., 2008); coupled with the particularly high dropout rates for some ethnic groups (e.g., Hispanics, see Swaim et al., 1997); the present study focuses only on 8th graders, the sample of students least likely to be substantially affected by dropping out. For the trend analyses we combined data into the following four time intervals: 1991-1994, 1995-1998, 1999-2002, and 2003-2007.

Each year, locally based University of Michigan representatives follow carefully standardized procedures to collect data from students via self-administered questionnaires during normal class periods. The questionnaires are designed for optical scanning; all items are closed-ended. The annual response rates for 8th graders average around 90%. Absence on the day of data collection is the primary reason that students are missed; it is estimated that less than one percent of students refuse to complete the questionnaire. Four different questionnaire forms are used each year, each administered to a randomly selected subset of the sample.

The statistical significance of the differences in tobacco use between the various racial/ethnic subgroups is a function of sample size, percentage size, and design effects. Accordingly, all variance estimates presented are adjusted for the sampling design. The multistage sampling design, with respondents clustered in schools, produces larger sampling errors than would a simple random sample of equivalent size. For statistics in the present paper, the largest estimated design effects are 6.9, 3.2, 2.6, 2.2, 2.1, 2.3, and 2.1 respectively for White, Black, Mexican American, Puerto Rican, Other Latina, Asian American, and American Indian girls.

In light of the relatively large number of subgroups that we examine, however, it would be unwieldy to specify significance levels for each subgroup comparison we discuss. As a general guideline for comparisons across racial/ethnic groups, the largest 95% confidence intervals around percentages in Table 1 are 1.5% for Whites, 2.2% for Blacks, 2.7% for Mexican Americans, 5.6% for Puerto Ricans, 4.7% for Other Latinas, 3.3% for Asian Americans, and 6.0% for American Indians. Given the relatively large numbers of cases that we use in these analyses, many of the findings may reach traditional levels of statistical significance (i.e., $p < .05$) and yet be of little substantive significance. Recognizing this possibility, we treat as significant only those differences that equal or exceed $p < .01$, and we focus our discussion on those differences that we judge to be both statistically and substantively important.

2.2. Study Variables

2.2.1. Cigarette Use—The cigarette use measures focus on the proportion of students who report having smoked cigarettes in their lifetime, in the last 30 days, daily (in the last 30 days), and at the rate of a half pack or more per day (in the last 30 days).

2.2.2. Gender and Race/Ethnicity—Gender is measured by the question, “What is your sex?,” with the response categories 1 = male and 2 = female (only analyses for females are presented). The race/ethnicity question asks respondents, “How do you describe yourself?,” with the response categories 1 = American Indian (including Alaska natives beginning in 2005), 2 = Black or African American, 3 = Mexican American or Chicano, 4 = Cuban American, 5 = Oriental or Asian American, 6 = White or Caucasian, 7 = Puerto Rican American, 8 = Other Latin American, 9 = Hawaiian/other Pacific Islander. Prior to 2005, respondents were instructed to select *one* race/ethnicity category. In 2005, in a random half of the questionnaires, and in 2006 and thereafter in the remainder of the questionnaires, students were instructed to mark *all* categories that applied. Approximately 6% of students selected more than one racial/ethnic group; because of the small sample sizes, these students—as well as Cuban Americans and Hawaiian/other Pacific Islanders—were excluded from these analyses.

2.2.3. SES and Demographic Controls—The SES variables include family composition (0 = neither parent, 1 = one parent, 2 = two parents); parental education (the mean of mother and father’s education as a proxy for family SES) where 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); student’s weekly income (earned or given, where 1 = \$10 or less, 2 = \$11-50, 3 = \$51 or more); and the mean parental educational level in the student’s school (as a proxy for school SES) divided in quartiles where 1 = low, 2 = med-low, 3 = med-high, 4 = high). The demographic control variables include urbanicity (1 = non-metropolitan statistical area or non-MSA, 2 = other MSA, and 3 = large MSA) and region of the country in which students live (1 = Northeast, 2 = South, 3 = West, 4 = Midwest).

2.3. Analysis Strategy

The analyses presented below proceed in four stages: First, to assess the prevalence of girls’ smoking, we present data on cigarette use, across the four smoking measures, separately by racial/ethnic subgroup (Table 1). Second, to understand racial and ethnic differences and similarities in girls’ SES and other demographics, Table 1 also presents data on the distributions of the SES variables (i.e., family structure, parent education, disposable income, school SES) and urbanicity and region, also separately by race/ethnicity. Third, to explore the extent to which girls’ smoking has changed over time, we present trend data, by race/ethnicity, in multiyear intervals from 1991 to 2007 (Figure 1). Fourth, we used logistic regression to examine the impact of the independent variables on the prevalence of girls’ smoking by regressing current (i.e., 30-day) cigarette use on the SES variables and urbanicity and region (see Table 2).

The data presented in Table 2 are adjusted odds ratios and their associated 95% confidence intervals. Odds ratios that exceed a value of 1.0 (and whose 95% confidence interval does not include the value 1.0) indicate that the group of girls to which the odds ratio is linked is significantly ($p < .05$) more likely to smoke than girls in the omitted category. Statistically significant odds ratios ($p < .05$) that are less than 1.0 indicate that the girls in that group are less likely than girls in the omitted category to smoke. Values at or near 1.0 (i.e., those that are not statistically significant) suggest that the prevalence of smoking for the girls in that category is not significantly different than that for the omitted group.

Rather than simply “controlling for” race/ethnicity and assuming that the relationships between the SES variables and smoking are the same for all girls, irrespective of their race/ethnicity, we present the odds ratios (and their 95% confidence intervals) separately for each racial/ethnic group. The magnitudes of the odds ratios provide an estimate of the relationships between the various SES measures and smoking *within* each group. Comparing the magnitudes (and confidence intervals) of the odds ratios across racial/ethnic groups allow us to determine the extent to which there are significant differences in the strength of the relationships *across* racial/ethnic groups. More specifically, where the magnitudes of the odds ratios differ, and where there is no overlap in their confidence intervals, the strength of the relationship between the SES variable in question and cigarette use differs for the racial/ethnic groups being compared.

3. Results

3.1. Study Sample

The sample of 8th graders included in this study involves nearly 36,000 girls—67% White, 14% Black, 7% Mexican American, 5% Other Latinas, nearly 4% Asian American, 2% American Indian, and 2% Puerto Rican.

3.2. Prevalence of Cigarette Use

Table 1 shows the prevalence of lifetime, 30-day, daily, and half-pack cigarette use among U.S. girls by race/ethnicity. The data in the first column of Table 1 reveal that approximately 25% of all 8th-grade girls in the U.S., irrespective of racial/ethnic group, have used cigarettes in their lifetime; nearly 10% are current smokers (30-day use), almost 4% smoke daily; and 1.3% smoke a half pack or more of cigarettes per day.

With regard to racial/ethnic differences, lifetime and 30-day cigarette use are highest among American Indian girls, at an intermediate level among Mexican American and Puerto Rican girls, somewhat lower among White, Black, and Other Latinas, and lowest among Asian American girls. Daily smoking prevalence rates, which average 3.8% for all girls, are also highest among American Indian girls, followed by White, Puerto Rican, and Mexican American girls. Fewer than 2% of Black, Other Latinas, or Asian American girls report that they smoke daily. Although half-pack or more smoking prevalence rates are relatively low among all 8th-grade girls, the pattern of racial/ethnic differences is roughly comparable to that for daily smoking.

3.3. Racial/Ethnic Differences in Girls' SES and Demographics

Table 1 also presents data on SES and demographic variables for the total sample and for each racial/ethnic subgroup. The variables include family structure, parental education, weekly income, school SES, community size, and region. Nationally, 75% of 8th-grade girls live with both parents, 21% live with one parent, and only 4% do not live with either parent. One third (33%) of girls' parents have low levels of education, 25% have a medium amount, and more than 40% have relatively high levels of educational attainment. Two fifths (41%) of girls have a weekly income of \$10 or less, nearly half have a weekly income between \$11-50, and slightly

more than one in ten have income that exceeds \$51 per week. Geographically, nearly one third of girls live in large cities, nearly half live in medium-sized cities or suburban areas, and about one quarter live in smaller communities. In terms of regional differences, approximately 18% of 8th-grade girls live in the Northeast, about a quarter live in the Midwest, nearly 40% live in the South, and 20% live in the West.

The data presented in Table 1 also show important racial and ethnic differences in girls' socioeconomic conditions. For example, the data reveal that the vast majority of Asian American, White, Mexican American, and Other Latina girls live with both parents, compared to two thirds of American Indian girls, slightly less than two thirds of Puerto Rican girls, and less than half of Black girls. Also, substantial racial and ethnic differences were found in parents' educational attainment. Specifically, more than half of Asian American girls' parents are highly educated; compared to slightly less than half of White girls'; a third of Black girls'; about a quarter of Puerto Rican, Other Latina, and American Indian girls'; and only 15% of Mexican American girls' parents.

Interestingly, girls in the racial and ethnic groups that are probably most economically advantaged (i.e., in two-parent families and with highly educated parents) have the *lowest* levels of personal income. For example, 52% of Asian American girls and 44% of White girls have weekly incomes of \$10 or less per week. In general, the proportion of girls with the most personal income (i.e., \$51 or more dollars per week) are highest among Black and Puerto Rican girls (23% and 21%, respectively); at an intermediate level among Mexican American, Other Latinas, and American Indian girls; and lowest among White and Asian American girls.

Girls in racial/ethnic subgroups whose parents have low levels of education are more likely to be in low-SES schools. As a result, more than half of Mexican American girls, half of Other Latinas, roughly 40% of American Indian and Black girls, and a third of Puerto Rican girls attend schools in which the mean parental education level is in the lowest quartile, compared to less than 20% of White and Asian American girls.

Geographically, half or more of Mexican American, Other Latinas, and Asian American girls live in large cities. Roughly 40% of Black girls live in large or medium-sized cities. Puerto Rican girls, and to a lesser extent White girls, are most likely to live in medium-sized communities. American Indian girls are disproportionately concentrated in nonurban areas. In terms of regional distribution, White girls are most likely to live in the Midwest and the South; Black, Other Latinas, and American Indian girls are concentrated in the South; and Mexican American and Asian American girls live disproportionately in the West.

3.4. Trends in Smoking

Figure 1 shows trends in girls' lifetime, 30-day, daily and half-pack smoking from 1991 to 2007 by racial and ethnic subgroup. The data suggest that the general pattern of racial and ethnic differences in smoking has existed over time, with rates typically being highest among American Indian girls, lowest among Black and Asian American girls, and at intermediate levels among girls in the other subgroups. Across subgroups, girls' cigarette use generally increased between 1991 and 1995 but declined sharply between 1995 and 2007. The decline in use has, on average, been sharpest among the groups with higher smoking prevalences.

3.5. SES and Girls' Cigarette Use

Is the prevalence of smoking higher among low-SES girls than among their more economically advantaged peers? In general, the answer is yes (see Table 2). For example, for family composition, the odds of cigarette use in the last 30 days is twice as high (OR = 2.0, total sample) among girls who do not live with either parent compared to those who live with both

parents. Although the magnitudes of the odds ratios vary (ORs range from 1.6 for American Indian girls to 3.2 for Other Latinas), the finding that the odds of smoking is higher among those who do not live with either parent is also true for girls in the various racial/ethnic subgroups. Additionally, girls who live with one parent are generally more likely to smoke than those who live with both parents.

Parents' educational attainment is also related to girls' smoking, with girls whose parents have the least education typically being more likely to smoke (OR = 2.4, total sample) than those whose parents are more highly educated. Looking within the various racial/ethnic groups, the data suggest that the relationship between low parental education and smoking may be particularly strong for White girls (OR = 2.9). On average, girls whose parents have a medium amount of education are also more likely to smoke than girls whose parents have the most education (OR = 1.7, total sample). This conclusion seems particularly true for the racial/ethnic groups whose parents have the highest level of educational attainment (see Table 1)—White girls (OR = 1.9) and Asian American girls (OR = 2.2).

The amount of income that girls receive weekly is also a significant predictor of cigarette use. Girls' who have larger amounts of discretionary income are much more likely to smoke than girls whose weekly income is \$10 or less (OR = 2.4 for the total sample). In general, this relationship holds true across racial/ethnic subgroups and is particularly strong for girls who have the highest weekly income, \$51 or more (ORs range from 2.0 for Black girls to 8.4 for Asian American girls).

Data for the final socioeconomic measure—school SES—indicate that it too relates to girls' smoking, but not necessarily the same way across the different racial/ethnic groups. White and American Indian girls who attend lower SES schools are more likely to smoke than girls within their racial/ethnic groups who attend high-SES schools. For the other racial/ethnic groups, however, the school SES measure is not significantly related to their odds of smoking.

4. Discussion

The purpose of this paper was to examine the relationship between race/ethnicity, SES, and smoking among early adolescent girls in the U.S. More specifically, we examined the prevalence of cigarette use among nationally representative samples of 8th-grade girls; the SES profiles of girls from different racial and ethnic subgroups; the extent to which cigarette use among girls has changed over time; and the extent to which SES, controlling for urbanicity and region, predict girls smoking, within and across racial/ethnic subgroups.

Consistent with the findings of past research (Wallace et al., 2003), we found that cigarette use is, on average, highest among American Indian girls; at an intermediate level among Mexican American, Puerto Rican, Other Latinas, and White girls; and lowest among Black and Asian American girls. The analyses of trend data suggest that relatively small but consistent racial and ethnic differences in 8th-grade girls' cigarette use have existed over time. The trend data also reveal that, across racial/ethnic subgroups, girls' cigarette use has declined substantially from the mid-1990s to the present.

As one of the first studies to explicitly examine the relationship between SES and smoking among girls from different racial/ethnic backgrounds, we found that socioeconomic factors are important predictors of smoking for girls, irrespective of their racial/ethnic identity. More specifically, the data indicate that the odds of being a smoker are generally higher among girls who do not live with both of their parents, whose parents have low levels of education, and who have large amounts of disposable income. We also found that the odds of smoking are higher for girls in some racial/ethnic subgroups who attend low-SES schools. The data further suggest that although being economically disadvantaged increases the odds that girls from all

racial/ethnic groups will smoke, the impact of low SES on smoking may be particularly strong for White girls.

4.1. Limitations

Despite our use of large, diverse, nationally representative samples, and our exploration of a range of family-, individual-, and school-level socioeconomic factors to investigate girls' tobacco use, this study still has a number of important limitations. First, the study is based upon samples of students. Accordingly, girls who are frequently absent, home-schooled, or institutionalized are not included. As a result, the smoking prevalence rates that we report probably underestimate the actual prevalence of smoking in the total population (although Johnston et al., 2008, consider those underestimates to be quite small). In any case, the vast majority of girls across racial/ethnic and socioeconomic and demographic factors are still in school in 8th grade, so the findings should generalize fairly well to the entire noninstitutionalized population of U.S. girls of modal age 14.

A second important limitation of the study is that we lacked sufficient numbers of cases (and sufficiently detailed measures) to disaggregate the large heterogeneous groups of young people whom we labeled as "White," "Black," "Asian American" and so forth. In reality, each of these labels includes many, often culturally distinct, groups of youth. For example, "White" youth include young people of numerous European descents; those who we labeled as "Black" include young people of African, Caribbean, South American, and other heritages; and "Asians" include Japanese, Chinese, Korean, Laotian, Hmong, and various other groups of young people. Recognizing the importance of this issue, we did, to the extent our data permitted, try to provide data on several groups of young people—Mexican American, Puerto Rican, and Other Latinas—who are typically labeled as "Hispanic."

A third potential limitation of the study is rooted in the assumption that students honestly and accurately report their cigarette use, and that students in each of the racial/ethnic subgroups are equally likely to provide valid data on their smoking and SES. Although these assumptions are certainly open for debate, a growing body of literature suggests that, under the proper circumstances, such as those used in the present study, young people generally report their substance use honestly and that racial/ethnic differences in cigarette and other drug use self-reports are, by and large, valid and reliable (see Harrison, 1995; O'Malley et al., 1983; Wallace and Bachman, 1993; Wills and Cleary, 1997).

4.2. Conclusions

The results of this study suggest a number of interesting and important directions for future research. One important task for future research is to attempt to better understand the mechanisms through which SES may relate to girls' cigarette use. Another potential focus for future research is to investigate the extent to which SES might also relate to other substance use outcomes (e.g., alcohol, marijuana, other illicit drugs) and help to explain racial/ethnic disparities in their prevalence. Because of the relative absence of racial/ethnic group analyses, very little is known about the extent to which many of the socioeconomic and other risk and protective factors that have been identified in predominantly White samples also matter for young people of color. The data presented here suggest that while there are probably many similarities, there might be important differences as well. Still another important task for future research is to use longitudinal data to discover how racial/ethnic differences and similarities in cigarette and other drug use unfold developmentally across adolescence and into adulthood.

In addition to providing direction for future research, this study also has important implications for social policy. Specifically, these results suggest that policy efforts that improve the

socioeconomic well-being of families will, in all likelihood, reduce tobacco use among girls, which ultimately will improve the health of the nation's women.

Acknowledgements

We wish to thank Nicole Ridenour and Timothy Perry for their assistance with data analysis and preparation of the tables and figure and Katie Johnson for her editorial support.

Acknowledgement and Role of Funding Source

Funding for this study was provided by grant number R01DA01411 from the National Institute on Drug Abuse. The opinions expressed herein are those of the authors.

Role of the Authors: Drs Bachman, Johnston, and O'Malley were responsible for the design and implementation of the data collection. Drs. Vaughn, Bachman, Johnston, O'Malley, Schulenberg, and Wallace all contributed to the design of this specific study, Dr. Wallace wrote the first draft and revision of the manuscript. All authors have approved of the final manuscript.

References

- Adler E, Rehkopf DH. U.S. disparities in health: Descriptions, causes, and mechanisms. *Annu Rev Public Health* 2008;29:235–252. [PubMed: 18031225]
- Bachman JG. Premature affluence: Do high school students earn too much? *Econ Outlook USA* 1983;10:64–67.
- Bachman, JG.; O'Malley, PM.; Schulenberg, JE.; Johnston, LD.; Freedman-Doan, P.; Messersmith, EE. *The Education-Drug Use Connection: How Successes and Failures in School Relate to Adolescent Smoking, Drinking, Drug Use, and Delinquency*. Lawrence Erlbaum Associates/Taylor & Francis; New York: 2008.
- Bachman JG, Wallace JM Jr. O'Malley PM, Johnston LD, Kurth CL, Neighbors HW. Racial/ethnic differences in smoking, drinking, and illicit drug use among American high school seniors, 1976–1989. *Am J Public Health* 1991;81:372–377. [PubMed: 1994746]
- Barbeau EM, Krieger N, Soobader M. Working class matters: Socioeconomic disadvantage, race/ethnicity, gender, and smoking in NHIS 2000. *Am J Public Health* 2004;94:269–278. [PubMed: 14759942]
- Centers for Disease Control and Prevention. Prevalence of cigarette use among 14 racial/ethnic populations—United States, 1999–2001. *MMWR Morb Mortal Wkly Rep* 2004;53:49–52. [PubMed: 14749612]
- Centers for Disease Control and Prevention. Annual smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 1997–2001. *MMWR Morb Mortal Wkly Rep* 2005;54:625–628. [PubMed: 15988406]
- Centers for Disease Control and Prevention. Tobacco use among adults—United States, 2005. *MMWR Morb Mortal Wkly Rep* 2006;55:1145–1148. [PubMed: 17065979]
- Delva J, Wallace JM Jr. O'Malley PM, Bachman JG, Johnston LD, Schulenberg JE. The epidemiology of alcohol, marijuana, and cocaine use among Mexican American, Puerto Rican, Cuban American, and other Latin American 8th grade students in the United States: 1991–2002. *Am J Public Health* 2005;95:696–702. [PubMed: 15798132]
- Ellickson PL, Orlando M, Tucker JS, Klein DJ. From adolescence to young adulthood: Racial/ethnic disparities in smoking. *Am J Public Health* 2004;94:293–299. [PubMed: 14759945]
- Epstein JA, Botvin GJ, Diaz T. Ethnic and gender differences in smoking prevalence among a longitudinal sample of inner-city adolescents. *J Adolesc Health* 1998;23:160–166. [PubMed: 9730359]
- Galea S, Nandi A, Vlahov D. The social epidemiology of substance use. *Epidemiol Rev* 2004;26:36–52. [PubMed: 15234946]
- Harrison LD. The validity of self-reported data on drug use. *J Drug Issues* 1995;25:91–111.
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. *Monitoring the Future National Survey Results on Drug Use, 1975–2007: Volume I, Secondary School Students*. National Institute on Drug Abuse; Bethesda, MD: 2008. NIH Publication No. 08-6418A

- Kiefe CI, Williams OD, Lewis CE, Allison JJ, Sekar P, Wagenknecht LE. Ten-year changes in smoking among young adults: Are racial differences explained by socioeconomic factors in the CARDIA study? *Am J Public Health* 2001;91:213–218. [PubMed: 11211629]
- King K, Martynenko M, Bergman M, Liu YH, Winickoff JP, Weitzman M. Family composition and children's exposure to adult smokers in their homes. *Pediatrics* 2009;123:e559–e564. [PubMed: 19336347]
- O'Malley PM, Bachman JG, Johnston LD. Reliability and consistency of self-reports of drug use. *Int J Addict* 1983;18:805–824. [PubMed: 6605313]
- O'Malley PM, Johnston LD, Bachman JG, Schulenberg JE, Kumar R. How substance use differs among American secondary schools. *Prev Sci* 2006;7:409–420. [PubMed: 16900406]
- Scragg R, Laugesen M, Robinson E. Cigarette smoking, pocket money and socioeconomic status: Results from a national survey of 4th form students in 2000. *N Z Med J* 2002;115:108. [PubMed: 11999222]
- Soteriades ES, DiFranza JR. Parent's socioeconomic status, adolescents' disposable income, and adolescents' smoking status in Massachusetts. *Am J Public Health* 2003;93:1155–1160. [PubMed: 12835202]
- Swaim RC, Beauvais F, Chavis EL, Oetting ER. The effect of school dropout rates on estimates of adolescent substance use among three racial/ethnic groups. *Am J Public Health* 1997;87:51–55. [PubMed: 9065226]
- Tyas SL, Pederson LL. Psychosocial factors related to adolescent smoking: A critical review of the literature. *Tob Control* 1998;7:409–420. [PubMed: 10093176]
- Unger JB, Sun P, Johnson CA. Socioeconomic correlates of smoking among an ethnically diverse sample of 8th grade adolescents in Southern California. *Prev Med* 2007;44:323–327. [PubMed: 17303234]
- U.S. Department of Health and Human Services. A Report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; Atlanta, GA: 1998. Tobacco Use among U.S. Racial/Ethnic Minority Groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics.
- U.S. Department of Health and Human Services. Healthy People 2010: Understanding and Improving Health. Vol. 2nd ed.. U.S. Government Printing Office; Washington, DC: 2000.
- U.S. Department of Health and Human Services. Women and Smoking: A Report of the Surgeon General. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; Atlanta, GA: 2001.
- U.S. Department of Health and Human Services. Women, Tobacco, and Cancer: An Agenda for the 21st Century. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; Washington, DC: 2004.
- Wallace, JM., Jr.; Bachman, JG. Validity of self-reports in student-based studies on minority populations: Issues and concerns. In: Delarosa, M.; Adrados, J-LR., editors. *Drug Abuse among Minority Youth: Advances in Research and Methodology*. National Institute on Drug Abuse Research Monograph 130. National Institute on Drug Abuse; Rockville, MD: 1993. NIH Publication No. 93-3479
- Wallace JM Jr, Bachman JG, O'Malley PM, Schulenberg JE, Cooper SM, Johnston LD. Gender and ethnic differences in smoking, drinking, and illicit drug use among American 8th, 10th, and 12th grade students, 1976-2000. *Addiction* 2003;98:225–234. [PubMed: 12534428]
- West P, Sweeting H, Young R, Robins M. A material paradox: Socioeconomic status, young people's disposable income and consumer culture. *J Youth Stud* 2006;9:439–465.
- Wetherington, CL.; Roman, AB., editors. *Drug Addiction Research and the Health of Women*. U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse; Rockville, MD: 1998. DHHS Publication No. 98-4290
- Wills TA, Cleary SD. The validity of self-reports of smoking: Analyses by race/ethnicity in a school sample of urban adolescents. *Am J Public Health* 1997;87:56–61. [PubMed: 9065227]

Figure 1. Trends in U.S. 8th-Grade Girls' Lifetime, 30-Day, Daily and Half-Pack Cigarette Use, by Race/Ethnicity (1991-2007). Source: The Monitoring the Future study, the University of Michigan.

TABLE 1

Descriptive Statistics: Cigarette Use, Socioeconomic Measures, Urbanicity and Region for U.S. 8th Grade Girls', by Race/
Ethnicity (2003-2007 data combined)

	Total N= 35,910	White 23,394	Black 4,592	Mex. Am. 2,303	Puerto R. 515	Oth Lat. 1,634	Asian Am. 1,226	Amer. In. ² 728
	%	%	%	%	%	%	%	%
CIGARETTE USE								
Frequency								
Lifetime	25.3	24.8	24.9	31.6	31.2	24.0	12.1	43.8
30 Day	9.1	9.9	5.2	9.5	11.2	6.0	3.5	18.9
Daily	3.8	4.5	1.5	3.0	4.0	1.6	1.1	9.3
1/2 Pack+/Day	1.3	1.6	0.7	0.9	2.0	0.1	0.0	3.1
SOCIO-DEMOGRAPHICS								
Family Structure								
0 Parents	3.6	2.1	9.4	4.9	6.8	3.2	2.5	9.2
1 Parent	21.4	16.8	43.5	19.2	33.5	24.9	13.6	25.8
2 Parents	75.0	81.1	47.1	75.9	59.6	72.0	83.9	65.0
Parental Education								
Low (1.0-3.0)	32.6	27.1	36.4	65.6	44.0	53.9	24.4	43.2
Medium (3.5-4.0)	25.4	26.0	28.0	19.2	27.6	19.4	18.4	28.7
High (4.5-6.0)	42.1	46.8	35.6	15.3	28.4	26.7	57.2	28.1
Weekly Income								
\$10 or less	41.2	43.7	27.8	40.4	41.1	39.1	52.1	37.2
\$11-\$50	46.4	46.9	49.1	43.2	38.5	46.5	38.5	49.9
\$51 or more	12.4	9.5	23.1	16.5	20.5	14.4	9.4	12.9
School SES								
Low (Q1)	25.3	16.9	39.7	59.1	33.8	48.2	16.0	43.0
Low-Mid (Q2)	24.7	24.6	29.1	19.2	31.2	19.9	24.6	24.2
Mid-High (Q3)	25.1	29.7	15.4	12.7	18.3	13.2	22.7	22.7
High (Q4)	25.0	28.7	15.8	8.9	16.7	18.7	36.7	10.1
Population Density								
Non MSA	23.5	29.3	15.1	9.5	4.9	5.5	3.8	54.3
Other MSA	45.5	47.5	42.7	40.3	60.6	38.9	44.9	30.3
Large MSA	31.0	23.2	42.3	50.2	34.6	55.5	51.3	15.4

	Total N= 35,910	White 23,394	Black 4,592	Mex. Am. 2,303	Puerto R. 515	Oth Lat. 1,634	Asian Am. 1,226	Amer. In. ² 728
Region								
Northeast	17.8	18.1	14.4	2.4	58.5	24.5	23.6	8.7
Midwest	22.7	27.8	17.3	9.6	9.7	4.6	9.7	22.1
South	39.2	35.7	63.5	38.3	25.0	42.9	16.5	55.6
West	20.4	18.4	4.8	49.8	6.8	28.0	50.1	13.6

The largest confidence intervals around percentages are 1.5 for Whites, 2.2 for Blacks, 2.7 for Mexican Americans, 5.6 for Puerto Ricans, 4.7 for Other Latin Americans, 3.3 for Asian Americans and 6.0 for American Indians.

² American Indian category includes Alaska natives beginning in 2005 in half of the forms and in 2006 in the remainder of the forms.

TABLE 2
Adjusted Odds Ratios from Multivariate Logistic Regressions of 30 Day Cigarette Use on Socioeconomic Status Measures, Urbanicity, and Region among U.S. 8th Grade Girls' by Race/Ethnicity (2003-2007 data combined)

	Total 35,910	White 23,394	Black 4,592	Mex. Am. 2,303	Oth. Lat. 1,634	Asian Am. 1,226	Amer. In 728	Puerto Rican 515
SOCIO-DEMOGRAPHICS								
Family Structure	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
0 Parents	2.0 (1.6,2.5)	2.4 (1.8,3.2)	2.7 (1.6,4.6)	2.6 (1.3,5.2)	3.2 (1.1,9.6)	2.3 (0.6,8.7)	1.6 (0.7,3.8)	2.5 (1.0,6.4)
1 Parent	1.5 (1.3,1.7)	1.9 (1.7,2.2)	1.2 (0.9,1.8)	1.8 (1.2,2.6)	2.2 (1.3,3.6)	4.3 (1.9,10.1)	1.1 (0.7,2.0)	1.3 (0.7,2.4)
2 Parents	-	-	-	-	-	-	-	-
Parental Education								
Low (1.0-3.0)	2.4 (2.1,2.8)	2.9 (2.5,3.3)	1.7 (1.2,2.4)	1.2 (0.7,2.1)	1.1 (0.6,2.0)	0.7 (0.3,1.7)	1.7 (0.9,3.2)	1.2 (0.5,2.6)
Medium (3.5-4.0)	1.7 (1.5,2.0)	1.9 (1.6,2.2)	1.2 (0.8,1.8)	1.3 (0.7,2.4)	1.3 (0.7,2.5)	2.2 (1.0,5.1)	0.7 (0.3,2.0)	1.3 (0.6,2.9)
High (4.5-6.0)	-	-	-	-	-	-	-	-
Weekly Income								
\$10 or less	-	-	-	-	-	-	-	-
\$11-\$50	1.5 (1.4,1.7)	1.6 (1.4,1.8)	1.4 (0.9,2.1)	1.6 (1.1,2.4)	2.6 (1.4,4.6)	1.8 (0.8,4.3)	1.2 (0.7,2.1)	1.6 (0.7,3.7)
\$51 or more	2.4 (2.1,2.7)	2.9 (2.5,3.5)	2.0 (1.3,3.2)	2.6 (1.5,4.6)	3.6 (1.7,7.5)	8.4 (3.5,20.3)	2.4 (1.4,4.3)	3.2 (1.5,7.2)
School SES								
Low (Q1)	1.7 (1.3,2.2)	3.1 (2.4,4.0)	0.6 (0.3,1.1)	0.5 (0.3,1.1)	0.7 (0.4,1.4)	1.9 (0.7,4.7)	3.8 (1.1,13.0)	0.6 (0.2,1.9)
Low-Mid (Q2)	1.8 (1.4,2.2)	2.7 (2.1,3.4)	0.7 (0.4,1.2)	0.8 (0.4,1.8)	0.7 (0.4,1.4)	0.9 (0.3,2.8)	2.6 (0.8,8.7)	0.9 (0.3,2.8)
Mid-High (Q3)	1.5 (1.2,1.8)	1.8 (1.4,2.3)	0.7 (0.4,1.4)	0.9 (0.5,1.8)	0.9 (0.5,1.7)	0.6 (0.2,1.7)	1.6 (0.5,5.6)	0.6 (0.2,1.8)
High (Q4)	-	-	-	-	-	-	-	-
Population Density								
Non MSA	0.7 (0.5,0.8)	1.2 (1.0,1.5)	0.4 (0.3,0.7)	0.9 (0.5,1.7)	0.4 (0.2,1.1)	0.4 (0.1,2.1)	0.6 (0.3,1.3)	0.3 (0.1,0.9)
Other MSA	1.0 (0.8,1.1)	1.3 (1.1,1.6)	0.6 (0.4,1.0)	0.9 (0.5,1.7)	0.8 (0.4,2.0)	0.6 (0.1,2.9)	0.7 (0.4,1.3)	0.5 (0.2,1.5)
Large MSA	-	-	-	-	-	-	-	-
Region								
Northeast	1.2 (0.9,1.5)	1.1 (0.9,1.4)	0.9 (0.4,2.3)	1.1 (0.3,3.7)	0.7 (0.4,1.5)	3.5 (1.5,8.2)	0.7 (0.2,2.2)	0.7 (0.2,2.3)
Midwest	1.4 (1.1,1.9)	1.3 (1.0,1.6)	1.4 (0.6,3.4)	1.8 (0.9,3.5)	0.7 (0.2,2.5)	1.4 (0.4,5.2)	1.4 (0.5,4.0)	0.4 (0.1,2.1)
South	1.3 (1.1,1.7)	1.4 (1.1,1.7)	0.8 (0.4,1.6)	1.3 (0.8,2.2)	1.3 (0.7,2.2)	1.3 (0.4,4.8)	1.3 (0.5,3.6)	1.1 (0.3,3.4)
West	-	-	-	-	-	-	-	-

Source: Monitoring the Future