

Exposure to Brand-Specific Cigarette Advertising in Magazines and Its Impact on Youth Smoking¹

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Background. Despite the potential influence of cigarette advertising on youth smoking, few studies have characterized brand-specific magazine advertising exposure among youths or examined its impact on youth smoking behavior.

Methods. A longitudinal youth survey was conducted to assess baseline exposure to brand-specific cigarette advertising in magazines and to measure subsequent smoking behavior. The sample comprised 1,069 Massachusetts youths, ages 12-15 years at baseline in 1993, and 627 of these youths who were interviewed after 4 years.

Results. Five brands accounted for 81.8% of the gross impressions for magazine advertising among Massachusetts youths. These same brands accounted for 88.4% of the brand market share among 12- to 15-year-old smokers nationally in 1993. The levels of brand-specific advertising exposure in the sample were highly correlated with these national brand market shares ($r = 0.96$, $P = 0.0002$). Among the cohort, baseline brand-specific exposure to cigarette advertising in magazines was highly correlated with brand of initiation among new smokers ($r = 0.93$, $P = 0.0001$), brand smoked by current smokers ($r = 0.86$, $P = 0.0004$), and brand whose advertisements attracted attention the most ($r = 0.87$, $P = 0.0002$).

Conclusion. By documenting a relationship between brand-specific magazine advertising exposure and brand of smoking initiation among new smokers, this study provides strong new evidence that cigarette advertising influences youth smoking. © 1999 American Health Foundation and Academic Press

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INTRODUCTION

The increasing prevalence of smoking among youths is of great public health concern [1,2]. The potential role of cigarette advertising in the smoking initiation process has become the focus of much research in recent years [3-7]. Magazines are one of the most important channels by which cigarettes are advertised, accounting for 46% of all cigarette advertising expenditures [8]. Restrictions on cigarette advertising in magazines were a part of the Food and Drug Administration's regulations [9], were included in national tobacco legislation considered by Congress in 1998 [10], and were considered in negotiations between state attorneys general and tobacco companies as they reached a settlement of state Medicaid reimbursement litigation [11]. It is important to understand the impact of cigarette advertising in magazines on youth smoking behavior in order to develop and evaluate interventions designed to prevent youth tobacco use.

A large number of studies have provided evidence that cigarette advertising in magazines targets youth readers [3,12-25]. However, few studies have examined the impact of this advertising on youth smoking behavior. Pollay et al. reported a strong association between brand-specific cigarette advertising expenditures in all media and changes in cigarette brand market shares among adolescents during the period 1979-1993 [7]. Another study demonstrated that changes in cigarette brand market shares among adolescents between 1989 and 1993 were related to the intensity of brand-specific advertising in all media during this period [26]. We are not aware of any previous study that has examined the relationship between adolescents' exposure to cigarette advertising in magazines and youth smoking behavior.

Demonstration of an association between brand-specific exposure to cigarette advertising in magazines and

the subsequent initiation of smoking with that cigarette brand among a cohort of youths would provide strong evidence for an impact of such advertising. However, few studies [25] have adequately characterized brand-specific magazine advertising exposure among youths and none have related this exposure to the brand of initiation among these youths.

In this paper, we quantify brand-specific exposure to cigarette advertising in magazines based on actual self-reports of magazines read by a cohort of Massachusetts youths ages 12–15 years in 1993. We also relate levels of brand-specific magazine advertising exposure to the subsequent brand of smoking initiation or regular use among this sample in 1997–1998.

METHODS

Overview

A longitudinal survey of Massachusetts youths, ages 12–15 years at the time of the baseline survey, was conducted to examine factors related to smoking initiation during a subsequent 4-year follow-up period. During the 1993 baseline survey, youths were asked what magazines they had read during the previous month. Using an independent source of data on the number of pages of cigarette advertising for different brands in a large number of popular magazines in 1993, we estimated the total potential exposure of each youth to brand-specific advertisements in the magazines they reported reading, assuming that the youth read the magazine for the entire year. The total number of pages of advertising to which a youth may have been exposed was termed the “gross impressions” of advertising for that brand. We summed the gross impressions over all youths in the sample to generate estimates of the share of gross impressions for each brand (the ratio of a brand's total gross impressions among the youth cohort to the total number of gross impressions for all cigarette brands).

From the follow-up survey in 1997–1998, we determined the brand of initiation for youths who had become smokers since baseline, the brand of regular use among all current smokers, and, for the entire sample, the brand whose cigarette advertisements attracted the most attention. We correlated the share of brand-specific gross impressions in 1993 with: (1) national estimates of cigarette brand market shares among 12- to 15-year-old smokers in 1993, (2) brand of initiation among new smokers in the Massachusetts youth cohort, (3) brand regularly smoked by current smokers among the Massachusetts youth cohort in 1997–1998, and (4) brand whose advertisements attracted the most attention among the Massachusetts youth cohort in 1997–1998.

Survey Sample

The 1993 Massachusetts Tobacco Survey of youth, conducted by the Center for Survey Research, University of Massachusetts Boston, was based on a probability sample of Massachusetts housing units with telephone numbers drawn using random-digit-dial techniques. Based on initial interviews with a household informant in 11,463 households, a representative sample of youths was selected for extended interview. Between October 1993 and March 1994, extended interviews were completed with 75% of the eligible youths, yielding a final baseline sample of 1,606 youths, 1,069 of whom were between the ages of 12 and 15. This subsample of youths represents the baseline sample in our paper.

Between November 1997 and February 1998, we attempted to recontact each of the 1,069 youths for a follow-up interview. We were unable to trace 328 (30.7%), leaving an eligible sample of 741 youths. Of these, interviews were completed with 627 (84.6%), yielding an overall follow-up response rate of 58.7%. This sample of 627 youths, ages 15–20 at the time of the follow-up survey, comprises our follow-up sample.

Survey Measures

Magazines read. In the baseline survey, respondents were asked “Have you read any magazines or newspapers in the past 30 days?” If they responded yes ($n = 867$), they were asked “Which ones did you read in the past 30 days?” and were prompted to list up to three magazines or newspapers.

Smoking status. We defined nonsmokers at baseline as respondents who had never “experimented with cigarette smoking, not even a few puffs” ($n = 656$). New smokers were then defined as respondents who were nonsmokers in 1993, but became smokers (experimented with cigarette smoking) by 1997–1998 ($n = 109$). Current smokers at follow-up were defined as respondents who reported having smoked at least one cigarette in the past 30 days ($n = 168$).

Brand of initiation. We defined the cigarette brand of initiation as that brand identified by the respondent when asked “What brand did you smoke most often when you first started smoking regularly?” Brands of initiation were analyzed only for respondents who had begun smoking since baseline ($n = 109$).

Brand smoked by current smokers. We defined the brand smoked by current smokers in 1997–1998 as that brand identified by the respondent in response to the question “What brand do you usually smoke?” This question was only asked of current smokers ($n = 168$).

Brand whose ads attract attention the most. In the follow-up survey, all respondents were asked the question "Of all the cigarette advertisements you have seen, which brand's ads do you think attract your attention the most?" ($n = 627$).

Other Data Sources

National youth brand market shares. We obtained national data on the market share for each cigarette brand among 12- to 15-year-old smokers in 1993 (defined as the proportion of youths ages 12–15 years who usually purchase a particular brand) from the Centers for Disease Control and Prevention's 1993 Teenage Attitudes and Practices Survey–II [26]. These data were based on telephone self-reports of the usual brand purchased by 140 smokers ages 12–15 years who reported that they usually bought their own cigarettes.

Magazine advertising data. We obtained data on the total number of pages of advertising for each cigarette brand in a large sample of magazines for the entire year 1993 from Leading National Advertisers [27].

Analyses

Advertising exposure. For each youth who indicated reading one or more magazines in 1993, we cross-referenced the named magazines with the Leading National Advertisers data to determine which cigarette brands advertised in that magazine and the number of advertising pages taken out by each brand in that magazine during the year. We added these figures together for all magazines read by an individual respondent to determine his or her individual exposure to brand-specific advertising, and we added exposures across all respondents in the sample to determine the total gross impressions for the sample as a whole in 1993.

Gross impressions for a particular cigarette brand were therefore defined as the total number of pages of cigarette advertising in 1993 for that brand in magazines that youths reported reading multiplied by the number of youths who reported reading that magazine. We determined the share of gross impressions for a brand by dividing the number of impressions for that brand by the total number of impressions for all brands. Total gross impressions and the share of gross impressions for each brand were calculated for the sample as a whole and for several subgroups of the sample: males, females, non-Hispanic whites, blacks, and Hispanics.

If a respondent did not list any magazines, or listed magazines that were not included in the Leading National Advertisers data, they did not contribute toward the calculation of gross impressions. A total of 307 youths reported reading one or more magazines that were included in our data set and comprised the sample upon which we calculated gross impressions of magazine advertising (Table 1).

Correlation analyses. We computed Pearson correlation coefficients to assess the strength of the relationship between the share of gross impressions for each cigarette brand and four measures of brand-specific smoking behavior and advertising appeal among youths: (1) national estimates of cigarette brand market shares among 12- to 15-year-old smokers in 1993, (2) brand of initiation among new smokers in the Massachusetts youth cohort, (3) brand regularly smoked by current smokers among the Massachusetts youth cohort in 1997–1998, and (4) brand whose advertisements attracted the most attention among the Massachusetts youth cohort in 1997–1998.

RESULTS

The most highly read magazine in the youth cohort was *Sports Illustrated*, which was read by 138 (45.0%) of the 307 youths who reported reading one of the magazines in our database (Table 1). This magazine was second in total number of pages of cigarette advertising in 1993. The magazines in our database that were reported as being read by youths in the cohort contained a total of 1,795.2 pages of cigarette advertising in 1993.

In 1993, the 1,069 Massachusetts youths ages 12–15 years were exposed to a total of 27,809.9 gross impressions of cigarette advertising pages (Table 2). Although males comprised 50.0% of the sample, 73.0% of the gross impressions occurred among males. Blacks comprised 10.5% of the sample and were exposed to 9.4% of the gross impressions.

TABLE 1

Magazines Read by Massachusetts Youth Cohort, Ages 12–15 Years, 1993, and Pages of Cigarette Advertising in Each Magazine, 1993

	Total number of youths who reported reading the magazine	Total number of pages of cigarette advertising ^a
Cosmopolitan	8	99.5
Ebony	11	44.6
Elle	2	40.3
Essence	1	48.6
Glamour	7	71.3
Jet	2	42.0
Mademoiselle	11	69.9
Newsweek	41	9.1
People	31	139.7
Sports Illustrated	138	133.6
Time	38	24.7
TV Guide	7	69.9
Vogue	7	54.3
Woman's Day	3	29.6
Total	307	1,795.2

^a Cigarette advertising data from Leading National Advertisers [27].

TABLE 2

Gross Impressions for Cigarette Advertising in Magazines Read by Massachusetts Youths and Share of Gross Impressions by Brand, Massachusetts Youths Ages 12–15 Years, 1993^a

	Total (all youths ages 12–15 years)		Males		Females		Non-Hispanic whites		Blacks		Hispanics	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
	Marlboro	10,264.4	36.9	8,166.4	40.2	2,098.0	27.9	6,763.2	37.4	792.4	30.2	476.6
Camel	3,772.5	13.6	2,508.2	12.4	1,264.3	16.8	2,511.5	13.9	284.0	10.8	203.6	15.0
Kool	3,100.8	11.2	2,512.7	12.4	588.2	7.8	1,987.4	11.0	325.4	12.4	131.2	9.7
Newport	3,074.7	11.1	2,324.1	11.5	750.5	10.0	1,913.2	10.6	395.8	15.1	139.5	10.3
Winston	2,499.0	9.0	1,778.9	8.8	720.2	9.6	1,675.7	9.3	181.9	6.9	114.9	8.5
Merit	1,230.6	4.4	937.0	4.6	293.6	3.9	811.9	4.5	92.1	3.5	65.4	4.8
Capri	873.3	3.1	237.9	1.2	635.4	8.5	539.2	3.0	132.0	5.0	67.9	5.0
Virginia Slims	868.5	3.1	263.9	1.3	604.7	8.0	502.2	2.8	182.9	7.0	60.3	4.4
Parliament	778.8	2.8	561.0	2.8	217.9	2.9	516.4	2.9	58.7	2.2	36.0	2.6
Benson & Hedges	644.7	2.3	532.2	2.6	112.5	1.5	369.8	2.0	109.2	4.2	30.2	2.2
Salem	517.8	1.9	398.6	2.0	121.2	1.6	329.9	1.8	56.2	2.1	23.8	1.8
Kent	182.8	0.7	77.4	0.4	105.4	1.4	140.5	0.8	14.2	0.5	8.6	0.6
Total	27,809.9	100	20,298.1	100	7,511.8	100	18,060.7	100	2,624.9	100	1,357.9	100

^a Gross impressions are defined as the total number of pages of cigarette advertising in 1993 in magazines that youths reported reading multiplied by the number of youths who reported reading that magazine. The share of gross impressions for a cigarette brand in a given demographic category is the number of impressions for that brand in the category divided by the total number of impressions for all brands in that category. Results are based on responses of 867 youths.

The top five cigarette brands in terms of share of gross impressions were Marlboro, Camel, Kool, Newport, and Winston (Table 2). These brands combined accounted for 81.8% of gross impressions for all cigarette brands. Among males, the top five brands fell in the same order. Among females, while Marlboro, Camel, Newport, and Winston were the top four brands, Capri and Virginia Slims ranked fifth and sixth, while Kool dropped to seventh. Capri and Virginia Slims were the only two brands for which the total number of gross impressions was greater among females than among males. While only 27.0% of all gross impressions occurred among females, 72.8% of gross impressions for Capri occurred among females, and 69.6% of gross impressions for Virginia Slims occurred among females.

Among black youths, Marlboro was still the top brand in terms of exposure, but Newport moved to second and Camel dropped to fourth. Virginia Slims was the fifth brand in terms of exposure, with more than twice the share of impressions among black youths as among the overall sample. Among Hispanic youths, the top five brands were the same as among the entire sample.

The top five brands smoked by U.S. youths ages 12–15 years in 1993 were identical to the top five brands to which Massachusetts youths ages 12–15 years were exposed through magazine advertising in 1993 (Table 3). These five brands accounted for 88.4% of the brand market share among 12- to 15-year-old smokers nationally in 1993 and 81.8% of the gross impressions for magazine advertising among Massachusetts youths of the same age during the same year. The correlation

between national brand market shares and brand-specific advertising exposures among our sample was striking ($r = 0.96$, $P = 0.0002$) (Fig. 1)

The brand of initiation among Massachusetts youths who initiated cigarette smoking between 1993 and 1997 was highly correlated with these youths' exposure to brand-specific advertising in magazines ($r = 0.93$, $P = 0.0001$) (Table 3). The top three brands of initiation (Marlboro, Newport, and Camel) were among the top four brands in terms of youth exposure to magazine advertising. These three brands accounted for 89.0% of the brands of initiation and 61.6% of the advertising exposure among our sample.

The cigarette brands smoked by current smokers among the Massachusetts youth cohort in 1997–1998 were also highly correlated with the youths' exposure to brand-specific advertising in magazines ($r = 0.86$, $P = 0.0004$) (Table 3). There was also a high correlation between the brand whose advertisements were reported to attract the most attention among Massachusetts youth in our follow-up sample and exposure to brand-specific cigarette advertising in magazines at baseline ($r = 0.87$, $P = 0.0002$).

DISCUSSION

To the best of our knowledge, this is the first study to document exposure to brand-specific cigarette advertising in magazines among youths based on actual self-reports of magazines read by these youths. We found

TABLE 3

Brand-Specific Share of Gross Impressions for Cigarette Advertising in Magazines Read by Massachusetts Youths Ages 12–15 Years, 1993, Compared to National and State-Specific Youth Cigarette Brand Use and Brand Advertising Appeal Data

	Share of gross impressions, Massachusetts youth, ages 12–15, 1993 (%) ^a	Brand market share among youth smokers, ages 12–15, U.S., 1993 (%) ^b	Brand of initiation among new smokers, Massachusetts youth cohort, 1993–1997 (%) ^c	Brand regularly smoked by current smokers, Massachusetts youth cohort, 1997 (%) ^d	Brand that attracts attention the most, Massachusetts youth cohort, 1997 (%) ^e
Marlboro	36.9	49.5	56.0	44.6	41.9
Camel	13.6	13.0	10.1	10.1	33.1
Kool	11.2	3.7	0.0	0.0	1.0
Newport	11.1	19.4	22.9	26.8	9.4
Winston	9.0	2.8	1.8	1.2	1.4
Merit	4.4	NA	0.0	0.0	0.2
Capri	3.1	NA	0.0	0.0	0.0
Virginia Slims	3.1	0.1	0.0	0.0	2.6
Parliament	2.8	NA	5.5	12.5	2.0
Benson & Hedges	2.3	0.0	0.0	0.0	0.0
Salem	1.9	0.4	0.0	0.0	0.2
Kent	0.7	NA	0.0	0.0	0.2
Correlation with share of gross impressions ^f		0.96 ($P = 0.0002$)	0.93 ($P = 0.0001$)	0.86 ($P = 0.0004$)	0.87 ($P = 0.0002$)

Note. NA, not available.

^a Gross impressions are defined as the total number of pages of cigarette advertising in 1993 in magazines that youths reported reading multiplied by the number of youths who reported reading that magazine. The share of gross impressions for a cigarette brand is the number of impressions for that brand divided by the total number of impressions for all brands. Results are based on the responses of 867 youths.

^b Percentage distribution of cigarette brands usually bought by current smokers, ages 12–15 years, who reported usually buying their own cigarettes, United States, 1993. From Teenage Attitudes and Practices Survey–II ($n = 140$) [26].

^c Percentage distribution of cigarette brands identified as being the brand smoked most often when respondent first started smoking regularly, among Massachusetts youth cohort members who were nonsmokers (defined as individuals who never puffed a cigarette) in 1993, but experimenters or smokers (defined as those who had puffed a cigarette) in 1997 ($n = 109$).

^d Brand usually smoked by current smokers (defined as those who smoked at least one cigarette in the past 30 days), Massachusetts youth cohort, 1997 ($n = 168$).

^e Brand whose advertisements attract respondent's attention the most, Massachusetts youth cohort, 1997 ($n = 508$).

^f Pearson correlation coefficient (r) for correlation of brand distribution within category shown with share of gross impressions by brand among Massachusetts youths, 1993 (first column).

that the exposure of 12- to 15-year-old youths in Massachusetts to cigarette advertising in magazines is concentrated among precisely those cigarette brands that are most popular among 12- to 15-year-old smokers.

We believe that this is also the first study to relate baseline brand-specific magazine advertising exposure among a cohort of youths to the subsequent brand of initiation among new smokers in that cohort. We found that the brand of initiation among Massachusetts youths who started smoking between 1993 and 1997 was highly correlated with their exposure to brand-specific advertising in magazines in 1993.

One strength of this study is that our estimates of brand-specific cigarette advertising exposure are not subject to recall bias. In some previous studies, exposure to advertising among youths was measured by asking them to report the names of cigarette brands whose advertisements they had seen or brands whose advertisements appealed to them. In this study, the level of exposure to brand-specific advertising in magazines was based solely on self-report of magazines read

by the youths. By using a separate data source to determine the number of pages of cigarette advertisements by brand in each magazine, we avoided the problem of recall bias.

Another strength of this study is that because it is longitudinal, it avoids the problem of interpreting the directionality of association. It is not possible that youths' self-reported exposure to brand-specific cigarette advertising in this cohort was a result of their decisions about what brand to smoke. The measurement of baseline advertising exposure was made in 1993. This baseline exposure was found to correlate highly with the subsequent brand of initiation among new smokers during the period 1993–1997, with the distribution of brands smoked by current adolescent smokers in the cohort in 1997 and with the distribution of brands whose advertisements attracted the most attention from members of the cohort in 1997.

By documenting a strong relationship between exposure to brand-specific magazine advertising among a cohort of young adolescents and the subsequent brand

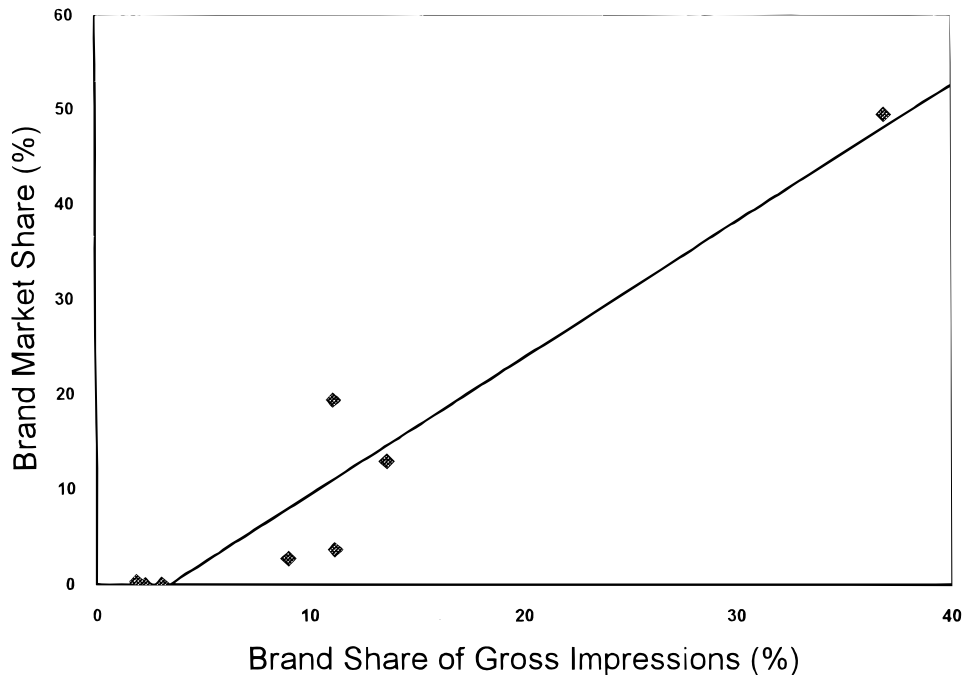


FIG. 1. Correlation between share of gross impressions for brand-specific cigarette advertising in magazines among Massachusetts youth, ages 12–15, 1993, and brand market shares among a national sample of youth smokers, ages 12–15, 1993 [26]. Pearson correlation coefficient = 0.96, $P = 0.0002$.

of smoking initiation among new smokers in this cohort, we believe this study provides strong new evidence that cigarette advertising influences youth smoking behavior. We can think of no plausible alternative explanation for why the brand of cigarette smoking initiation should be tied so closely to the levels of exposure to brand-specific advertising among this cohort.

It is important to note that these results alone do not imply that exposure to cigarette advertising causes youths to initiate smoking. These results merely suggest that the advertising is related to the youths' choices of cigarette brands. However, because brand choice is an integral part of the smoking initiation process [7,28,29], it would be difficult to argue that cigarette advertising affects only brand choice and not the smoking initiation process itself. Pollay et al. have argued that if the attitudes affecting brand choice are influenced by cigarette advertising, it seems implausible that those same brand attitudes would not also affect the decision to use cigarettes: "It is impossible to advertise a specific brand without also simultaneously advertising cigarettes as a product class. . . . Advertising that makes a cigarette brand attractive inevitably also makes cigarette smoking attractive, at least the smoking of that brand" [7]. Thus, we believe the results of this study suggest an effect of advertising on smoking initiation and not only brand selection because: (1) brand selection is an important and inherent part of the smoking initiation process, so that if advertising affects brand selection it is inherently affecting the

smoking initiation process as well, and (2) advertising theory suggests that it would be implausible for advertising to have an isolated effect on brand selection without simultaneously affecting perceptions about the product itself.

It is also important to point out that the effect we are suggesting is probably not the sole result of cigarette advertising in magazines. To the extent that youths' exposure to brand-specific cigarette advertising in magazines is correlated with their exposure to brand-specific advertising in other media, and with brand-specific sales promotion, this study may simply be detecting a relationship between overall levels of exposure to brand-specific advertising and promotion and brand-specific smoking behavior among youth.

Our findings are subject to several limitations. First, a correlation between patterns of brand-specific advertising exposure and patterns of cigarette brand use does not necessarily imply causation. Alternative explanations need to be considered. However, both the specificity of this relationship and the fact that we observe this association in a longitudinal study make alternative explanations seem less plausible.

Second, the correlation between brand-specific advertising exposure and brand of initiation among new smokers was not perfect. For example, both Kool and Newport obtained approximately 11% of gross impressions of magazine advertising among Massachusetts youths in 1993. While 22.9% of new smokers by 1997

had initiated smoking with Newport, none reported initiating smoking with Kool. This result may be partially an artifact due to the low number of black adolescents in the study (only three black adolescents were included among the new smokers in the study cohort). Because Kool is a popular brand among black youths but is smoked infrequently among whites [26], our study may have seriously underestimated the use of Kool among Massachusetts youths. Nevertheless, even if this result is accurate, it is the overall correlation that is most important, not the presence or absence of a perfect correlation in the data. The lack of a perfect correlation suggests that nonmagazine forms of cigarette advertising and promotion are important and that factors other than cigarette advertising influence brand selection.

Third, the fact that subjects reported reading a magazine does not imply that they actually saw the cigarette advertisements. However, there is no reason to believe that actual exposure to these advertisements would vary differentially by cigarette brand. Therefore, our estimates of the share of gross impressions for cigarette brands should still be reasonably accurate.

Fourth, it is possible that exposure to cigarette advertising among the cohort could have changed over the course of the study. This is unlikely, however, and even if it did occur, it would still be difficult to explain the observed association between baseline advertising exposure and subsequent smoking behavior.

Despite these limitations, we believe that this study adds to the accumulating evidence [3–7] that cigarette advertising influences youth smoking behavior. Based on this evidence, efforts to eliminate or restrict cigarette advertising to prevent youth tobacco use are justified.

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