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## Reported Exposure to Pro-Tobacco Messages in the Media: Trends Among Youth in the United States, 2000–2004

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### Abstract

**Purpose**—Document changes from 2000 to 2004 in youth reports of exposure to pro-tobacco messages in the mass media, including images of smoking and tobacco advertising.

**Design**—Comparison of cross-sectional data from three waves of the school-based National Youth Tobacco Surveys conducted in 2000 (N = 33,772), 2002 (N = 23,439), and 2004 (N = 23,540).

**Setting**—Public and private middle schools and high schools across the United States.

**Subjects**—Students in grades 6 through 12.

**Measures**—Smoking status; exposure to images of smoking on television and in movies; exposure to advertisements for tobacco products in stores, on the Internet, and in newspapers and magazines; demographic data.

**Results**—Youth exposure to pro-tobacco messages declined within all media channels studied from 2000 to 2004, except the Internet. Despite these declines, most youth in the United States remain exposed to pro-tobacco messages: 81% saw images of smoking on television or in movies (down from 90%), 85% saw tobacco ads in stores (down from 88%), 50% saw tobacco ads in newspapers and magazines (down from 66%), and 33% saw tobacco ads on the Internet (up from 22%).

**Conclusion**—Despite recent progress in this area, most youth in the United States are still at increased risk of smoking as a result of exposure to pro-tobacco messages in the mass media.

### Keywords

Adolescent; Smoking; Tobacco Industry; Marketing; Mass Media; Prevention Research; Manuscript format: research; Research purpose: descriptive; Study design: nonexperimental; Outcome measure: cognitive, behavioral; Setting: school, local community, state/national; Health focus: smoking control; Strategy: policy, culture change; Target population age: youth; Target population circumstances: education/income level, race/ethnicity

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## PURPOSE

Smoking rates among youth in the United States have declined in recent years. Between 2000 and 2004, there were declines in current smoking among both middle school students (from 11.0% to 8.4%) and high school students (from 28.0% to 21.7%).<sup>1,2</sup> These declines have been attributed to a combination of factors, including increases in the price of cigarettes; strong national, state, and local anti-tobacco control programs; legislation that eliminates smoking in public spaces; and restrictions on tobacco industry marketing as a result of the Master Settlement Agreement (MSA).<sup>1</sup> Although strong tobacco control measures and the associated declines in youth smoking represent positive news for the public health community, there is some concern that the rate of decline of youth smoking is being slowed by tobacco industry marketing and other implicitly pro-tobacco messages in the mass media.

There is a growing body of literature showing that tobacco industry marketing strongly influences youth cigarette smoking. A recent review of the literature concluded that there is a causal relationship between exposure to tobacco marketing and youth smoking initiation, with greater exposure to marketing resulting in greater risk for smoking, even after controlling for socioeconomic status, parental smoking, and peer smoking.<sup>3</sup> A longitudinal study from 1998 showed that having a favorite tobacco ad or owning a tobacco-industry promotional item or being willing to own such an item resulted in greater risk of smoking or being open to smoking 3 years later.<sup>4</sup> The authors estimated that 700,000 annual instances of youth smoking experimentation nationwide can be attributed to tobacco industry promotion.

Furthermore, recent research showed that traditional promotional channels are not the only ones that have a substantive influence on youth behavior: a number of studies have documented the relationship between youth exposure to tobacco use in films and smoking initiation, intention to smoke, and progression to established smoking.<sup>5–10</sup> Longitudinal studies conclude that exposure to smoking in movies is the primary risk factor for smoking initiation among youth in the United States.<sup>9,11</sup> Among girls, having a favorite movie star who smoked doubled the risk of the girl smoking 3 years later.<sup>7</sup> The most recent of these studies showed that youth who report greater exposure to smoking imagery in movies at baseline are more likely than their peers to be an established smoker 2 years later, regardless of other common smoking factors, such as age, parental smoking, and friend smoking.<sup>10</sup>

Given the evidence that explicit and implicit pro-tobacco media messages encourage youth smoking, it is important to monitor the resources expended in the dissemination of these messages and, when possible, their prevalence. Tobacco is among the most heavily advertised and promoted consumer products in the United States.<sup>12</sup> In 2005 alone, the tobacco industry spent more than \$13.1 billion in domestic promotional activities, up from \$9.6 billion in 2000.<sup>13</sup> Approximately \$46.4 million was spent in 2005 on advertisements in newspapers and magazines, including adult-marketed magazines with popularity among youth, such as *Rolling Stone* and *Glamour*. Approximately \$1.3 billion was spent on retail promotions, including point-of-sale advertising, promotional allowances for retailers, and “retail value-added” promotions, such as bonus cigarettes. Other promotional expenditures of the tobacco industry in 2005 included \$9.8 billion on price discounts, \$214.2 million for public entertainment, \$51.8 million in direct mail advertising, \$30.6 million in sponsorships, and \$5.3 million for branded promotional items.<sup>13</sup> Independent research has suggested that marketing expenditures reported by the industry to the Federal Trade Commission (FTC) may vastly under-represent the real amounts spent on tobacco marketing.<sup>14</sup> The tobacco companies report no expenditures dedicated to advertising on the Internet, which the MSA prohibits. However, the Web offers hundreds of sites that glamorize famous smokers and smoking culture and is readily accessible to individuals of all ages.<sup>15</sup> Youth also have ample opportunities to purchase tobacco products through the Internet because online tobacco vendors have weak barriers to underage tobacco access.<sup>16</sup>

Despite an overall increase in spending on tobacco marketing, FTC data show declines in spending on magazine and newspaper advertising, point-of-sale promotions, and promotional items. This may be a result of restrictions placed on tobacco industry promotions by the 1998 MSA with the major tobacco companies and 48 attorneys general, and public pressure not to advertise to youth. One of the greatest declines in expenditure was for magazine advertising, which declined from \$294.9 million in 2000 to \$44.8 million in 2004, due in large part to the elimination of magazine advertising by Phillip Morris.<sup>14</sup>

The MSA prohibits promotional arrangements that would result in “product placement” of branded tobacco products in movies and television programs. Nevertheless, there is ample potential for youth exposure to smoking imagery in movies. A recent study showed that tobacco was depicted in 75% of G-, PG-, and PG-13-rated movies, as well as in 90% of R-rated movies.<sup>17</sup> Another recent study showed that 534 popular, contemporary movies delivered a total of 13.9 billion smoking impressions to U.S. adolescents of 10 to 14 years.<sup>18</sup>

Given the documented effect of exposure to pro-tobacco messages on youth smoking, monitoring the extent of youth exposure to explicit and implicit pro-tobacco messages conveyed through a variety of media channels is an important area of research. This study examined changes from 2000 to 2004 in youth reports of exposure to pro-tobacco messages in the mass media to understand potential differences in exposure—and thus risk—experienced by population subgroups. Exposure was examined by grade level, gender, race/ethnicity, and smoking status.

## METHODS

### Design

The data used in this study are from the National Youth Tobacco Surveys (NYTS), cross-sectional surveys that were conducted in middle and high schools in the springs of 2000, 2002, and 2004. The NYTS is a comprehensive survey measuring the tobacco use behavior of students, as well as their beliefs and attitudes about tobacco, and an array of factors that encourage and inhibit tobacco use. Measures include exposure to secondhand smoke, parental and peer smoking, rules about smoking in the home, and exposure to pro- and anti-tobacco messages in the mass media.

The survey instrument was a self-administered, paper and pencil questionnaire that was distributed by the field staff in selected classrooms. Participation was voluntary, and the survey was anonymous. Written parental permission was obtained prior to the date of survey administration; youth consent to participate was obtained at the time of the survey administration. The study was approved by Copernicus Group Institutional Review Board (IRB), a contractor to American Legacy Foundation, in 2000 and 2002; the Centers for Disease Control and Prevention IRB in 2004; and the IRB of the data collection contractor ORC Macro in 2000, 2002, and 2004.

Student respondents were selected using a three-stage design. Primary sampling units consisted of counties or groups of contiguous counties. Within each selected county, schools were chosen with probability proportional to size, with stratification by size to force some smaller schools into the sample. Students from each selected school were selected within grade strata. To allow for separate analyses of African-American, Hispanic, and Asian-American students, schools with substantial proportions of these races/ethnicities were oversampled in the NYTS. Schools were given an honorarium of \$1000 for their participation.

### Sample

In 2000, 35,828 students in 324 schools completed the survey, with an overall response rate of 84%. In 2002, 26,149 students in 246 schools completed the survey, with an overall response rate of 90%. In 2004, 27,933 students from 267 schools completed the survey, with an overall response rate of 82%. After exclusions for missing values, the sample sizes for the current analyses were 33,772, 23,439 and 23,540 in 2000, 2002, and 2004, respectively. Percent missing for different items ranged from less than 0.01% for gender in 2000 to close to 6.0% for the response to reported exposure to ads in magazines and newspapers in 2004.

### Measures

Smoking status was defined as follows.

- Current smokers were students who smoked in the previous 30 days
- Former smokers were students who reported smoking in the past but not in the past 30 days

- Open-to-smoking youth were students who had never smoked but did not “strongly disagree” with three statements about intentions to smoke (“Do you think that you will try a cigarette soon?”, “Do you think you will smoke a cigarette anytime during the next year?”, and “If one of your best friends offered you a cigarette, would you smoke it?”)
- Closed-to-smoking youth were students who had never smoked and “strongly disagreed” with the above statements.

Exposure to pro-tobacco media messages was measured using the following items.

- When you watch TV or movies, how often do you see actors smoking?
- When you are searching the Internet on a computer, how often do you see ads for cigarettes and other tobacco products?
- When you read newspapers or magazines, how often do you see ads or promotions for cigarettes and other tobacco products?
- When you go to a convenience store, supermarket, or gas station, how often do you see ads for cigarettes and other tobacco products or items that have tobacco company names or pictures on them?

In 2000 and 2004 response options for each question were “most of the time,” “some of the time,” “hardly ever,” “never,” and “I don’t watch TV or movies” (or read newspapers and magazines, etc.). Youth who reported being exposed to media messages “most of the time” or “some of the time” were classified as “exposed.” Those who reported being exposed “hardly ever” or “never,” as well as those who reported no opportunities for exposure (don’t watch TV, etc.) were classified as “not exposed.” In 2002 the response option “all of the time” was also offered to respondents; these respondents were classified as “exposed.” In 2000 exposure to smoking in movies and exposure to smoking on TV were asked as two separate questions. For the purpose of this study, the data for these items were combined so that responses from that year could be compared with those from other years, when a single question covered both domains.

### Statistical Analysis

The proportion of youth reporting exposure to pro-tobacco messages was compared across waves of the NYTS, overall and by subgroups, for each media channel. Chi-square tests were used to assess whether differences in subgroups were statistically significant. Survey weights were used to adjust for the probability of selection, for nonresponse, and to control for race/ethnicity and grade level. Multiple logistic regression was used to quantify the average odds of youth exposure to pro-tobacco messages through each media channel from 2000 to 2002 and from 2002 to 2004, controlling for gender, grade level, race/ethnicity, weekly income, and smoking status. The cluster design of the NYTS was accounted for in all analyses. Analyses were conducted using STATA 9.2.

## RESULTS

### Sample Characteristics

The sample was divided into approximately equal proportions of boys and girls in each of the 3 survey years (Table 1). The samples grew younger over time, with the proportion of students in grades 6 through 8 increasing from 2000 to 2004. The proportion of white youth in the samples decreased over the study period, whereas the proportion of Hispanic and African-American youth increased. The proportion of current and former smokers declined from 2000 to 2004; the proportion of never-smokers increased. Weekly income among youth declined over the study period—the proportion of youth who reported no or little income increased and the number who reported higher incomes decreased. Each of these differences were statistically significant at the  $p < .05$  level, a result that is to be expected given the large size of the study sample.

### Exposure to Smoking on TV and in the Movies

Youth exposure to smoking imagery on TV and in movies declined from 90.3% in 2000 to 81.0% in 2004 (Table 2). This pattern of decline was reflected in all of the subgroups analyzed. The largest decline was observed among students in grades 6 to 8, among whom exposure declined from 90.2% in 2000 to 76.7% in 2004. Students who had never smoked and were closed to smoking also showed a large decline in exposure from 88.9% in 2000 to 76.7% in 2004. In contrast, current smokers showed only a small decrease in exposure to smoking on TV and in movies over the same period, from 91.1% to 88.2%. The unadjusted odds ratios showing change in the probability of youth exposure to pro-tobacco messages over time, by gender, grade level, race, and smoking status appear in Table 3. Adjusted odds ratios (Table 4) indicated that, on average, youth were 17% less likely to report exposure to smoking imagery on TV or in the movies in each of the two time periods studied, 2000 to 2002 and 2002 to 2004 ( $p = .000$ ).

Although there were no age differences in exposure in 2000 and 2002, in 2004, 85% of youth in grades 9 to 12 reported exposure, compared with 77% in grades 6 to 8 (a statistically significant difference). In 2000 and 2004 current and former smokers reported statistically significantly higher levels of exposure than never-smokers who were closed to smoking. In 2002 there were no statistically significant differences in exposure between current smokers and closed-to-smoking youth, but former smokers reported higher levels of exposure than youth who were closed to smoking.

### Exposure to Tobacco Advertising on the Internet

The percentage of students reporting high levels of exposure to tobacco advertising on the Internet increased over the study period, overall and in every subgroup (Table 2). Overall, 22.1% of youth reported Internet exposure in 2000 compared with 32.8% in 2004. Students in grades 9 to 12 showed the greatest change in exposure, from 19.4% in 2000 to 35.0% in 2004. Current smokers reported the highest levels of exposure in 2004 (39.6%) up from 23.8% in 2000. Youth who had never smoked and were closed to smoking showed a relatively smaller increase in exposure, from 20.5% in 2000 to 28.4% in 2004. To ensure that this trend was not the result of increases in Internet access among youth during the

study period, the analysis was repeated with the subset of youth who reported Internet access. The results of this analysis were similar to those generated using the full sample. The multiple logistic regression analysis indicates that, on average, youth were 17% more likely to report exposure to smoking imagery on the Internet in each of the two time periods studied ( $p = .000$ ) (Table 4).

There were no consistent patterns of exposure within subgroups, but in 2004 current smokers were more likely to report seeing tobacco ads on the Internet than former smokers (35.1%), open-to-smoking youth (35.6%), and closed-to-smoking youth (28.4%).

### **Exposure to Tobacco Advertising in Newspapers and Magazines**

Youth exposure to tobacco advertising in newspapers and magazines declined overall and in every subgroup (Table 2). The period of greatest decline occurred between 2002 and 2004, when exposure among youth overall dropped from 63.3% to 50.3%. The greatest decline in exposure occurred among youth in grades 6 to 8, of whom 59.6% reported exposure in 2000 and 41.0% in 2004. Non-Hispanic white youth also showed a marked decline (from 68.4% to 51.2%), as did closed-to-smoking youth (from 63.0% to 45.1%). The multiple logistic regression analysis showed that, on average, youth were 13% less likely to report exposure to pro-tobacco messages in newspapers or magazines in each of the two time periods ( $p = .000$ ) (Table 4).

Students in grades 9 to 12 showed statistically significantly higher frequencies of exposure than students in grades 6 to 8. Girls reported higher frequency of exposure than boys in each study year. Non-Hispanic white youth reported higher levels of exposure than Hispanic and African-American youth across all survey years, but the difference in exposure was statistically significant only in 2000. In each survey year, current smokers reported statistically significantly higher frequencies of exposure than youth who had never smoked and were closed to smoking. In 2004 current smokers reported statistically significantly higher levels of exposure than youth in every other smoking category.

### **Exposure to Tobacco Advertising in Stores**

Exposure to tobacco advertising in stores declined from 2000 to 2004, from 88.2% to 84.7%. Examining trends by age group revealed a substantial decline only among students in grades 6 to 8; in 2000, 86.5% of students reported seeing tobacco advertising in retail outlets compared with 80.6% in 2004. Declines within other subgroups were relatively small. The multiple logistic regression model showed that, on average, youth were 6% less likely to report exposure to tobacco advertising in stores in each of the time periods studied ( $p = .000$ ) (Table 4).

Girls, students in grades 9 to 12, and Non-Hispanic white students reported higher frequencies of exposure to advertising in stores in each survey year than did their peers. In 2000 and 2002, current and former smokers reported higher frequencies of exposure than nonsmokers. In 2004, current smokers reported higher exposure to advertising in stores than youth in all other smoking categories. More than 9 of 10 current smokers saw ads for tobacco in stores in each wave of interviews from 2000 to 2004.

## DISCUSSION

This study showed that self-reported youth exposure to pro-tobacco messages on TV and in movies, in newspapers and magazines, and in stores declined from 2000 to 2004. Nevertheless, the vast majority of youth in the United States remain exposed to pro-tobacco messages: in 2004, 85% of all youth were exposed to tobacco advertising in stores; 81% were exposed to pro-tobacco imagery through TV and movies; and 50% were exposed to tobacco advertisements or promotions through newspapers and magazines. During this same period, exposure to pro-tobacco messages on the Internet increased, from 22% in 2000 to 33% in 2004.

Although this study is based on cross-sectional data, which carry limitations, the data are appropriate for assessing trends in exposure over time. The descriptive results may be influenced by changes in the sample characteristics over time; however, the within-group and multiple logistic regression analyses are not subject to this weakness. Youth surveyed in 2000 should be no more or less likely to notice, recall, and report exposure to pro-tobacco messages than youth in 2004. Although other studies have documented a causal relationship between exposure to pro-tobacco media messages and youth smoking (using longitudinal data), this study makes no claims about causality. Small shifts in reported exposure over time within media channels may have been obscured as a result of combining survey questions and response options that differed slightly from year to year.

From a public health perspective, this study presents reasons for both optimism and concern. Declines in exposure to pro-tobacco messages were reported across subgroups, with substantive declines among youth who may be especially susceptible to such messages—nonsmokers who are “open” to smoking. These data suggest that recent declines in tobacco industry marketing expenditures in certain areas (e.g., magazines and stores) have resulted in lower levels of youth exposure to pro-tobacco messages. This may be the result of restrictions placed on tobacco industry marketing by the MSA. Given the clear, causal link between exposure to pro-tobacco messages and youth smoking, these reductions in exposure may translate into lower smoking rates in years to come. It is possible that the reductions in youth smoking rates that occurred during the period of this study were to some degree influenced by changes in tobacco industry marketing and declines in youth exposure to pro-tobacco messages.

With exposure to pro-tobacco messages on the Internet increasing, a concern is that influential tobacco imagery is merely shifting from old to new media. Although the MSA prohibits tobacco industry marketing on the Internet, it is legal to sell tobacco over the Internet and tobacco vendors are permitted to advertise their products. Tobacco sales are ostensibly limited to those who are of legal smoking age, but in reality, it is not possible to verify such data over the Internet. Aside from explicit tobacco advertising, the Internet hosts innumerable images that associate smoking and tobacco use with popular movie stars and teen cultural heroes. Recent studies have shown that many youth who are exposed to these images will experiment with tobacco and subsequently progress to established smoking as a result of this exposure. Despite recent declines in youth exposure to pro-tobacco messages through certain media channels, most youth in the United States remain at increased risk for



smoking as a result of pro-tobacco imagery in the mass media. The public health and tobacco control communities must work to reduce this influence through national, state, and local laws; organizational policies; countermarketing campaigns; continued pressure on the tobacco industry; and the continued education of individuals who produce or act in TV programs and movies. There is a great deal more work to be done in this area.

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### **SO WHAT? Implications for Health Promotion Practitioners and Researchers**

Youth who are exposed to pro-tobacco media messages are at higher risk of smoking and ultimately of tobacco-related disease and death. This study showed that youth exposure to pro-tobacco messages on TV and in movies, in newspapers and magazines, and in stores declined from 2000 to 2004 but that the vast majority of youth in the United States remain exposed to such messages through the mass media. Exposure to pro-tobacco messages on the Internet increased during the study period, to 33% in 2004. The public health and tobacco control communities must work to reduce the prevalence of pro-tobacco media messages through national, state, and local laws; organizational policies; countermarketing campaigns; continued pressure on the tobacco industry; and the continued education of individuals who produce or act in TV programs and movies.

**Table 1**

Demographic Characteristics of National Youth Tobacco Survey Samples, 2000–2004

Characteristic	%		
	2000	2002	2004
Gender			
Male	50.2	49.4	48.7
Female	49.8	50.6	51.3
Grade level			
6–8	45.1	46.9	50.2
9–12	54.9	53.1	49.8
Race/ethnicity			
White	56.9	51.5	45.8
African-American	15.4	17.8	18.0
Hispanic	20.7	24.1	25.9
Asian	4.7	4.7	5.3
Other	2.2	2.0	4.9
Smoking status			
Current smoker	19.7	15.5	14.0
Former smoker	30.3	29.2	23.9
Never smoker	50.0	55.3	62.2
Weekly income			
None	10.4	15.9	20.9
\$1–\$20	41.4	43.1	46.4
\$21–\$100	30.1	24.0	23.1
\$101	18.2	17.0	9.6

**Table 2**

Percentages of Middle and High School Students Reporting Exposure to Pro-Tobacco Messages, National Youth Tobacco Surveys, 2000–2004

	TV or Movies*			Internet†			Newspaper or Magazines‡			Convenience Store, Supermarket, or Gas Station§		
	2000	2002	2004	2000	2002	2004	2000	2002	2004	2000	2002	2004
Overall	90.3 ± 0.4	89.9 ± 0.7	81.0 ± 1.1	22.1 ± 0.8	34.0 ± 1.0	32.8 ± 1.1	65.5 ± 1.2	63.3 ± 1.1	50.3 ± 1.4	88.2 ± 0.8	89.7 ± 0.7	84.7 ± 1.2
Gender												
Male	89.1 ± 0.6	88.9 ± 0.8	80.2 ± 1.2	22.3 ± 0.9	34.0 ± 1.3	32.4 ± 1.1	63.3 ± 1.3	61.8 ± 1.7	46.8 ± 1.6	86.3 ± 0.9	88.4 ± 0.7	82.6 ± 1.3
Female	91.5 ± 0.5	90.9 ± 0.8	81.7 ± 1.3	22.0 ± 1.0	34.0 ± 1.2	33.3 ± 1.5	67.7 ± 1.5	64.7 ± 1.3	53.7 ± 1.6	90.1 ± 1.0	90.9 ± 0.8	86.7 ± 1.3
Grade level												
6–8	90.2 ± 0.5	89.3 ± 0.9	76.7 ± 1.6	25.4 ± 1.3	38.1 ± 1.3	30.0 ± 1.7	59.6 ± 1.4	56.9 ± 2.0	41.0 ± 1.5	86.5 ± 1.2	87.2 ± 0.9	80.6 ± 1.5
9–12	90.5 ± 0.7	90.5 ± 0.7	84.6 ± 1.1	19.4 ± 0.9	30.8 ± 1.3	35.0 ± 1.5	70.4 ± 1.3	68.5 ± 1.0	57.9 ± 1.4	89.8 ± 0.9	91.8 ± 0.8	88.0 ± 1.2
Race//												
White	91.0 ± 0.5	90.3 ± 0.7	81.8 ± 1.4	21.9 ± 1.1	33.4 ± 1.2	33.1 ± 1.4	68.4 ± 1.2	64.1 ± 1.2	51.2 ± 1.7	90.9 ± 0.7	91.2 ± 0.8	87.2 ± 1.3
African-American	88.6 ± 1.1	89.8 ± 1.4	79.8 ± 1.7	22.6 ± 1.3	34.9 ± 2.1	30.7 ± 2.0	57.7 ± 2.5	61.3 ± 2.3	49.7 ± 2.7	80.2 ± 1.7	84.8 ± 1.5	79.3 ± 2.1
Hispanic	89.0 ± 1.1	89.0 ± 1.5	79.0 ± 1.4	22.5 ± 1.3	35.7 ± 1.5	33.5 ± 1.6	59.3 ± 1.8	61.8 ± 2.1	48.1 ± 1.9	83.7 ± 2.1	87.6 ± 1.4	80.2 ± 1.6
Smoking status												
Current smokers	91.1 ± 0.9	89.5 ± 1.1	88.2 ± 1.3	23.8 ± 1.1	35.0 ± 2.5	39.6 ± 2.4	69.6 ± 1.4	67.2 ± 1.7	60.5 ± 2.4	90.1 ± 0.9	91.6 ± 1.1	90.6 ± 1.3
Former smokers	92.0 ± 0.6	92.5 ± 0.9	85.2 ± 1.3	21.4 ± 1.3	35.5 ± 1.5	35.1 ± 1.6	67.2 ± 1.6	67.1 ± 1.7	54.1 ± 1.7	90.0 ± 0.9	91.1 ± 1.0	87.1 ± 1.3
Never—Open	91.3 ± 1.3	91.4 ± 1.4	82.6 ± 1.9	24.8 ± 1.7	37.4 ± 2.1	35.6 ± 2.0	64.8 ± 2.1	65.5 ± 2.7	50.5 ± 2.5	86.6 ± 1.7	90.9 ± 1.4	83.3 ± 1.9
Never—Closed	88.9 ± 0.7	88.5 ± 1.0	76.7 ± 1.3	20.5 ± 0.9	31.0 ± 1.4	28.4 ± 1.1	63.0 ± 1.6	58.7 ± 1.4	45.1 ± 1.7	87.5 ± 1.1	88.3 ± 1.0	82.7 ± 1.4

\* The unexposed category includes 1.4%, 1.4%, and 2.4% of respondents who did not watch TV or go to the movies in 2000, 2002, and 2004, respectively.

† The unexposed category includes 20.3%, 9.1%, and 10.0% of respondents who did not use the Internet in 2000, 2002, and 2004, respectively.

‡ The unexposed category includes 11.9%, 10.4%, and 16.9% of respondents who don't read newspapers or magazines in 2000, 2002, and 2004, respectively.

§ The unexposed category includes 2.6%, 1.7%, and 2.8% of respondents who never went to convenience stores, supermarkets, or gas stations in 2000, 2002, and 2004, respectively.

// Only youth classified as non-Hispanic white, non-Hispanic African-American, Hispanic, and Asian were included in the analyses.

**Table 3**

Unadjusted Odds Ratios Showing Changes in the Probability of Youth Exposure to Pro-Tobacco Messages Over Time, by Gender, Grade Level, Race, and Smoking Status, National Youth Tobacco Surveys, 2000–2004<sup>†‡</sup>

	TV or Movies		Internet		Newspaper or Magazines		Convenience Store, Supermarket, or Gas Station	
	Odds Ratio	<i>p</i>	Odds Ratio	<i>p</i>	Odds Ratio	<i>p</i>	Odds Ratio	<i>p</i>
Overall	0.82	0.000	1.15	0.000	0.86	0.000	0.93	0.000
Gender								
Male	0.84	0.000	1.14	0.000	0.85	0.000	0.93	0.000
Female	0.79	0.000	1.16	0.000	0.86	0.000	0.92	0.000
Grade level								
6–8	0.77	0.000	1.07	0.000	0.83	0.000	0.90	0.000
9–12	0.87	0.000	1.22	0.000	0.87	0.000	0.96	0.037
Race <sup>§</sup>								
White	0.81	0.000	1.16	0.000	0.84	0.000	0.91	0.000
African-American	0.84	0.000	1.11	0.000	0.93	0.000	0.99	0.744
Hispanic	0.82	0.000	1.15	0.000	0.90	0.000	0.95	0.047
Smoking status								
Current smokers	0.92	0.000	1.21	0.000	0.91	0.000	1.02	0.412
Former smokers	0.84	0.000	1.20	0.000	0.88	0.000	0.94	0.002
Never—Open	0.81	0.000	1.14	0.000	0.86	0.000	0.94	0.022
Never—Closed	0.79	0.000	1.11	0.000	0.83	0.000	0.91	0.000

<sup>†</sup> Based on three cross-sectional National Youth Tobacco Surveys conducted in 2000, 2002, and 2004. Time trend was modeled as a continuous covariate. Odds ratios measure the change in the logit of the probability of self-reported exposure from 2000 to 2002 and from 2002 to 2004.

<sup>‡</sup> Separate logistic regressions were conducted overall and by each subgroup domain.

<sup>§</sup> Only youth classified as non-Hispanic white, non-Hispanic African-American, Hispanic, and Asian were included in the analyses.

\* Statistically significant at  $p < 0.0001$ .

**Table 4**  
Adjusted Odds Ratios Showing Changes in the Probability of Youth Exposure to Pro-Tobacco Messages Over Time, National Youth Tobacco Surveys, 2000–2004<sup>†‡</sup>

	TV or Movies		Internet		Newspaper or Magazines		Convenience Store, Supermarket, or Gas Station	
	Odds Ratio	p	Odds Ratio	p	Odds Ratio	p	Odds Ratio	p
Time trend	0.83	0.000	1.17	0.000	0.87	0.000	0.94	0.000
Gender								
Female	1.00		1.00		1.00		1.00	
Male	0.83	0.000	0.98	0.226	0.80	0.000	0.71	0.000
Grade level								
6–8	1.00		1.00		1.00		1.00	
9–12	1.20	0.000	0.76	0.000	1.58	0.000	1.50	0.000
Race <sup>§</sup>								
White	1.00		1.00		1.00		1.00	
African-American	0.82	0.000	0.97	0.349	0.76	0.000	0.47	0.000
Hispanic	0.83	0.000	1.04	0.231	0.81	0.000	0.58	0.000
Smoking status								
Current smokers	1.00		1.00		1.00		1.00	
Former smokers	1.26	0.000	0.89	0.000	1.02	0.599	1.22	0.000
Never smokers	0.87	0.000	0.77	0.000	0.89	0.000	0.96	0.211
Weekly income								
None	1.00		1.00		1.00		1.00	
\$1–\$20	1.36	0.000	1.17	0.000	1.30	0.000	1.39	0.000
\$21–\$100	1.48	0.000	1.38	0.000	1.45	0.000	1.41	0.000
\$101	1.16	0.002	1.35	0.000	1.41	0.000	1.21	0.000

<sup>†</sup> Based on three cross-sectional National Youth Tobacco Surveys conducted in 2000, 2002, and 2004. Time trend was modeled as a continuous covariate. Odds ratios measure the change in the logit of the probability of self-reported exposure from 2000 to 2002 and from 2002 to 2004.

<sup>‡</sup> Gender, grade level, race, smoking status, and weekly income were included as covariates in each logistic regression model.

<sup>§</sup> Only youth classified as non-Hispanic white, non-Hispanic African-American, Hispanic, and Asian were included in the analyses.

\* Statistically significant at  $p < 0.0001$ .