



Nina Mikhaïlenko. *Chickens for Sale*. Oil on canvas, 16" × 20".

*Race and ethnicity affect
smoking outcome expectancies
and smoking status.*

Race/Ethnicity, Smoking Status, and Self-Generated Expected Outcomes From Smoking Among Adolescents

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*R*acial/ethnic differences in adolescent smoking suggest that different factors may motivate smoking among various racial/ethnic groups. This study examined relations among race/ethnicity, self-generated smoking outcome expectancies, and smoking status. Our findings noted that current smoking was highest among Hispanics, whereas African Americans and Asians were least likely to ever smoke. African Americans were most likely to experiment but least likely to smoke currently. Five expectancies differed significantly by race/ethnicity: reduce tension, image, negative aesthetics, addiction, and cost. However, none were significant mediators or moderators. Racial/ethnic groups most susceptible to smoking initiation and with the highest rates of current smoking should be targeted for prevention and cessation. Research is needed to examine more thoroughly racial/ethnic differences in expectancies.

Introduction

Although adolescent smoking rates have declined in recent years, roughly one quarter of high school students regularly smoke by the time they graduate from high

school. Moreover, smoking rates are substantially higher among students who have dropped out of school.¹ Because the majority of individuals who initiate smoking during adolescence continue to smoke into adulthood, adolescence represents a critical window of time for the

The relationship between race/ethnicity, self-generated smoking outcome expectancies, and smoking status among high school students was examined.

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prevention and treatment of tobacco smoking.² Therefore, the identification of factors that may influence the initiation and maintenance of smoking within this vulnerable segment of the population is crucial.

Racial/ethnic differences in smoking rates among adolescents have been well documented. White high school students have markedly higher rates of smoking than African American, Hispanic,^{2,3} and Asian students.⁴ These racial/ethnic differences in adolescent smoking rates suggest that different factors could motivate the initiation and maintenance of tobacco smoking among various racial/ethnic groups. Examination of the positive and negative expected outcomes from smoking, a key component of most social learning and cognitive models of smoking and other substance use motivation,⁵⁻⁷ has the potential to more clearly elucidate racial/ethnic differences with respect to the motivational determinants of adolescent smoking behavior.^{5,8,9}

Theoretically, expected outcomes for smoking that are highly accessible in memory should most strongly predict smoking behavior.¹⁰⁻¹² Therefore, expected outcomes that are self-generated rather than predetermined by experimenters should be more highly accessible in memory¹³ and better reflect the specific cultural influences in the populations under study.⁸ Furthermore, experimenter-generated questionnaire measures of expectancies are often developed using primarily white samples, which may limit their generalizability to other racial/ethnic populations. Thus, allowing adolescents to use their own words to name the outcomes they expect from smoking may be particularly useful in understanding the functional significance of smoking among different racial/ethnic groups. Moreover, this information could be used to develop future smoking prevention and cessation interventions tailored to race/ethnicity.

Study Purpose and Design

This paper reports secondary analyses of data collected from students attending one all-girls' and one all-boys' urban Catholic high school.⁸ The purpose of the report is to examine relations among race/ethnicity, self-generated smoking outcome expectancies, and smoking status within a sample of high school students. We hypothesized that smoking outcome expectancies would differentially influence smoking status among different racial/ethnic groups during adolescence, even after controlling for key sociodemographic (ie, gender and grade) and psychosocial (ie, peer smoking) correlates of smoking. Gender, grade, and peer smoking have been identified as key variables associated with adolescent smoking behavior.¹³⁻¹⁵ Therefore, all analyses controlled for gender, grade, and peer smoking in order to ensure that observed differences among racial/ethnic groups were not attributable to these factors.

Methods

Participants

Girls (n = 332) and boys (n = 283) attending two same-sex urban Catholic high schools participated in the study. Parents were provided with parental informed consent forms that stated that the survey was anonymous. All data were collected during a single class period and most students participated during required health or physical education classes.

Procedure

Teachers left the room after introducing the experimenter (C.B.A.). Students who produced signed parental consent forms participated in the study. Students were again informed that the survey was completely confidential. Participants received a packet that contained a sheet of paper with 10 blank lines for listing positive expected outcomes of smoking and a sheet with 10 blank lines for listing negative expected outcomes of smoking. Students were instructed to turn over the packet and write down all the positive (or negative) outcomes of smoking that they could think of in 60 seconds. Time was called and the procedure repeated for negative (or positive) outcomes. The order of administration was counterbalanced by class. Students then responded to questionnaires on demographics, smoking status, and peer smoking.

Measures

Expected Outcomes: Because free response periods have varied widely in previous studies, ranging from 3 or 4 minutes^{16,17} to no time restriction,^{18,19} no clear criteria exist for determining the time frame within which the most salient beliefs are accessible.²⁰ Therefore, we used a relatively short free response period in an effort to capture the most salient expected outcomes.

Expected smoking outcomes generated within each of the two 60-second free response periods were evaluated.^{17,19} Two of the investigators (C.B.A. and K.I.P.) independently grouped the 5,900 responses into 22 positive and 14 negative categories and coded the responses. Specifically, the two investigators first examined the responses individually and generated logical, data-driven categories. Next, they independently assigned codes to each of the words and then compared their codes in order to finalize the categories. A "garbage" category was also created for idiosyncratic (eg, "nicotine is beautiful"), unreadable or unclear responses, and responses that were mentioned only once or twice (eg, "calms nausea"). As a reliability check, two graduate students unrelated to the project were asked to code a random subset of 25 girls and 25 boys into the categories. Kappa coefficients of .96 for the complete set of responses and .92 for the subset indicated excellent inter-rater agreement. Participants' responses were entered verbatim into a database. If an expected outcome was written by a student within the 60-

second time frame, it was counted as ever mentioned (0 = not mentioned; 1 = mentioned).

Demographics: This questionnaire included items assessing race/ethnicity (ie, white, Hispanic, African American, Asian, or other), gender, and current grade in school. Because the objective of this paper was to examine racial/ethnic differences in smoking status and self-generated smoking outcome expectancies, students who identified their racial/ethnic classification as “other” (n = 47) were excluded from all analyses.

Smoking Status: Four mutually exclusive groups — current smokers, experimenters, susceptible never smokers, and nonsusceptible never smokers — were created. Consistent with the Youth Risk Behavior Survey,¹ whether students had ever tried even one puff of a cigarette was measured using one dichotomous item (0 = never; 1 = even one puff) and current smoking was defined as any cigarette use within the past 30 days (0 = no smoking in past 30 days; 1 = smoked at least one day in past 30 days). To be classified as a current smoker, participants had to respond positively to both the current- and ever-smoking items. Experimenters responded positively to the ever-smoking item and negatively to the current-smoking item. Prior to being classified as susceptible or nonsusceptible never smokers, participants were first classified as never smokers. Never smokers responded negatively to both ever- and current-smoking items. Three items were then used to classify each participant as susceptible or not susceptible to smoking²¹: (1) Do you think you might smoke in response to an offer for a cigarette from one of your best friends? (2) Do you think you might smoke any time during the next 30 days? (3) Do you think you might smoke a cigarette any time during the next year? The response scale for all three items included the following options: *definitely not*, *probably not*, *probably yes*, and *definitely yes*.

To be classified as not susceptible to smoking, never smokers had to answer *definitely not* to the question about whether they would smoke in response to an offer for a cigarette from one of their best friends, *definitely not* to the question assessing whether they might smoke in the next 30 days, and *definitely not* to the question about whether they might smoke any time during the next year. Never smokers who provided responses other than *definitely not* to any of the three susceptibility questions were classified as susceptible to smoking. We were particularly interested in assessing susceptibility to smoking among never smokers because susceptibility has been linked to future experimentation with cigarettes^{22,23} as well as established smoking.²⁴

Peer Smoking: Students responded to the item “Does he/she smoke cigarettes?” three times, once for each of his or her three best friends. The item had three response options: *never*, *sometimes*, and *often*. A dichotomous variable was then created (1 = yes, at least one of three best friends *sometimes* or *often* smokes; 0 = each of three best friends *never* smokes).¹

Data Analyses

Because smoking status was defined using four ordered categories (ie, nonsusceptible never smoker, susceptible never smoker, experimenter, current smoker), ordinal logistic regression analysis (OLR)²⁵ was used to examine racial/ethnic differences in smoking status. OLR permits the quantification of the odds of increased smoking status. The OLR analyses used a cumulative logit model with the proportional odds assumption, which holds that cumulative probabilities are equivalent and are not influenced by the cut-point of the specified outcome variable. Odds ratios (ORs) of 1.0 indicate no association between the independent variable and the outcome, ORs greater than 1.0 indicate a positive association, and ORs of less than 1.0 indicate a negative association. Binary logistic regression analysis was used to examine relations between race/ethnicity and self-generated smoking outcome expectancies. Because few studies have examined adolescents’ self-generated expected outcomes for smoking, we did not correct for the number of tests performed and left significance at $P < .05$ to capture small but potentially important relationships. Of note, peer smoking was defined as a dichotomous variable (ie, no best friends smoke vs one or more best friends smoke) in all analyses. To examine whether defining peer smoking continuously (ie, no best friends smoke, one best friend smokes, two best friends smoke, three best friends smoke) might improve our ability to detect racial/ethnic differences in smoking status and expectancies, we also ran all models using peer smoking as a continuous variable. Results of both models were identical for all outcomes. Therefore, we chose to report the results models that included peer smoking as a dichotomous variable in this paper.

Results

Participant Characteristics and Smoking Status

Girls (n = 332) and boys (n = 283) attending two urban Catholic high schools participated in the study. Participant demographic and smoking characteristics by race/ethnicity are presented in Table 1. Peer smoking approached significance with African Americans reporting that fewer of their peers smoked compared to the other racial/ethnic categories.

Racial/Ethnic Differences in Smoking Status

Ordinal logistic regression (OLR) analysis indicated significant racial/ethnic differences across the four smoking status categories ($P = .0022$). All analyses controlled for gender, grade, and peer smoking. As depicted in the Figure, smoking status among whites differed significantly from that of Asians (34% vs 24%; OR = 0.51, $P = .0247$) and African Americans (34% vs 4%; OR = 0.32, $P = .0031$). Whites served as the reference group for these compar-

Table 1. — Relationship Between Demographic Variables and Race/Ethnicity

Demographics	Race/Ethnicity				P Value
	White (n = 457; 74%)	African American (n = 29; 5%)	Hispanic (n = 81; 13%)	Asian (n = 48; 8%)	
	%	%	%	%	
Grade:					.693
9	34	38	29	44	
10	33	24	41	33	
11	16	17	14	8	
12	17	21	16	15	
Gender:					.695
Boys	45	55	48	48	
Girls	55	45	52	52	
Peer smoking status:					.052
At least 1 of 3 best friends smokes	50	28	56	43	

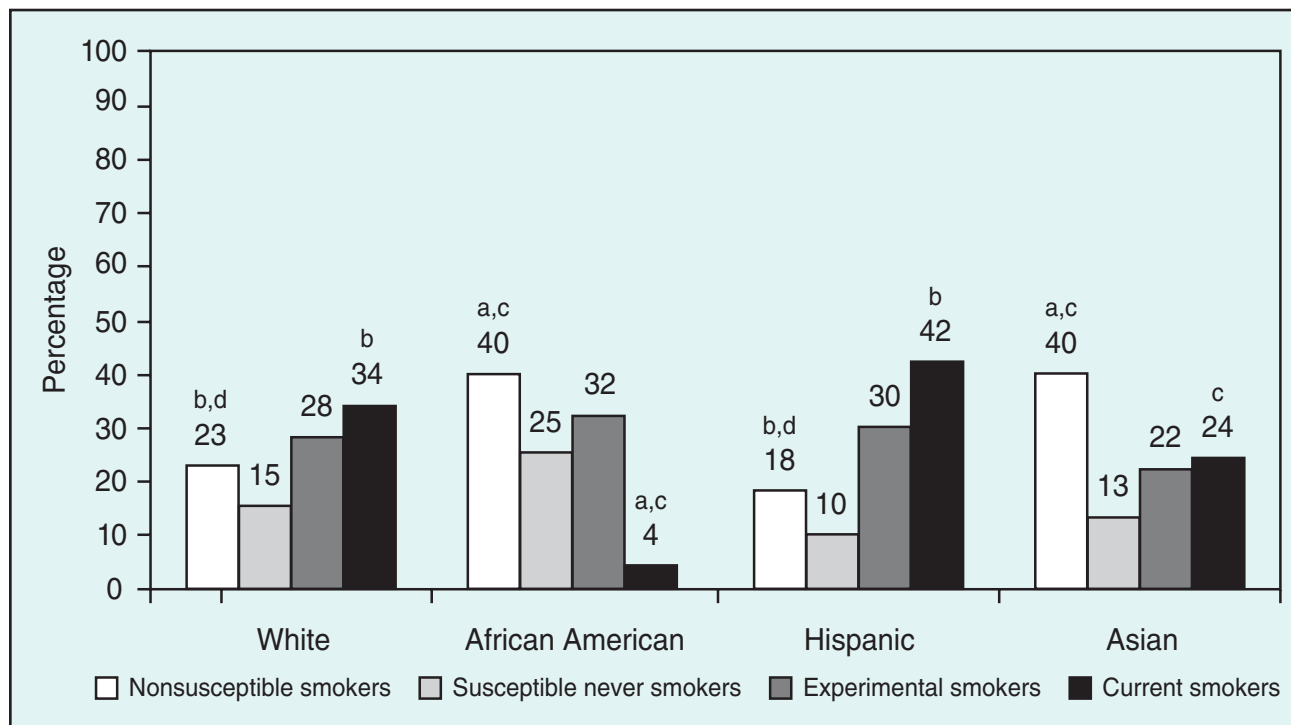
Note: Relations with race/ethnicity were examined using chi-square tests.

isons. Smoking status among Hispanics differed significantly from Asians (42% vs 24%; OR = 0.42, $P = .0149$) and African Americans (42% vs 4%; OR = 0.27, $P = .0020$). Hispanics served as the reference group for these comparisons. There were no significant differences across the four smoking status categories between whites and Hispanics or between African Americans and Asians.

Relations of Race/Ethnicity With Self-Generated Expected Smoking Outcomes

Logistic regression analyses that controlled for gender, grade, and peer smoking revealed significant racial/ethnic

differences in 5 (14%) of 36 self-generated expected smoking outcomes examined (Table 2). Specifically, 2 positive (ie, reduces tension, positive image) and 3 negative (ie, negative aesthetics, addiction, cost) expected smoking outcomes differed significantly across racial/ethnic groups. As shown in Table 2, Asians were significantly more likely than whites (OR = 2.39, $P = .0147$) and African Americans (OR = 3.03, $P = .0316$) to generate the expected outcome that smoking reduces tension. In addition, whites were significantly more likely than African Americans to report that smoking was associated with a positive image (OR = 4.17, $P = .0217$). In addition, whites



Relationship between race/ethnicity and smoking behavior (a = significantly different from whites ($P < .05$), b = significantly different from African Americans, $P < .05$, c = significantly different from Hispanics, $P < .05$, d = significantly different from Asians, $P < .05$). All analyses controlled for grade, gender, and peer smoking.

were significantly more likely than Asians to report that smoking was associated with negative aesthetics (OR = 2.29, $P = .0199$). Whites were significantly more likely than Hispanics to associate smoking with addiction (OR = 1.78, $P = .0371$) and more likely than African Americans to associate smoking with the cost of cigarettes (OR = 7.93, $P = .0443$).

Mediator and Moderator Analyses

OLR and binary logistic regression models were used to examine whether expected smoking outcomes mediated or moderated relations between race/ethnicity and smoking status. All models controlled for grade, gender, and peer smoking. To examine whether expected smoking

outcomes mediated relations between race/ethnicity and smoking status, we used ordinal and binary logistic regression analyses. Following Baron and Kenny,²⁶ we first examined associations between (1) race/ethnicity and smoking status, and (2) race/ethnicity and expected smoking outcomes. Because none of the expected smoking outcomes examined was associated with both race/ethnicity and smoking status at a significance level of $P < .25$, no further mediator analyses were conducted. OLR models were used to examine whether expectancies moderated relations between race/ethnicity and smoking status. Specifically, we examined the influence of expected smoking outcome by gender interactions on smoking status and found no significant interactions.

Table 2. — Frequencies of Self-Generated Smoking Expectancies as a Function of Ethnicity

Expected Outcomes	White	African American	Hispanic	Asian
Positive:				
Reduce tension	53.8% ^d	44.8% ^d	60.5%	75.0% ^{a,b}
Image	33.3% ^b	10.3% ^a	28.4%	20.8%
Social	30.0%	31.0%	30.9%	27.1%
Buzz	24.1%	13.8%	21.0%	10.4%
Pleasure	23.0%	24.1%	16.0%	20.8%
Weight	16.0%	20.7%	11.1%	12.5%
Relieve boredom	7.9%	6.9%	7.4%	6.3%
Taste/smell	7.2%	6.9%	3.7%	0.0%
Relieve cravings	4.8%	10.3%	11.1%	10.4%
Reduce dysphoria	5.9%	0.0%	7.4%	6.3%
Escape problems	4.2%	10.3%	1.2%	6.3%
Enhance self-esteem	3.9%	3.4%	2.5%	2.1%
Stimulation	3.1%	6.9%	4.9%	0.0%
Boost economy	3.3%	3.4%	1.2%	2.1%
Curiosity	2.2%	0.0%	6.2%	2.1%
Cognitive improvement	2.0%	0.0%	3.7%	4.2%
Coupons/ads	2.4%	0.0%	0.0%	0.0%
Risk taking	1.8%	3.4%	2.5%	4.2%
Something to do w/hands	2.0%	0.0%	1.2%	0.0%
Smoke tricks	1.3%	0.0%	2.5%	0.0%
Reduce anger	1.3%	0.0%	0.0%	4.2%
Better than other drugs	0.9%	0.0%	1.2%	0.0%
Negative:				
Health impairment to self	97.8%	100%	95.1%	100%
Negative aesthetics	82.5% ^d	75.9%	74.1%	68.8% ^a
Addiction	41.6% ^c	24.1%	28.4% ^a	33.3%
Negative social	23.9%	13.8%	18.5%	25.0%
Endanger/disturb others	19.9%	24.1%	22.2%	27.1%
Cost	21.7% ^b	3.4% ^a	14.8%	10.4%
Exercise/sport impairment	13.1%	3.4%	7.4%	8.3%
Get in trouble	7.7%	3.4%	7.4%	4.2%
Cause negative mood	5.7%	0.0%	3.7%	6.3%
Cognitive impairment	2.4%	3.4%	8.3%	2.8%
Pollute air	1.3%	3.4%	3.7%	4.2%
Taste bad	1.5%	0.0%	1.2%	4.2%
Taste/smell impairment	1.8%	3.4%	0.0%	2.1%
Drug gateway	1.3%	3.4%	0.0%	4.2%

^a = significantly different from whites, $P < .05$
^b = significantly different from African Americans, $P < .05$
^c = significantly different from Hispanics, $P < .05$
^d = significantly different from Asians, $P < .05$
 Logistic regression (SAS Proc Logistic) was used for analyses. All analyses controlled for grade, gender, and peer smoking.

Discussion

In contrast to recent epidemiological data,^{2,3} rates of current smoking in our sample were higher among Hispanics than whites (42% vs 34%). This finding is consistent with research indicating that higher levels of acculturation predict increased smoking among Hispanic adolescents.²⁷ Whites reported the second highest rate of current smoking in our sample, followed by Asians and African Americans. Rates of experimental smoking were relatively high for all racial/ethnic groups, but were highest for African Americans and followed closely by Hispanics. Overall, the most striking racial/ethnic differences were observed at both ends of the smoking status continuum, among nonsusceptible never smokers and current smokers. Despite Hispanics' having the highest rate of current smoking, Hispanic students who had never smoked were also the least susceptible to smoking. Conversely, African Americans were dramatically less likely than other racial/ethnic groups to be current smokers but never smokers were much more susceptible to smoking than whites and Hispanics were. Current smoking among Asian students was also more prevalent than anticipated, and Asians who reported never smoking were much more susceptible to smoking compared with whites and Hispanics. These data clearly support the importance of smoking prevention interventions for all racial/ethnic groups. However, they also highlight the need to target specific racial/ethnic groups with the highest rates of current smoking as well as those that are most at risk for smoking initiation.

Our results provide little preliminary support for the hypothesis that smoking outcome

expectancies differentially influence smoking status among different racial/ethnic groups during adolescence. After controlling for sociodemographic (ie, gender and grade) and psychosocial (ie, peer smoking) correlates of smoking, we found that whites, overall, were significantly more likely than other racial/ethnic groups to associate smoking with negative expected outcomes (ie, negative aesthetics, addiction, and financial cost). Asians were about as likely or significantly more likely than other racial/ethnic groups to associate smoking with positive expected outcomes (ie, positive image and reduced tension, respectively). In addition, we found that the negative aesthetics of smoking were significantly less likely to be reported by Asians than by whites. The tendency to associate smoking with a positive image was significantly more common among whites than African Americans. Whites were also more likely than African Americans to report the financial cost of smoking as a negative expected outcome. This finding was surprising, given the socioeconomic disparities between whites and African Americans in society as a whole. However, because all students attended the same private schools, socioeconomic status differences may have been similar or less apparent across racial/ethnic groups. Unfortunately, socioeconomic data for the schools were not available to us. In addition, it is likely that the dramatically higher rate of current smoking among whites vs African Americans in our sample (34% vs 4%) influenced this result. Current smoking among African Americans in our sample was also much lower than in the general adolescent population (ie, 15.1%).³ On the other hand, the rate of experimental smoking among African Americans in our sample was higher than anticipated (32%). Although African American students reported slightly higher rates of experimentation with smoking than any other racial/ethnic group in our sample, they also reported the lowest rates of current smoking. This finding suggests that African Americans who experimented with smoking were less likely than other racial/ethnic groups to move on to current smoking. It is also consistent with previous studies indicating that, compared to whites, minority adolescents are more likely to start smoking at a later age and less likely to become dependent on nicotine.^{28,29}

To our knowledge, no other studies have formally examined racial/ethnic differences in smoking outcome expectancies among adolescents. Therefore, we are unable to make comparisons among racial/ethnic differences in expectancies assessed via validated questionnaires and self-generated assessment methodologies. However, Robinson and Klesges¹⁴ examined the relationship between race/ethnicity and beliefs about the “instrumental value” of smoking among a sample of white and African American adolescents. The instrumental value of smoking was conceptualized as the social value of smoking and was assessed using six items (eg, students were asked to rate the degree to which smoking would make

them look “cool”), which were averaged to create an overall instrumental value index. Their results indicated that whites rated the perceived social value of smoking as significantly higher than African Americans.

We view the use of self-generated expected outcomes of smoking as a considerable strength of the current study. According to Stacy and colleagues,¹⁸ questionnaire measures of expected smoking outcomes are unlikely to tap the most accessible expected outcomes because the response options have been predetermined by the investigator. Expected outcomes self-generated by individuals are, therefore, likely to better reflect outcomes that are most accessible in memory and to be more representative of specific populations. On the other hand, there are limitations of using self-generated vs experimenter-generated (eg, the Smoking Consequences Questionnaire)³⁰⁻³³ measures of expected smoking outcomes. For example, validated questionnaire measures of smoking outcome expectancies such as the Smoking Consequences Questionnaire have known psychometric properties, and questionnaire measures should more readily allow for direct comparisons of findings across studies. Furthermore, there is some evidence that both self-generated and questionnaire measures of expectancies contribute unique information to the prediction of substance use.³⁴ Thus, inclusion of both types of measurements may improve our understanding of substance use.

The present study has several limitations. Conclusions that can be drawn are limited by the cross-sectional nature of the data. Specifically, it is not possible to determine whether the observed racial/ethnic differences in expected smoking outcomes emerged before or after racial/ethnic differences in the initiation of smoking patterns. In addition, compared to whites ($n = 457$), our study included relatively small numbers of Hispanic ($n = 81$), Asian ($n = 48$), and African American ($n = 29$) students, which decreased our likelihood of detecting meaningful racial/ethnic differences in expectancies between these groups. The pattern of racial/ethnic differences in smoking status that emerged from our data also differs from that documented at the population level. Specifically, Hispanics in our study had a higher prevalence of smoking than in the general population, and African Americans reported a somewhat lower smoking prevalence than expected. Nonetheless, the racial/ethnic composition of our sample was similar to the most recently reported racial/ethnic composition of the United States population (ie, whites, 74% vs 72%; Hispanics, 13% vs 11.8%; Asians, 8% vs 4.1%; and African Americans, 5% vs 12%).³⁵ Finally, because our data were collected from students attending two urban, private, Catholic schools located in the southern United States, the racial/ethnic groups sampled in our study may not be representative of the same racial/ethnic groups at the population level. Each of these limitations may restrict the generalizability of our findings.

Conclusions

Our data indicated large racial/ethnic differences in smoking status among a sample of urban adolescent high school students. Moreover, significant racial/ethnic differences emerged in self-generated positive and negative expected smoking outcomes. However, racial/ethnic differences in expected smoking outcomes were not found to mediate or moderate the relationship between race/ethnicity and smoking status, providing little support for the hypothesis that expected smoking outcomes play much of a role in relations between race/ethnicity and smoking status. Nonetheless, this study provides the first data that we know of on racial/ethnic differences in expected smoking outcomes among adolescents. Further research is needed to examine racial/ethnic differences in smoking outcome expectancies more thoroughly. Although the use of self-generated smoking outcome expectancies is a considerable strength of this study, questionnaire studies may be needed to examine how the strength of these expectancies may differ among racial/ethnic groups. Additional research is needed prior to drawing conclusions about the potential utility of interventions that target expectancies specific to racial/ethnic groups.

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