

Trends in adolescent smoking initiation in the United States: is tobacco marketing an influence?

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Abstract

Objective—To compare recent trends in smoking initiation by adolescents with trends in inflation-adjusted cigarette pricing and tobacco marketing expenditures.

Design—We examined smoking initiation trends in demographic subgroups of adolescents aged 14–17 years during the decade 1979–1989. Data on cigarette pricing and tobacco marketing expenditures were adjusted for inflation and plotted over this same period.

Setting—Large population surveys, United States.

Subjects—140 975 ever-smokers aged 17–38 when surveyed in 1992 or 1993, who reported on age of smoking initiation during the decade 1979–1989.

Main outcome measure—Initiation rate was calculated as the number in an age group who reported starting to smoke regularly in a year, divided by the number of never-smokers at the start of the year. Trends were evaluated by linear and quadratic models.

Results—From 1979 to 1984, adolescent initiation rates decreased, but increased thereafter, particularly among males, whites, and those who, as adults, reported never having graduated from high school. Cigarette price increased throughout the decade as did tobacco marketing expenditures, especially for coupons, value-added items, and promotional allowances.

Conclusion—Availability of cheaper cigarettes is not likely to be a cause of increased smoking initiation by adolescents. Although other influences cannot be ruled out, we suspect that the expanded tobacco marketing budget, with its increased emphasis on tactics that may be particularly pertinent to young people, affected adolescent initiation rates.

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Introduction

The slow rate of decline in smoking prevalence in developed countries is strongly related to the persistent recruitment of new smokers.^{1–4} Over the past 30 years, the public health movement has been very successful in convincing adults not to start smoking, but adolescents remain a challenge.^{3–5} Public health programmes designed to influence young people not to start smoking must play against opposing influ-

ences, such as the more than \$6 billion that the tobacco industry spent in 1993 to market its products in the United States.⁷

In the context of public health action to restrict the tobacco industry's marketing activities, it would be useful to investigate the possible association between increased tobacco marketing and increased smoking initiation by adolescents. Such an investigation requires appropriate surveillance of adolescent smoking. The most common measure of smoking activity by adolescents relies on self-reporting the smoking of a cigarette in the past month.³ Both positive and negative responses pose interpretative difficulties with respect to the rate of adolescent smoking. A young person who eventually becomes an addicted smoker may be in a pre-experimentation stage or in an intermittent period of abstinence when surveyed, or an individual labelled as a smoker may be one of the approximately 30% of new experimenters who do not proceed to becoming addicted smokers.⁸ Complicating this issue is the tendency (in some settings) for adolescents to exaggerate or deny any cigarette use.

In the light of these difficulties, we have developed a measure of the incidence of smoking initiation that is based on recall by adults who became established regular smokers.^{5–9–10} This measure, computed from the age at which smokers or former smokers recall having started smoking regularly, appears to be insensitive to the age of the respondent when surveyed,⁵ and has proved useful for examining age- and gender-specific trends over time in smoking initiation among both adults and adolescents.^{5–6–9–10} From this work, we determined that, in 1980, initiation of regular smoking was greatest among adolescents aged 14–17 years,⁹ or alternatively, that this age range is when most smokers start smoking regularly.

This study uses more recent data to examine trends in rates of smoking initiation among demographic subgroups of adolescents, aged 14–17 years, throughout the 1980s. As in another report documenting an increase in initiation for this group as a whole,⁶ initiation rates were calculated from the continuous Current Population Survey, which included a smoking supplement during selected months in 1992 and 1993. In addition, we present trends over this period in inflation-adjusted cigarette pricing and in the tobacco industry's budget for marketing. We then comment on the temporal association of these trends.

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Methods

DATA SOURCES

Initiation of regular smoking

We combined data from three recent Current Population Surveys (September 1992, January 1993, and May 1993) that contained a special supplement on tobacco use. The Current Population Surveys are continuously conducted by the US Census Bureau for labour force monitoring; they cover the civilian, non-institutionalised population aged 15 years and older.¹¹ The Current Population Survey typically surveyed about 56 000 households each month, in which interviews were conducted with a knowledgeable household member who responded for all eligible household members. About a quarter of all interviews were conducted in person; the remainder were conducted by telephone. For the tobacco use supplement, the Current Population Survey included intensive telephone follow-up efforts to maximise the proportion of respondents who completed the supplement. Response rates for the tobacco use supplement were 88.5%, 89.1%, and 86.1% for September, January, and May, respectively.

Supplement respondents were asked, "Have you smoked at least 100 cigarettes in your entire life?" Those who responded "yes" were asked, "How old were you when you started smoking cigarettes fairly regularly?" We restricted our present analysis to self-respondents who were 17–38 years old when surveyed ($n = 140\ 975$). Such people would have been in the age range 14–21 years at some time during the decade 1979 to 1989.

The public-use data tape for these three surveys includes a weighting variable for self-respondents which ensures that estimates from the combined sample will be representative of the US population by gender, age, race/ethnicity, and region. Subjects were identified only by a number on the public-use tape, so there is no way to link responses to individuals.

Cigarette price and tobacco marketing data

The Tobacco Institute publishes the weighted average price per pack of cigarettes at the state level and for the nation, as of 1 November each year.¹²

Data on tobacco marketing expenditures are from the US Federal Trade Commission (FTC).⁷ Tobacco companies are required to report their expenditures on an annual basis, and the FTC reports categories for different types of expenditures: *newspapers, magazines, outdoor, transit, point of sale, promotional allowances, sampling distribution, specialty item distribution, public entertainment, and all other*. Starting in 1988, the *coupons and retail value added* category was added. Promotional programmes initiated that year by the tobacco industry allow individuals to redeem coupons obtained from cigarette purchases for specialty items. The value-added aspect of the new line item refers to multiple pack offers (buy two, get one free) and gifts of items, such as key chains or lighters with the purchase of cigarettes at the

point of sale. Inspection of the category totals reported in 1987 and earlier indicated that this new category encompassed most of what was previously included in the *specialty item distribution* and *all other* categories, as the expenditures recorded for these categories dropped dramatically in 1988.

For our analysis, we combined the amounts for *newspapers, magazines, outdoor* (billboards), and *transit* (signs in and around public transit) into a category for traditional *print media*. We also examined the *promotional allowances* category, which includes incentives given to wholesalers and retailers to stock and promote a particular product, including trade allowances (free goods or price reductions in return for buying a specific quantity of goods) and slotting allowances (fees to encourage retailers to carry a new product or allocate premium shelf space to a given product). Finally, we combined the categories for *specialty item distribution*, which refers to items such as teeshirts, caps, and sporting equipment that are imprinted with a brand's logo, *coupons and retail value added*, and *all other* into a category designated *promotional items*.

Both the price of a pack of cigarettes and the total tobacco industry marketing expenditures were adjusted to 1989 dollars by using the annual Consumer Price Index (CPI) from the Bureau of Labor Statistics.¹³

CALCULATION OF INITIATION RATES

As described in previous research,^{5 9 10} we reconstructed each respondent's smoking status for each year, starting with 1979 through 1989, from the age at which an ever-smoker reported starting to smoke regularly. Never-smokers were considered to be at risk to start smoking throughout the period, and ever-smokers were at risk only through the year in which they started. The denominator for the initiation rate for a demographic group of interest was the sum of the weights for those in the group at risk to start smoking in a given year. The numerator was the sum of the weights of those whose reported age of starting to smoke indicated they started in that year. Previously, we have shown that the age of the respondent when surveyed had no apparent effect on the age the respondent reported for when regular smoking commenced.⁵ We computed initiation rates for 14–17-year-old males and females, for blacks and whites, and according to attained educational level. For educational level, we did not compute initiation rates for 1989, because some respondents were still high-school seniors when surveyed, and it was not known whether they would graduate or go on to college.

STATISTICAL ANALYSIS

The initiation rates were multiplied by the actual sample size at a given year to determine a pseudo-numerator, and then exact 95% binomial confidence intervals were computed in the usual manner.¹⁴

When we examined the plot of initiation rates over the decade for 14–17-year-olds, it appeared that a simple linear fit would not

adequately represent the data; there appeared to be an inflection point near the middle of the decade. Thus, we fitted both linear and quadratic models to the initiation rates. We weighted each rate by the inverse of its standard error in these analyses, and plotted the model (linear or quadratic) that best fitted the data together with the yearly initiation rates and their 95% confidence intervals. In the text below, we report probability values for determining whether the relevant model coefficients are different from zero.

Results

INITIATION RATE TRENDS IN DEMOGRAPHIC SUBGROUPS

A pattern of a decline in the first half of the decade (which was reversed in the second half) was observed both in males, and to a lesser extent, in females (figure 1). The quadratic fit for males showed an improvement ($P = 0.020$) compared with the linear fit ($P = 0.103$). For females, neither the linear model ($P = 0.943$) nor the quadratic one ($P = 0.102$) produced significant coefficients, although the quadratic

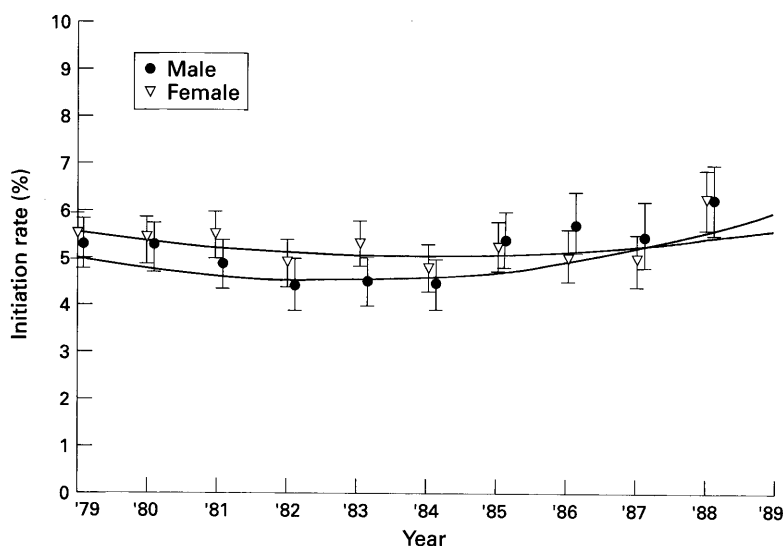


Figure 1 Initiation rates in male and female adolescents aged 14-17 years.

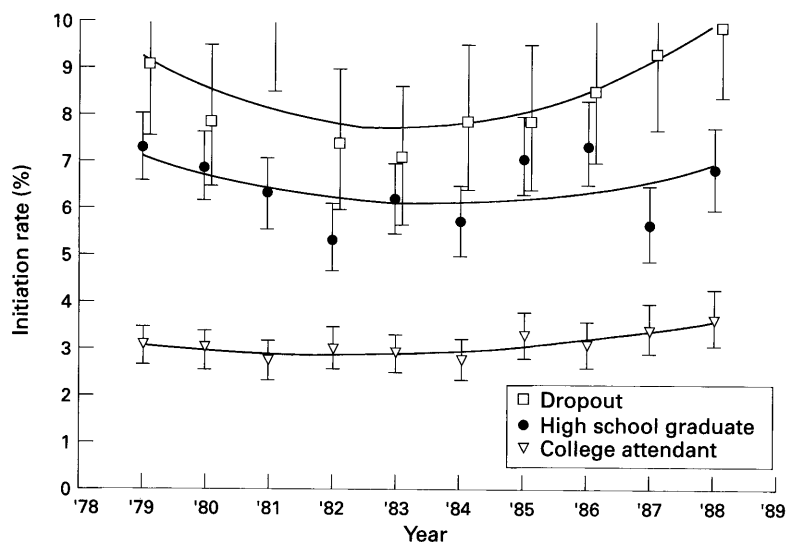


Figure 2 Initiation rates in respondents reporting less than 12 years of education, 12 years with no college education, and more than 12 years with some college education as adults. Rates are for the adolescent years (ages 14-17 years) of these adult respondents.

model came closer. By 1989, the incidence rate among males was 5.8% compared with a rate of 5.3% in females.

Initiation was highest among high school dropouts and lowest among those who eventually attended college (figure 2). Quadratic models performed better than linear ones for all three educational groups. For high-school graduates, however, neither model produced significant regression coefficients. For dropouts, the significance of the linear coefficient in the linear model was $P = 0.562$, and for the quadratic term of the quadratic model, it was $P = 0.035$. For high-school graduates, these significance levels were $P = 0.782$ and $P = 0.184$, and for those with some college they were $P = 0.081$ and $P = 0.014$. In 1988, the rate of initiation was 9.9% for those who did not graduate from high school, 6.9% for high-school graduates reporting no college, and 3.7% for those reporting at least some college.

Initiation in black adolescents is considerably lower than in white adolescents (figure 3). For whites, initiation first decreased and later increased, with the quadratic model ($P = 0.023$) showing a better fit than the linear one ($P = 0.092$). For blacks, however, the linear model was superior ($P = 0.014$ compared with $P = 0.092$ for the quadratic). In 1989, the initiation rate for whites was 6.0%, in comparison with only 2.2% for blacks.

CIGARETTE PRICE TREND

Figure 4 shows the average price paid for a pack of cigarettes during the decade. The prices plotted have been adjusted by the CPI. Over the decade, the adjusted price per pack (in 1989 dollars) rose from \$1.02 to \$1.44, which was an increase of 40%. From 1979 to 1984, the percentage increase was 14%, and from 1984 to 1989, it was 23%.

COMPONENTS OF TOBACCO MARKETING

The type of marketing activity emphasized as a percentage of the total advertising budget changed markedly during the decade (figure 5). In 1979, almost two thirds of tobacco marketing expenditures paid for *print media*. By 1989, less than 25% of the total budget was allocated to that category. The percentage of the budget allocated to promotional allowances increased from 12.7% of the total in 1979 to 27.6% in 1989. From 1979 to 1984, the percentage increase in the portion of the budget devoted to these activities was 38.0%, and this accelerated to 59.5% during the second half of the decade from 1984 to 1989. The combined categories we designate as *promotional items* increased from 10.2% of the total in 1979 to 36.3% of the total in 1989. The percentage increase was 100% from 1979 to 1984 and 77.9% from 1984 to 1989.

MARKETING AND INITIATION

Figure 6 (right axis) shows the total marketing budget. From 1979 to 1984 the percentage increase in the total budget was 35.2%, compared with 44.6% for the period from 1984 to 1989, demonstrating an acceleration in total expenditures even after adjustment for

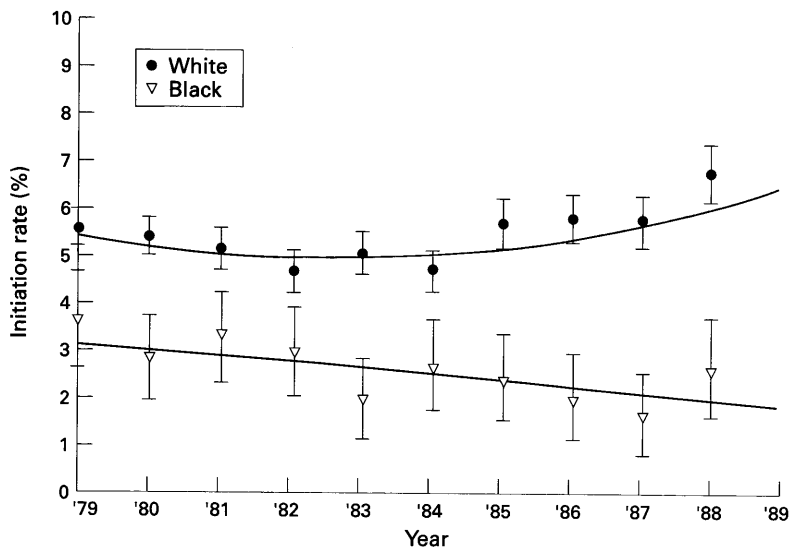


Figure 3 Initiation rates in white and black respondents aged 14-17 years.

inflation. The left axis of figure 6 shows the overall initiation among adolescents 14-17 years. Overall, the quadratic model fits the data better ($P = 0.020$) than the linear one ($P = 0.397$). By 1989, the initiation rate for adolescents reached 5.5%, which was up from its lowest rate of 4.6% in 1982 and 1984; this was a nearly 20% increase compared with the 15% decline observed in the first part of the decade.

Discussion

In the early 1980s, the rates of smoking initiation among both adolescents (aged 14-17 years) and young adults (aged 18-21 years) were decreasing.⁶ However, in mid-decade the downward trend was arrested only in adolescents,⁶ suggesting some change in the external influences for starting to smoke that may be specifically meaningful to adolescents, but not to young adults. Our analysis shows that the increase in initiation was particularly marked among male adolescents, white adolescents, and those who eventually did not graduate from high school.

There are a number of external factors that could potentially account for the increased initiation in adolescents. Some of these are difficult to measure, such as enforcement of laws regarding sales of cigarettes to minors, changes in the social image of smoking derived from peers, or changes in community norms regarding smoking, including preventive education. Certainly during the 1979 to 1989 decade, ever-increasing non-smoker activism and associated public education and awareness

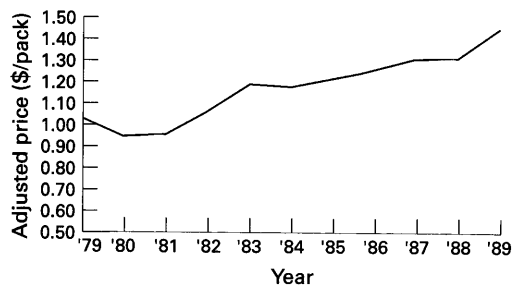


Figure 4 Price per pack of cigarettes adjusted by Consumer Price Index (CPI) to 1989 dollars.

would have been expected to produce a downward trend in smoking initiation, as observed in young adults.⁶ It is not known whether it was these messages or other cultural influences that contributed to the continuing decline of smoking initiation among black adolescents. Considerably lower smoking rates among black adolescents compared with whites have been documented previously.^{3, 15} Rates of use of street drugs and alcohol among high-school seniors declined during the decade, especially between 1985 and 1989.¹⁶ The same study showed that a decline in the prevalence of current smoking (use in the past 30 days) observed in the very early part of the decade was arrested in the latter part.¹⁶ In our study, we present data regarding cigarette price and tobacco marketing expenditures, and we comment below on how these factors might influence smoking uptake.

Some data indicate that adolescents may be much more sensitive to pricing than young adults, with a price elasticity as high as -1.2; that is, each 10% increase in real cigarette price will be associated with a 12% decrease in adolescent smoking prevalence.^{2, 17, 18} Thus, we could expect that the upswing in adolescent-specific initiation might be temporally associated with a downturn in cigarette price. However, as the data of figure 5 indicate, cigarette price (adjusted for inflation) increased throughout the decade, which should have driven adolescent initiation rates lower, assuming they bought their own cigarettes. Although experimentation usually occurs with cigarettes obtained from friends, or perhaps pilfered from adults, by the time adolescents smoke more than a few cigarettes a day, they are probably buying their own. A recent survey of 13-16-year-olds, who are under the legal age for buying cigarettes in the United States, showed that 88% of daily smokers brought their own cigarettes, compared with only 41% of those who had smoked in the past 30 days, but not daily.¹⁹

Perhaps adolescents had different purchase practices in the early 1980s, or perhaps their disposable income has increased. Low-priced generic cigarettes were introduced into the market in 1985, so it is possible that adolescents were strongly attracted to these alternatives to the premium brands. However, a recent analysis has demonstrated that adolescents and young adults preferentially smoke premium cigarette brands, and that generic cigarettes are more popular among smokers over the age of 45 years, particularly those with high levels of consumption.²⁰ Thus, it is unlikely that the price of cigarettes can explain the turnaround in smoking initiation among adolescents that we have documented.

Other data associate tobacco marketing activity with adolescent smoking uptake.^{9, 21-24} During periods when the tobacco industry sought to broaden their market by targeting particular groups with vigorous and novel marketing campaigns, initiation among youth increased. The first major cigarette marketing campaign of this century occurred in the 1910s, when RJ Reynolds launched the Camel

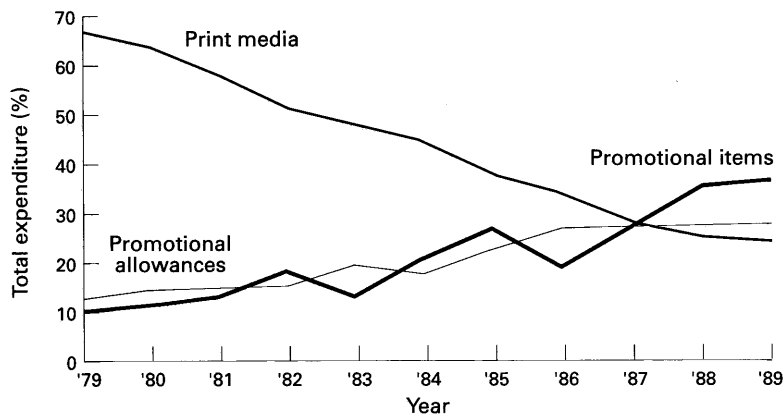


Figure 5 Percentage of total annual expenditures for different components of the tobacco industry marketing budget.

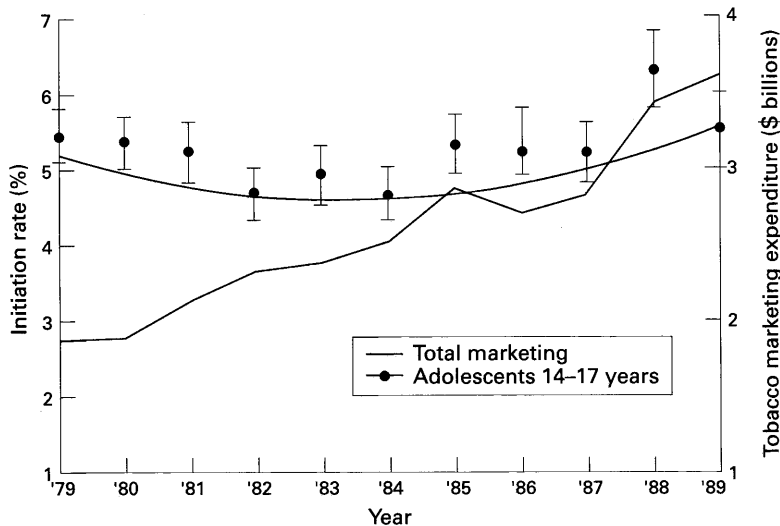


Figure 6 Left axis: initiation rates in adolescents aged 14-17 years; right axis: total tobacco marketing expenditures adjusted by Consumer Price Index (CPI) to 1989 dollars.

brand with an unprecedented marketing campaign.²⁵ The brand quickly gained market leadership as sales soared,²⁵ and initiation increased among both adolescent and young adult males.²⁴ Females did not begin to take up smoking until the 1920s, when Lucky Strike and Chesterfield brands were pitched to women with such slogans as "Reach for a Lucky instead of a sweet" and "Blow some my way". As sales of these brands increased,²⁶ so did initiation in adolescent and young adult females, but not males.²⁴

Another period with a temporal association between increase in smoking initiation and tobacco marketing occurred between 1968 and 1973, when tobacco companies launched major advertising campaigns to introduce various new brands of cigarettes specially for women.^{10, 27} This time, however, initiation increased only among adolescent girls, whereas initiation in young adult females actually decreased. The advertising effect appears specific to adolescent females; young adult females apparently heeded the warnings about the health consequences of smoking.^{5, 24} The tobacco industry commented that this correlation simply reflected the *Zeitgeist* of women's liberation, "the time when bra-burning women were abandoning traditional roles".²⁸

During the 1980s, the tobacco industry both increased the amount of its marketing budget and radically changed its marketing approaches (figures 5 and 6). The increase in the budget began shortly after the federal ban on cigarette advertising in the electronic media was implemented in 1971. But most of the increase occurred after 1979. The CPI-adjusted percentage increase in the total budget from 1970 to 1978 was 44% or a yearly average of 5.5%; from 1979 to 1989, it was 95.5% or a yearly average of 9.5%. The decline in smoking among adolescents in the late 1970s and early 1980s^{3, 16} might have been even greater if the industry had not increased its marketing expenditures. Given the history outlined above, it would be surprising if the acceleration in the rate of expenditures observed in the 1980s did not eventually contribute to the reversal of the downward trend. When the data become available, it is very likely that a further increase in smoking initiation by adolescents will be observed, and will corroborate recent reports documenting increased smoking prevalence.¹⁶

Changing marketing strategies also may have played a role. Throughout the decade 1979 to 1989, less emphasis was placed on print media. An interesting area for future research would be to characterise the placement of such advertisements. For example, are the remaining elaborate advertisements (multiple page or pop-up advertisements) more likely to appear in magazines with a substantial youth readership? The increased emphasis on promotional allowances, particularly in convenience stores where young children often purchase sweets, ice cream and soft drinks, delivers the advertising message to these young customers even before adolescence. Finally, the promotional item component, especially coupon redemption (which is based on the airline industry's successful frequent flyer marketing programme), has had an impact on youth.^{29, 30} These programmes have escalated considerably since 1989. A recent study showed that 10.6% of adolescents 12-17 years of age reported possession of a promotional item, and 35% either had an item, had collected coupons, or had a catalogue for such items.²⁹ In another school survey, 39.1% of high-school students had heard of Camel Cash, 8.6% had used the cash, and 5.2% indicated that they had bought cigarettes specifically to obtain the cash.³⁰ It is unlikely that the industry would devote so much of its marketing resources to these activities if it did not attract new smokers.

The question of why adolescents appear to be vulnerable to tobacco marketing tactics when adults (even young adults) are not may be related to the developmental stages that characterise adolescence.³ Adolescents sometimes seek to assert their independence with a symbol, such as a cigarette, which is associated with adulthood. Possession of a promotional item with a brand logo also provides such a symbol. In addition, adolescents are continuously seeking to define themselves as individuals and trying on various images. Tobacco

advertising and promotions provide a multitude of such images: the tough independent, the slim sophisticate, the "party animal", and the sportsman or athlete (association of tobacco with the sponsorship of sporting events). Adolescents tend to live for the moment, to be self-indulgent, and to think of themselves as invulnerable; consequently, health warnings are not heeded. Tobacco companies have carried out considerable research on the young, and they have carefully characterised the traits mentioned above and the best methods for exploiting them.^{3 31}

The unprecedented scale of the recent expenditures for tobacco marketing and the increased emphasis on tactics that are particularly appealing to youth should be cause for national concern. Data from surveys conducted in California in 1993 and 1994 indicate that 12–17-year-old adolescents show as much interest in possessing promotional items as 18–24-year-old adults, although fewer adolescents actually own them.³² It is noteworthy that boys, white adolescents and those who report that their school performance is below average express more interest in having these items, and these groups are more likely to own them than girls, minorities, or those who rate their school performance as average or above.³² These findings, together with the historical data^{10 21–24} and the evidence from the present study, indicate that hypothesising a causal association between current tobacco marketing practices and the upward trends in adolescent initiation is reasonable.

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