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## Smoking Behavior of Adolescents Exposed to Cigarette Advertising

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### Synopsis .....

*The purpose of the study was to explore the relationship between the exposure of adolescents in the seventh and eighth grades to cigarette advertis-*

*ing and their being smokers. A survey questionnaire given to 602 adolescents assessed their exposure to cigarette advertising and provided measures of their smoking behavior, demographic characteristics, and some psychosocial variables.*

*The results indicated that exposure to cigarette advertising and having friends who smoked were predictive of current smoking status. Adolescents with high exposure to cigarette advertising were significantly more likely to be smokers, according to several measures of smoking behavior, than were those with low exposure to cigarette advertising. The findings extend previous research identifying factors that may play a role in the initiation and maintenance of smoking among adolescents.*

**C**IGARETTE SMOKING is the leading preventable cause of mortality and morbidity in the United States and has been described as the "most important public health issue of our time" (1). More than 40,000 studies have provided evidence on deleterious effects of cigarette smoking. A growing body of clinical and epidemiologic research demonstrates cigarette smoking to be associated with cancer, cardiovascular disease, and chronic obstructive lung disease (1-3). Cigarette smoking has been identified as the most widespread form of drug dependence in our society (2).

Cigarette smoking has declined in prevalence from more than 50 percent of the population during the late 1940s and early 1950s to about 25 percent (4). The reductions, in large measure, are the result of widespread public health campaigns on the national, State, and local levels by government and voluntary organizations. Other contributing factors have been legislative actions, such as banning cigarette advertising on electronic media, requiring warning labels on cigarette packages and cigarette printed advertising, and more recently, legislation restricting cigarette smoking in public

Table 1. Periodicals read by respondents to a survey of 602 adolescents, showing total number of pages, total cost of cigarette advertising in the periodical, and periodical ranking by dollar amount of cigarette advertising, 1986

Periodical	Total pages	Total dollars	Rank
TV Guide	327.48	32,252,868	1
Sports Illustrated	290.74	27,698,692	2
People	324.53	23,576,525	3
Time	156.92	21,560,209	4
Newsweek	132.28	12,821,946	5
Better Homes	117.40	11,654,745	6
Family Circle	124.58	10,115,265	7
Women's Day	128.29	9,575,703	8
Cosmopolitan	141.94	6,910,964	12
U.S. News and World Report	100.49	6,688,071	14
Field and Stream	95.77	5,026,825	18
Life	71.00	4,406,555	19
Rolling Stone	132.50	4,166,607	20
Ebony	96.31	3,279,056	21
U.S.	139.86	2,832,560	24
Outdoor Life	83.85	2,831,335	25
Home Mechanix	61.60	1,903,289	39
Esquire	50.70	1,502,996	48
Psychology Today	51.02	1,324,067	53
House and Garden	38.00	921,433	60
Discover	31.70	671,644	66
Harpers	17.00	131,175	93

Table 2. Newspapers read by respondents of a survey of 602 adolescents, showing the number of column inches and pages devoted to cigarette advertising, January–September 1986

Newspaper	Column inches	Pages
New York Times	9,464	75.11
New York Post	5,960	85.14
New York Daily News	9,582	114.07
Newsday	2,520	30.00

places and on commercial passenger aircraft within the United States.

However, despite such encouraging developments, concerns about adverse consequences of cigarette smoking and little meaningful reduction in smoking onset rates among adolescents (5, 6) have led to growing interest in the passage of other legislation that would impose a total ban on cigarette advertising.

Cigarettes are the most heavily promoted product in the country (7). Currently, \$352 million is spent annually on advertising cigarettes in periodicals (8). More than \$119 million was spent in 1988 to advertise one brand of cigarettes, Marlboro (8). Since the 1971 ban on cigarette advertising in electronic media, advertisers have dramatically increased their expenditures for cigarette advertising in periodicals and other types of promotion (9).

Although cigarette manufacturers have maintained that the sole purpose of advertising is to compete with other brands among current smokers, the tobacco industry aggressively recruits new smokers. Tye and coworkers (10) estimated that more than 5,000 children and adolescents would need to begin smoking every day to maintain the current size of the smoking population. Since tobacco companies are not permitted to market cigarettes to children directly, advertising appeals are made indirectly. Tobacco companies sponsor sporting events; sell souvenirs; display brand-associated cartoon characters on billboards; show cigarette brands in movies designed for young people; and ignore the sale by candy manufacturers of candy cigarettes having cigarette brand logos, overlooking copyright infringements (11–14).

Research on the relationship between cigarette advertising and adolescent smoking has generally focused on two factors: awareness of cigarette advertising and cigarette brand identification. In general, research has shown that there is a relationship between awareness of cigarette advertising messages and adolescent smoking (15–17) and that cigarette advertising may impact on children as young as 3 years of age. Aitken and coworkers (18) found that children as young as 6 years were aware of the presence of cigarette advertisements and that primary school children were able to identify correctly cigarette brands in advertisements when brand identifications were deleted (19). In a more recent study, Fisher and coworkers (20) found that 30 percent of 3-year-olds surveyed were able to match correctly Old Joe, the cartoon camel, with the tobacco brand.

Children and adolescents are responsive to the visual images and messages of cigarette advertisements. Advertisers present images of smoking that downplay health concerns and instead associate smoking with positive attributes, such as beauty and youth. The majority of advertisements portray healthy, enthusiastic, young people engaged in outdoor or social activities, sports, or feats of personal achievement (21). Since experimentation with new social behaviors often begins with the imitation of attractive models, who appear to be rewarded for their behavior (22), carefully crafted advertisements using attractive models are likely to increase the possibility that children and adolescents will try cigarettes.

Little empirical evidence concerns the actual process of advertisement exposure and behavioral imitation. Atkin and coworkers (23), in a study designed to assess teenage exposure to alcohol

advertising and its impact on teenage drinking, developed an overall index of their exposure. The index consisted of a measure of the reading habits of teenagers reading various periodicals, weighted by the average number of advertisements in each periodical, the number of advertisements typically noticed, the proportion of advertisements viewed for at least 5 seconds, the number of advertisements remembered in six categories of advertisements of alcoholic beverages, an estimate of the number of times the advertisements were viewed, the amount of attention paid to these advertisements, and the number of times other advertisements had been viewed for the particular beverage. A dose-response relationship was found between exposure to alcohol advertising and adolescent drinking behavior, with the higher exposure group reporting the most drinking. In addition, drinking behavior was found to be less related to such factors as peer influence, social status, community size, viewing television characters consuming alcohol, or viewing public service announcements.

Our study was designed to extend our understanding of the relationship between cigarette advertising and smoking among junior high school students. The majority of research studies assessing the impact of advertising on adolescent tobacco use have focused primarily on the relationship between smoking and cigarette brand identification, or have been statistical studies correlating the relationship between demand and promotional expenditures. The focus of this research was the exposure of adolescent-aged persons to tobacco advertising in popular periodicals and the effect that periodical advertising has on their smoking habits.

## Methods

**Subjects.** In the spring of 1986, 602 junior high school students from grades seven (28 percent) and eight (72 percent) participated in our survey. The sample was 48 percent male, 82 percent white, and included students from four middle-class, suburban schools. Most lived in intact families (75 percent). More than one-third of the students indicated that both their mother and father had attended college.

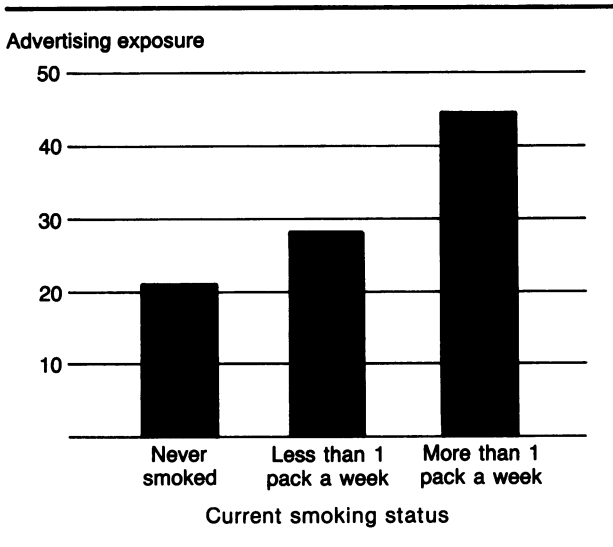
**Measures.** Four measures of smoking behavior were on the questionnaire. The 7-point current smoking measure assessed how often the subject smoked currently, with possible responses ranging from never to more than a pack a day. Students were asked questions to determine the number of cigarettes they had smoked the day before, in the

*'If a dose-response relationship does exist between cigarette smoking and advertising exposure, African American adolescents may now be at increased risk for becoming cigarette smokers, since cigarette advertisers appear to have increased the amount of advertising directed to that population.'*

past week, and in the past month. Their intention to smoke in the future was assessed by asking the students if they intended to smoke 2 years later.

Demographic characteristics were assessed using items structured in a multiple choice format. Included were items concerning race or ethnicity, grade, sex, age, and family structure. To assess social influences to smoke, data were collected on the smoking habits of others, such as friends, siblings, and parents; attitudes of parents and peers toward smoking; and prevalence of smoking by peers and adults. Smoking by friends was measured using a 5-point scale for the number who smoked, ranging from none to all. Smoking by older siblings was measured on a 4-point scale for the number who smoked, ranging from none to three or more. Smoking by parents was assessed by separate questions for the respondents' father and mother, with response categories including have no father (mother), no, used to but quit, and yes. The perceived attitudes of respondents' parents toward their smoking was assessed on a 5-point scale ranging from strongly against to strongly in favor. Perceived smoking by peers and adults was measured with six categories for each item ranging from none to all.

Ten true or false items were used to assess smoking-related knowledge. Included were items concerning the immediate and short-term consequences of smoking, smoking prevalence among adults and peers, and social acceptability. Assertiveness was measured using a shortened, 14-item version of the Assertion Inventory (24). Items were included on substance refusal assertiveness, saying "no" when someone tries to get you to smoke, and social assertiveness skills, such as complimenting friends. Responses were measured on a 5-point Likert-type scale ranging from never to always. Locus of control was assessed using five items from the Norwicki and Strickland Locus of Control Scale for Children (25).



Exposure to cigarette advertising was assessed using a composite measure to determine how many cigarette advertisements that adolescents reported reading, defined as “looked at for 5 seconds or more,” weighted by how frequently they were exposed to each of the periodicals listed, shown in tables 1 and 2, in the period of March through September, 1986. The number of cigarette advertisements that adolescents looked at in each periodical was assessed on a 5-point Likert-type scale ranging from none to most. The frequency of exposure to these periodicals was assessed on a 5-point Likert scale ranging from none to almost always.

In this way, exposure to cigarette advertising was assessed both in terms of overall level of exposure to periodicals containing cigarette advertisements and level of exposure to cigarette advertisements within each periodical. Scores were obtained for each periodical and summed across all periodicals included in the study. One-week test-retest reliability for the advertisement exposure measure was 0.84.

**Magazine and newspaper selection criteria.** A review of the literature did not provide a basis for determining which periodicals adolescents are likely to read with any regularity and which of those contain cigarette advertising. Forty-five subjects in 6 focus groups of about 5 to 12 students were conducted with both urban and suburban junior high school students (grades 6 to 10). Information obtained in preliminary focus groups showed that al-

though the main sources of cigarette advertising were in printed material directed to adults, such material was readily available to adolescents and of interest to them. From the details gathered in the focus groups, a list of 23 periodicals and 5 newspapers was constructed, limited to periodicals found to have the highest percentage of cigarette advertising.

Table 1 lists 22 periodicals read by respondents, with the total number of pages and the total dollar cost of the cigarette advertising in each publication in 1986. Information on an additional periodical read by respondents was not available. Table 2 presents similar information concerning the amount of cigarette advertising contained in four of the five newspapers read by respondents, measured in the number of column inches and pages devoted to cigarette advertising. Information was not available for the local newspaper.

Table 3 shows the periodicals included in the study and two measures of the amount of cigarette advertising contained in each magazine for the period of the study, March through September 1986. Cigarette advertising is measured both in terms of (a) the percentage of all advertisements that are for cigarettes, which is the total number of cigarette advertisements divided by the total number of all advertisements in each magazine and (b) the percentage of cigarette advertisement pages, the total number of cigarette advertising pages divided by the total number of advertising pages.

The first measure provided an indication of the number of cigarette advertisements relative to the total number of advertisements. The second provided an indication of the number of cigarette advertisement pages relative to the total number of all advertising pages. The two measures yield similar percentages; differences between the measures are the result of differences in the size of the advertisements. Table 1 ranks the periodicals by the total cost of cigarette advertising carried by the periodical in 1986.

**Procedure.** Data were collected using group administration of the study questionnaire in regular school classes. Students were told that their answers would be confidential and would only be seen by members of the project staff. For the purposes of the study, subjects were told that their definition of reading (for the readership survey) should include “browse, look through, or pick up.” Subjects who had questions were told by the project staff to “do the best you can” or “answer to the best of your knowledge.”

## Results

**Relationship between smoking and advertising.** The results indicate that exposure to cigarette advertising is significantly correlated with reported smoking behavior. The number of cigarettes smoked per day produced the highest correlation with exposure to cigarette advertising ( $r = 0.50, P = < 0.001$ ). The figure shows the relationship between exposure to cigarette advertising and level of cigarette smoking. The seven categories of smoking were collapsed into three categories: never (those who had never smoked), less than a pack a week (those who indicated they smoked from about one cigarette per week to about a pack a week), and more than a pack a week (those who indicated that they smoked from more than a pack a week to more than a pack a day). As the figure shows, subjects who smoked more than a pack a week had the highest exposure to cigarette advertising, measured in the numbers of cigarette advertisements in the publications the respondents reported reading.

**Factors associated with exposure to cigarette advertising.** Correlations were computed between the advertisement exposure index and the demographic, psychosocial, social influence, and knowledge variables. A parental smoking index was constructed by combining the reported smoking behavior of the subject's mother and father. Strong associations were found between exposure to cigarette advertising and smoking by the subjects' friends ( $r = 0.28, P = < 0.001$ ). Similarly, subjects' estimates of smoking prevalence among their peers ( $r = 0.18, P = < 0.001$ ) and among adults ( $r = 0.17, P = < 0.001$ ) were associated with exposure to cigarette advertising. Exposure to cigarette advertising was not found to be associated with smoking by students' fathers, mothers, or older siblings. Finally, an association was found between locus of control and exposure to cigarette advertising ( $r = 0.13, P = < 0.01$ ).

**Concurrent predictors of cigarette smoking.** In addition to the correlational analyses presented, several multiple regression analyses were used to examine the role of cigarette advertising in promoting and supporting cigarette smoking. All of the variables included in this data set, along with the advertisement exposure measure, were used to predict current smoking. Table 4 shows separate regressions that were computed for each of the smoking variables. The two most important predictors of cigarette smoking were friends' smoking status and

Table 3. Periodicals read by respondents to a survey of 602 adolescents, ranked by percentages of all advertisements that are for cigarettes, and percentages of all advertising pages that have advertisements for cigarettes, March–September 1986

Periodical	Percent cigarette advertising	Percent cigarette advertising pages
TV Guide	19	18
U.S.	17	21
Psychology Today	13	15
Life	12	11
Field and Stream	9	9
People	8	19
Better Homes	8	9
Women's Day	8	9
Rolling Stone	8	8
Sports Illustrated	7	11
Ebony	7	9
Family Circle	7	9
Outdoor Life	6	9
Discover	6	10
Home Mechanix	6	10
Time	6	6
Harpers	5	7
U.S. News and World Report	5	6
Cosmopolitan	5	5
House and Garden	4	5
Esquire	3	5
Newsweek	3	5

Table 4. Results of regression analysis of variables as predictors of cigarette smoking by respondents to a survey of 602 adolescents, 1986

Variable	beta	t
<b>Current smoking status:</b>		
Friends smoking	0.48	17.88
Exposure to advertising	0.17	13.38
R <sup>2</sup>	0.37	...
<b>Smoked yesterday:</b>		
Friends smoking	0.25	13.75
Exposure to advertising	0.30	15.51
R <sup>2</sup>	0.24	...
<b>Smoked last week:</b>		
Friends smoking	0.23	13.48
Exposure to advertising	0.37	17.03
R <sup>2</sup>	0.28	...
<b>Smoked last month:</b>		
Friends smoking	0.38	16.10
Exposure to advertising	0.24	14.76
Siblings smoking	0.10	2.02
R <sup>2</sup>	0.36	...

<sup>1</sup>  $P < 0.001$ , <sup>2</sup>  $P < 0.05$ .

exposure to cigarette advertising.

Table 5 shows the results of the regression using the same set of independent variables and the intention to smoke in the future as the dependent variable. Exposure to cigarette advertising and friends' smoking status emerged as the most significant predictors. Other less significant predictors of

Table 5. Results of regression analysis of variables as predictors of intention to smoke in the future by respondents to a survey of 602 adolescents, 1986

Variable	beta	t
Friends smoking .....	0.40	<sup>1</sup> 6.99
Exposure to advertising .....	0.18	<sup>1</sup> 3.96
Sibling smoking .....	0.10	<sup>2</sup> 2.06
Locus of control .....	0.12	<sup>3</sup> 2.61
Assertiveness .....	-0.15	<sup>3</sup> -3.22
Single parent household .....	0.11	<sup>2</sup> 2.41
R <sup>2</sup> .....	0.44	...

<sup>1</sup> P < 0.001, <sup>2</sup> P < 0.05, <sup>3</sup> P < 0.01.

Table 6. Likelihood of survey respondents being cigarette smokers, by degree of exposure, 602 adolescents, 1986

Variable	Number of respondents		Rate ratio <sup>1</sup>	95 percent CI
	Low exposure	High exposure		
Ever smoked.....	95	173	1.44	1.19-1.75
Smoked in past month.....	42	93	1.77	1.27-2.45
Smoked in past week.....	26	54	1.67	1.08-2.59
Smoked in past day.....	22	44	1.60	0.98-2.60
Currently smoke ..	32	78	1.93	1.32-2.82
Intend to smoke...	47	90	1.52	1.11-2.08

<sup>1</sup> Low exposure group is the referent.

intention to smoke in the future included an external locus of control, low assertiveness, smoking status of older siblings, and living in a single-parent household. The data show that exposure to cigarette advertising is an important predictor of current smoking and intention to smoke in the future.

**Smoking risk and cigarette advertising.** To examine more fully the role played by exposure to cigarette advertising, we performed a median split on the advertisement exposure index; adolescents who scored 14 or lower on the index were placed in a low exposure group, and adolescents who scored greater than 14 were placed in a high exposure group. Following the median split, rate ratios and confidence intervals were calculated to evaluate differences on the various smoking measures between high and low exposure groups. Rate ratios for the smoking measures were calculated using the low exposure group as the reference group.

Table 6 shows the proportion of adolescents in the high and low exposure groups who were likely to smoke. Adolescents in the high exposure group were 1.44 times more likely than adolescents in the

low exposure group to have tried cigarette smoking, 1.93 times more likely be a current smoker, 1.77 times more likely to have smoked in the past month, 1.67 times more likely to have smoked in the past week, and 1.52 times more likely to report that they intended to smoke in the future.

## Discussion

Many environmental and psychosocial risk factors predispose adolescents towards starting to smoke cigarettes, such as parental smoking and low self-esteem (26). The results of this study point to an additional risk factor: the level of exposure to cigarette advertising. Exposure to cigarette advertising was found to be correlated with several measures of adolescent smoking behavior, and it was found to be an important concurrent predictor of current smoking and intention to smoke in the future. Adolescents who reported a high level of exposure to cigarette advertising were between 1.44 and 1.93 times more likely to be smokers than those reporting a low level of exposure. They were 1.5 times more likely to indicate that they intended to smoke in the future.

The findings are consistent with social learning theory concerning the power of attractive models in promoting the adoption of specific behaviors, such as smoking, which are repeatedly presented as facilitating the acquisition of desired characteristics or goals (22). The results support ideas resulting from research in self-enhancement that suggest that a modeled behavior is adopted if one identifies with the image portrayed by the model (27). If the models depicted in cigarette advertisements portray the personal ideal of an adolescent, the self-image, as well as the self-esteem of the adolescent, can be enhanced by adopting the smoking behavior.

Some support for the modeling hypothesis can be shown through statistics on cigarette sales. In 1968, when Philip Morris launched the first major promotional campaign directed to women (14), only 8.4 percent of teenage women smoked (28, 29). Other tobacco companies followed with their own version of cigarettes for women. Soon after, cigarette products for women became one of the most heavily advertised products in periodicals for young women. Associated with this phenomenon was a significant increase in the proportion of teenage women smoking cigarettes, which nearly doubled between 1968 and 1974 to 15.3 percent (29). Today, the prevalence of cigarette smoking among teenage women is slightly higher than it is among teenage men (6). Young women may be particularly suscep-

tible to cigarette advertising images that portray women smokers as slim, attractive, sophisticated, intelligent, and independent.

While the findings of our study provide empirical support for the hypothesis that cigarette advertising plays a role in the smoking initiation process, these findings must be regarded as suggestive rather than conclusive because of the nature of the study and its reliance on correlational data. An alternative explanation of these findings is that the observed association between smoking and advertising exposure might be the result of selective attention on the part of smokers, rather than an indication that exposure to cigarette advertising causes people to become smokers. If that were the case, that would support the consistency theory idea that people selectively attend to information that is consonant with their personal behavior (30).

A second limitation concerns the population studied. Because the majority of the participants in the study were white, middle-class adolescents, the findings cannot be generalized to other populations. Previous research has documented racial differences in cigarette advertising. Cummings and coworkers (31) found that periodicals directed to African American readers contained significantly more cigarette advertising and more advertising for menthol cigarettes than periodicals similar in content but directed to white readers. If a dose-response relationship does exist between cigarette smoking and advertising exposure, African American adolescents may now be at increased risk for becoming cigarette smokers, since cigarette advertisers appear to have increased the amount of advertising directed to that population. However, although higher rates of smoking have been observed among adult African Americans relative to that of whites, rates are currently lower among African American youth (3).

A third limitation is that to some extent the results of this study may have been confounded by promotional efforts of cigarette companies other than advertising. As Blum indicated, cigarette companies spend a considerable amount of money on other types of promotional activities, such as sponsoring sports events, point-of-sale promotions, coupons, sample give-aways, and other activities designed to promote brand name recognition (11).

However, evidence from this and other studies suggests that there may be a causal relationship between cigarette advertising and smoking initiation. In addition, a temporal association has been observed between cigarette advertising campaigns and increased adolescent smoking (29). Taken to-

gether, there would appear to be ample evidence to warrant more careful scrutiny by legislators of the impact of cigarette advertising on children and adolescents.

Future research is needed to extend the findings of this study to other populations to better understand the relationship between advertising and smoking in general and among specific racial and ethnic groups in particular. One issue concerns the relative impact of cigarette advertising on smoking behavior at different points during the adolescent period. However, like many other types of phenomena, the strongest evidence concerning the role of advertising in the promotion and maintenance of smoking can best be obtained from longitudinal research.

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