Teenage Smoking, Attempts to Quit, and School Performance

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ABSTRACT

Objectives. This study examined the relationship between school performance, smoking, and quitting attempts among teenagers.

Methods. A logistic regression model was used to predict the probability of being a current smoker or a former smoker. Data were derived from the 1990 California Youth Tobacco Survey.

Results. Students' school performance was a key factor in predicting smoking and quitting attempts when other sociodemographic and family income factors were controlled.

Conclusions. Developing academic or remedial classes designed to improve students' school performance may lead to a reduction in smoking rates among teenagers while simultaneously providing a human capital investment in their futures. (*Am J Public Health.* 1998;88:940–943)

Introduction

To reduce smoking rates among teenagers, it is important to create fewer new smokers among teenagers, to increase the number of teenage smokers who quit, or both. Despite a consistent decline in smoking rates among the adult population in recent years, smoking among teenagers has increased since 1991.[1] There have been numerous studies examining the prevalence of teenage smoking,[2–12] but few have focused on quitting behavior, including successful or unsuccessful attempts.[13–15] Understanding this behavior may provide insights for future policy formulation on tobacco control for teenagers. This paper explores smoking status and quitting attempts, with particular emphasis on school performance.

Factors that influence teenagers to smoke are complex and numerous. They include sociodemographic characteristics, family background, school performance, and other social and environmental factors. Among these factors, some are predetermined, such as age, gender, and ethnicity. Others can be affected through program implementation or policy initiatives such as prohibition of cigarette sales to minors or education about the effects of smoking. We used the 1990 California Youth Tobacco Survey to study the relationship between school performance, smoking, and attempts to quit smoking among teenagers.

It has generally been accepted that a student's school performance is inversely related to smoking status.[16–18] That is, the better a student does scholastically, the less likely she or he is to become a smoker. School performance can be viewed as a broad indicator that reflects traits such as general educational commitment, motivation, competence in learning and value judgment, and academic success.[19–21] The purpose of this paper is to investigate in detail the issue of school performance in relation to smoking status.

Methods

Data Source

The 1990 California Tobacco Survey was undertaken as a part of the evaluation of the outcome of Proposition 99, the Tobacco Tax Initiative. The 1990 California Youth Tobacco Survey was part of the California Tobacco Survey. These surveys used random-digit dialing telephone interviews; 32 135 households (85 379 individuals) were contacted. The California Youth Tobacco Survey instrument was used to interview 6604 teenagers 12 to17 years of age among the 85 379 respondents. The interview response rate was 76.3%, 5040 individuals completing the survey. Of the respondents, 12 had missing information. Thus, the final sample was composed of 5028 teenagers.

Dependent Variables

In this study, teenagers were divided into 3 categories in terms of their smoking status: current smokers, former smokers, and nonsmokers. According to the definition of the Centers for Disease Control and Prevention, a current smoker is anyone who has smoked during the past 30 days (including daily smokers and occasional smokers). A teenager who had smoked any time before but not during the previous 30 days was considered a former smoker. A teenager who had never smoked was classified as a nonsmoker.

To study quitting behavior, we divided a subsample of former and current smokers into 3 categories: (1) those who had been smokers but had not smoked during the past 30 days (i.e., those who quit), (2) those who had smoked during the past 30 days, and (3) those who had smoked during the past 30 days but had made a number of attempts to quit smoking.

Explanatory Variables

Many factors may influence teenage smoking or quitting behavior; given data availability and statistical considerations, however, we included the following variables

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in the analysis: age, gender, race/ethnicity, income, and school performance.

The youth smoking survey included teenagers between 12 and 17 years of age. The interviewees were divided into 3 age groups: 12 to 13 years, 14 to 15 years, and 16 to 17 years. Since the respondents were of school age, and schooling year (i.e., grade) and age are almost completely correlated, the years-in- school variable was not included in the model. In the model estimation, the 12- to 13-year age group was the comparison group.

Among the gender and ethnicity classifications, female and White were the comparison groups. Ethnic classifications, in addition to White, were Black, Asian, Hispanic, and "other."

Family income was grouped as follows: less than $20000, $20000 to $49999, $50 000 to $74999, and $75000 or above. Families with incomes below $20000 were the comparison group.

School performance was self-reported and included 4 categories: much better than average, better than average, average, and below average. Much better than average was the comparison group.

TABLE 1—Sociodemographic Characteristics by Youth Smoking Status

Characteristic	Nonsmokers (n = 3664),%	Former Smokers (n = 868),%	Current Smokers (n = 496), %	Total No. (n = 5028)
Age, y				
12–13	89.17	7.67	3.16	1708
14–15	72.86	18.33	8.81	1691
16–17	55.80	26.21	17.99	1629
Gender				
Male	71.55	18.14	10.31	2541
Female	74.23	16.37	9.41	2487
Race/Ethnicity				
White	70.99	18.41	10.61	3488
Black	82.11	12.46	5.43	313
Asian	80.55	12.36	7.09	437
Hispanic	67.90	20.99	11.11	324
Other	77.04	13.95	9.01	466
Income, $				
<20 000	73.64	15.73	10.63	1449
20 000–49 999	73.60	16.67	9.73	2004
50 000–74 999	74.67	16.41	8.62	847
≤75 000	66.90	22.94	10.16	728
School performance				
Much better than average	80.62	13.92	5.46	934
Better than average	76.18	16.41	7.41	1889
Average	68.32	19.37	12.31	1998
Below average	47.31	21.51	31.18	186
Undefined	90.48	4.76	4.76	21

Note. Data were derived from the 1990 California Youth Tobacco Survey.

Results

Descriptive Statistics

Table 1 shows that, among the 5028 teenagers, 72.9% were nonsmokers, 17.2% were former smokers, and 9.9% were current smokers. As expected, the older the teenager, the more likely he or she was to be a current smoker. Almost 18% of the teenagers 16 or 17 years old were current smokers, as compared with 8.8% of those 14 or 15 years old and 3.2% of those 12 or 13 years old. There were no differences between boys and girls in terms of smoking status. Among ethnic youth, Black teenagers were less likely to be current smokers. Furthermore, students who performed below average in school were more often current or former smokers than better-than-average students.

Among current smokers (n = 496), 344 teenagers reported some effort to quit smoking. As these teenagers were classified among the current smokers, their attempts clearly were not successful. The survey provided information on the frequency of quitting attempts, however; 58 teenagers had never attempted to quit, 92 had made 1 attempt, 108 had made 2 or 3 attempts, and 86 had made 4 or more attempts. A multivariate analysis was performed to analyze

factors that may predict attempts to quit smoking.

Multivariate Analysis

Given the multiple classifications of smoking status, logistic regression was used to predict the probability of being a former smoker (successful quitter) vs a current smoker; current smokers were the comparison group. The explanatory variables (age, gender, ethnicity, income, and school performance) were used in the model.

Table 2 presents logistic coefficients and the estimated odds ratio for each variable in the model. It can be seen that age (i.e., 16 or 17 years) was a statistically significant variable. Among teenagers 16 or 17 years old, the odds of being a former smoker were 0.54 in comparison with teens 12 or 13 years old. In other words, the older the teen, the less likely he or she was to become a former smoker. No significant differences existed between boys and girls in terms of likelihood of being former smokers. As expected, non-White teenagers were less likely to be current or former smokers. Teenagers from the highest income group (≥ $75 000) had higher odds (1.43) of becoming former smokers.

In comparison with students in the much-better-than-average–school-performance category, below-average students

were less likely to become former smokers (lowest odds ratio: 0.26); average students also had lower odds (0.64). These findings indicate that poorer-performing students had less chance of becoming former smokers than better-performing students.

Current smokers were asked about their attempts to quit smoking during the last 6 months. Of these respondents, 16.9% indicated that no effort was made, 26.7% attempted to quit once, 31.4% attempted to quit 2 or 3 times, and 25% attempted to quit 4 or more times. From this, it is evident that 83% of these current smokers had tried to quit and failed. Given the large percentage of 0 values in the dependent variable, a tobit model was used to estimate attempts to quit. The tobit model is an extension of the probit model, which takes into account both discrete numerical values (i.e., number of attempts to quit) and 0 values (as estimated by the maximum likelihood method). In general, the tobit model is statistically superior to the ordinary least squares technique for estimating a data set such as the present one. Table 3 presents the tobit results. These results indicate that there were no differences among gender or age groups in attempts to quit smoking. However, Black teenagers in the current smoking group attempted to quit less frequently. The main effect shows that teenagers from households with incomes between $20 000 and $49 000

TABLE 2—Logistic Regression of Factors Associated with Teenage Smoking Status (Former Smoker = 1, Current Smoker = 0)

	Coefficient	Odds Ratio
Constant	1.17**	
Age, y		
14–15	−0.22	0.80
16–17	−0.62**	0.54**
Female	−0.09	0.91
Race/ethnicity		
Black	0.46	1.58
Asian	0.04	1.04
Hispanic	−0.04	0.99
Other	0.18	1.20
Income, $		
20 000–49 999	0.15	1.16
50 000–74 999	0.18	1.20
≥75 000	0.35*	1.43*
School performance		
Better than average	−0.09	0.91
Average	−0.44**	0.64**
Below average	−1.34**	0.26**
χ^2 (df = 13)	56.20**	

Note. Current smokers were the control group. Sample sizes were as follows: former smokers, n = 868, current smokers, n = 496. The deleted categories were age below 14 years, male, White, family income below $20 000, and much better than average school performance.
*P < .05 (2-tailed); **P < .01 (2-tailed)

TABLE 3—Tobit Regression of Factors Associated with Number of Quitting Attempts among Smokers (n = 344)

	Coefficient	SE
Constant	0.82*	
Age, y		
14–15	−0.20	0.25
16–17	−0.20	0.24
Female	0.22	0.13
Race		
Black	−1.23**	0.41
Asian	0.27	0.27
Hispanic	−0.35	0.27
Other	−0.35	0.23
Income, $		
20 000–49 999	1.81**	0.54
50 000–74 999	0.76	0.69
≥ 75 000	0.40	0.55
School Performance		
Better than average	0.45	0.44
Average	0.99**	0.39
Below average	1.14*	0.45
Interaction terms <20 000 family income		
Better than average performance	−1.36*	0.64
Average performance	−1.78**	0.58
Below average performance	−2.04**	0.67
Scale	1.14	0.05
χ^2 (df = 22)	39.19	

Note. The deleted categories were age below 14 years, male, White, family income below $20 000, and much better than average school performance. All interactions between school performance and income were included in the model, but only significant interactions are presented here.
*P < .05 (2-tailed); **P < .01 (2-tailed).

made more attempts to quit than teenagers from households with incomes of less than $20 000. Students who performed below average in school and whose household income was between $20 000 and $49 999 made the least number of attempts to quit smoking, as shown by the coefficient of the interaction term in Table 3.

Discussion

The results from this study indicate that (1) students' school performance is a key factor in predicting smoking status after control for other sociodemographic and family income factors; (2) the older the teen, the less likely he or she is to successfully quit smoking; (3) below-average students are less likely to become former smokers; and (4) below-average students with lower household incomes make fewer attempts to quit. This study has provided a more precise quantitative magnitude of the influence of students' school performance on smoking status while confirming previous findings about the influence of ethnicity and household income on student smoking status.

One unresolved issue is whether smoking can influence a student's school performance. The literature shows no direct causation from smoking to school performance, but smoking might have an indirect effect, leading to other delinquency behaviors or drug abuse. These behaviors, in turn, could lead to poor school performance. However, the main argument against this hypothesis is that smoking is a relatively common behavior relative to other factors that lead to antisocial behaviors.[19,20] Therefore, it is appropriate to treat school performance as an explanatory variable.

As indicated at the beginning of this paper, teenage school performance often reflects certain qualities during adolescence, such as dependability, self-confidence, and intellectual investment. Educational success can be viewed as a broad construct that includes components of motivation, educational commitment, and a sense of control over one's present and future. On the other hand, lack of educational success can be interpreted as students' lack of current opportunities or perceived future opportunities. One policy implication is that increasing the educational involvement and school performance of teenage students is likely to have important additional payoffs in terms of reduced cigarette smoking that may well extend into adulthood.[19,21]

In this study, school performance data were self-reported; as a result, the data generated were determined in large part by the

students' perceptions of themselves relative to their peers. These data also reflect students' self-images. Thus, the school performance variable per se is by no means a comprehensive indicator of scholastic achievement; rather, it may be a partial measure of self-esteem.

Given the increasing rates of smoking among teens, it seems that developing academic or remedial classes designed to improve students' school performance may lead to a reduction in smoking rates among teenagers while simultaneously providing a human capital investment in their futures. □

Acknowledgments

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