The Association Between Cigarette Marketing Practices and Youth Smoking Behavior

Sandy J. Slater, PhD, Frank J. Chaloupka, PhD, Lisa M. Powell, PhD

University of Illinois at Chicago

Institute for Health Research and Policy

Melanie Wakefield, PhD
Center for Behavioral Research in Cancer
The Cancer Council Victoria

Lloyd D. Johnston, PhD, Patrick M. O'Malley, PhD

University of Michigan

Institute for Social Research

The Study

•Public policy can be a powerful instrument to initiate behavior change, and the issue of whether tobacco POP marketing strategies influence youth smoking has important public policy implications.

•Through the 1990s and more recently, there was a growing emphasis on youth-focused tobacco control and numerous local, state and Federal policies were enacted to address this issue.

•In the wake of these tobacco control efforts, and in particular the MSA, the tobacco industry has eliminated some of its more traditional forms of advertising. However, there is evidence that the tobacco industry is turning more and more to retail stores as outlets for its marketing efforts (Wakefield et al. 2002).

The Study Cont'd.

•In 2003, the Tobacco Industry spent a total of $14.2 billion on POP advertising and promotions to facilitate the sale or placement of cigarettes (i.e., price discounts, promotional allowances paid to retailers, wholesalers, others, advertising and retail value-added promotions). This accounts for 94 percent of all 2003 advertising and promotional spending (FTC 2005 Cigarette Report).

•The POP retail environment represents a marketing arena that is still relatively unregulated, and, although the MSA included provisions for other marketing restrictions, the tobacco industry is still finding ways to widely market its products.

•A strength of the data used for this study is that most was collected after the implementation of the MSA provisions, allowing for an examination of the post-MSA tobacco POP environment.

The Study Cont'd.

Limitations of Previous Research:

•Study was based on a community, group of communities, or statewide sample.

•Used self-reported measures for exposure to cigarette advertising and promotions.

Strengths of the Current Study:

•Its use of a national sample of adolescents the communities in which they reside.

•Its use of more objective measures of the POP marketing practices.

•Its ability to examine the differential effects of these POP strategies on smoking uptake.

Data and Methods

➤Data are from two primary sources: 1) the ImpacTeen Project, a component of Bridging the Gap, conducted by the University of Illinois at Chicago's Institute for Health Research and Policy and funded by The Robert Wood Johnson Foundation, and 2) the Monitoring the Future (MtF) study, the nation's longest running survey of youth substance use and abuse, conducted by the University of Michigan's Institute for Social Research and funded by the National Institute on Drug Abuse (NIDA).

➤Selection of ImpacTeen communities was determined by the location of MtF's separate nationally representative school samples of 8th, 10th, and 12th graders.

➤The study covers five years, 1999 through 2003, in which students were administered surveys that included questions on youth smoking behavior. (109,308 students in total).

➤For each index school, a catchment area, or community, was defined, reflecting the area from which the school draws its students.

Data and Methods Cont'd.

➤A list of all likely tobacco retailers located within the specified area was then generated. From that list a random sample of up to 30 tobacco retail outlets was selected for on-site observation (if less than 30 a census of retailers was selected, this was the case in 82 percent of the catchment areas visited).

➤Information on cigarette placement, price for premium brand cigarettes, promotions, and advertising was collected by on-site observation in the Spring and Summer of 1999, 2000, 2001, 2002, and 2003 and extracted from the retailer sampling data set.

➤There are a total of 966 sites and 17,476 stores in the sample, with an average of 18.1 (st. dev. 9.9) stores per site. Range: 1 to 31 stores per community (some catchment areas may have 31 stores because observers were instructed to add the store closest to the school if it was not included in the random sample of 30).

➤Control variables come from the MtF surveys, except for urbanization, which was extracted based on the location of the school from the National Center for Education Statistics database.

Analysis

➤ **Created three outcome variables**:

1. Overall 30-day prevalence measure for smoking by 8th, 10th and 12th Graders.

Prevalence is a dichotomous measure of the responses to current smoking that reflect having smoked in the last 30 days. Those who responded they have never smoked=0 (80 percent) and those who said they smoked at all in the past 30 days=1 (20 percent).

2. Average number of cigarettes smoked in the past 30 days by 8th, 10th and 12th Graders.

A 'continuous' measure of consumption was constructed based on the categorical responses of the MTF question "how frequently have you smoked cigarettes during the past 30 days?" < cigarette/day (0.5); 1-5 cigarettes/day (3.0); about ½ pack/day (10); about 1 pack/day (20); about 1 ½ pack/day (30); and, 2+ packs/day (40). The natural log of this variable was used in empirical analyses.

3. Smoking Uptake Measure for 8th, 10th and 12th Graders.

Three MTF questions are used to create the uptake measure: 1) ever smoking, 2) smoking in past 30 days, and 3) intention to smoke in 5 years. The uptake measure includes the following categories: 0) never smoker; 1) puffer; 2) non-recent experimenter; 3) former established smoker; 4) recent experimenter; and, 5) current established smoker.

Analysis Cont'd.

➤ **Explanatory variables**:

1. <u>Placement variable</u>—Aggregated up to the site level, this variable can be interpreted as the proportion of stores in a site that have no self-service cigarette placement.

2. <u>Advertising Scale Variable</u>—includes several variables: 1) advertising on the property/parking lot; 2) advertising on the exterior of the store; and 3) interior store advertising; 4) functional objects; and, 5) low height interior ads. Range: 0, i.e., no advertising up to five, i.e., all five types of advertising were present in stores within the site.

3. <u>Promotions variable</u>—This variable can be interpreted as the proportion of stores in a community that have promotions, in most cases, Marlboro or Newport promotions, or the level of promotions found in a community.

4. <u>Premium price variable</u>— represents the average price of Marlboro and Newport cigarettes across all stores in a site and is adjusted to reflect inflation (1982-84 base year).

Analysis Cont'd.

➤ **State-level Tobacco Control Policy variables**:

5. <u>Smoke-Free Air Index accounting for Preemption</u>—Sum of nine separate restrictions (i.e., restrictions on smoking in private worksites, restaurants, recreational facilities, shopping malls, health facilities, etc.). These restrictions take on a value depending on the strength of the regulation. The highest possible score a state could receive is 61. The index is derived by adding up the restriction ratings for each of the nine restrictions.

6. <u>Possession-Use-Purchase Index</u>—Sum of 'Minors' possession, use, and purchase prohibited variables. This index represents the number of possession, use, and/or purchase laws (PUP laws) present for a given state and year (possible values: 0 = no PUP laws; 1 = 1 PUP law present; 2 = 2 PUP laws present; 3 = all 3 PUP laws present).

7. <u>Youth Access Index</u>—Sum of nine separate youth access provisions, which are given a rating between 0-4, or 0-5 for three provisions depending on the stringency of the provision. The highest possible score for the index is 39.

Analysis Cont'd.

• Analyses were run in Stata V8. LOGISTIC was used for the dichotomous smoking prevalence measure, REGRESS was used for the conditional cigarette consumption measure, and GOLOGIT was used for the smoking uptake measure. The complex multi-stage sample design was accounted for by using sampling weights to adjust for differential selection probabilities, and by using Taylor linearization-based variance estimators to adjust for clustering by site to compute robust standard errors.

• To assess the magnitude of the association between cigarette marketing and youth smoking prevalence, a series of simulations was conducted for various scenarios reflecting different levels of availability of promotions and no self-service placement.

• All analyses controlled for student grade, gender, race/ethnicity, whether the student lives with both parents, students' income, father's and mother's level of education (college or more), urbanization, state-level tobacco policies, and year of data collection.

Descriptive Table of Variables

	Mean/Proportion	Standard Deviation	Range
Outcome Variables			
Smoking Prevalence	0.20	0.40	0 – 1
Consumption	5.72	8.09	0.5-40
Explanatory Variables			
Advertising Scale	2.62	0.76	0 – 5
Placement	0.83	0.21	0 – 1
Any vs. No Promotions	0.48	0.26	0 – 1
Premium Priced Cigarettes	1.97	0.32	1.29 – 3.72
MTF Control Variables			
Grade 8*	0.35	0.47	0 – 1
Grade 10	0.33	0.47	0 – 1
Grade 12	0.32	0.47	0 – 1
Male	0.48	0.49	0 – 1
Student Income	29.98	30.31	0 – 151.20
Lives with Both Parents	0.77	0.42	0 – 1
Father's Education	0.55	0.49	0 – 1
Mother's Education	0.59	0.49	0 – 1
Percent Black Population	0.12	0.32	0 – 1
Percent White Population*	0.68	0.47	0 – 1
Percent Hispanic Origin	0.11	0.31	0 – 1
Percent Asian Population	0.04	0.18	0 – 1
Percent Other Race Population	0.05	0.22	0 – 1
Year	2001	1.41	1999 – 2003
NCES Variables			
Urban	0.23	0.42	0 – 1
Suburban	0.42	0.49	0 – 1
Rural*	0.35	0.47	0 – 1
State-level Policy Variables			
SFAPREMP Index	13.19	12.09	-22.5 – 51
PUP Index	1.78	1.05	0 – 3
Youth Access Index	17.23	6.96	3 – 29

*Indicates Referent Category. Sample N is 81,851, except for cigarette consumption which is 16,425

Descriptive Table of Variables

Frequency Distribution of Smoking Experience for Uptake Variable			
Behavior	**Level**	**N**	**%**
Never Smoker	0	14,130	53.7
Puffer	1	5,456	20.7
Non-recent experimenter	2	1,077	4.1
Former Established Smoker	3	815	3.1
Recent Experimenter	4	1,808	6.9
Current Established Smoker	5	3,015	11.5
TOTAL	**6**	**26,301**	**100%**

ImpacTeen POP Measures Trends by Year

ImpacTeen Measures	1999	2000	2001	2002	2003
Advertising Scale	2.66	3.04	2.68	2.39	2.39
No Self-Service Placement	0.66	0.79	0.82	0.92	0.91
Any vs. No Promotions	0.50	0.38	0.39	0.47	0.57
Premium Priced Cigarettes	1.77	1.94	1.99	2.14	2.06
Sample N	163	173	221	209	200

Multivariate Models For Prevalence and Consumption

	Smoking Prevalence	Cigarette Consumption
Advertising Scale	0.99	0.015
	(0.95 – 1.05)	(0.71)
Promotions	**1.15**	0.021
	(1.00 -- 1.31)	(0.33)
Placement	**0.81**	0.086
	(0.67 -- 0.97)	(-1.09)
Premium Price	**0.81**	-0.098
	(0.69 -- 0.94)	(-1.61)
Price Elasticity	*-0.35*	*-0.18*
SFA Index	**0.99**	-0.002
	(0.98 -- 0.99)	(-1.01)
PUP Index	0.99	-0.001
	(0.96 – 1.03)	(0.03)
YA Index	1.00	**-0.007**
	(0.99 -- 1.01)	**(-2.78)**
Sample N	81,851	16,425

Odds ratios with 95% CIs are presented for prevalence model. Coefficients presented for consumption model with t-ratios in parentheses

All Models include intercepts and control for: grade, gender, race/ethnicity, whether student lives with both parents, students' income, father's and mother's level of education (college or more), urbanization, year of data collection, and state-level tobacco control policies.

Results of the Generalized Ordered Logit Model for Smoking Uptake

Store Variables	Level 1 (0-1) Non-Smoker to Puffer	Level 2 (1-2) Non-recent Experimenter	Level 3 (2-3) Former Est. Smoker	Level 4 (3-4) Recent Experimenter	Level 5 (4-5) Current Est. Smoker
Advertising Scale	**1.08** **(1.02 – 1.14)**	1.06 (0.99 – 1.12)	1.05 (0.97 – 1.12)	1.01 (0.94 – 1.08)	0.99 (0.91 – 1.07)
Promotions	1.09 (0.93 – 1.29)	1.16 (0.97 – 1.38)	**1.21** **(1.01 – 1.44)**	**1.23** **(1.01 – 1.49)**	**1.39** **(1.11 – 1.72)**
Placement	0.93 (0.76 – 1.15)	0.90 (0.72 – 1.12)	0.93 (0.74 – 1.17)	0.83 (0.65 – 1.06)	0.81 (0.60 – 1.10)
Premium Price	0.87 (0.74 – 1.02)	**0.76** **(0.64 – 0.89)**	**0.77** **(0.65 – 0.92)**	**0.81** **(0.67 – 0.98)**	**0.79** **(0.63 – 0.98)**

Sample N=26,301. Entries in bold are significant at $p < .05$. Odds Ratios are presented with 95 percent confidence intervals in parentheses. All models include intercepts and control for: grade; gender; race/ethnicity; whether student lives with both parents; students' income; father's and mother's level of education (college or more); urbanization; state-level smoke free air policies; state-level youth purchase, use, and possession policies; state-level youth access policies; and year of data collection. Complete Model Results available upon request.

Results of the Simulation Models

Purpose: to examine the impact of promotions and placement on smoking prevalence using the estimates from our final model.

➤**Promotions**

Predicted prevalence for 100, 75, 25 or zero percent of stores having promotions.

•If promotions available in all stores, estimated smoking prevalence would rise by 2.5 percent

•Increasing promotion availability to 75 percent of stores would have little impact on youth smoking prevalence.

•Reducing promotions from the sample mean of 47.9 percent to 25 percent would result in a 5.8 percent relative decline of prevalence

•Fully eliminating promotions would result in an 8.4 percent relative decline in prevalence.

➤**Placement**

•Increasing clerk assist only placement from the sample mean of 83.5 percent to all stores, simulations indicate that youth smoking prevalence would fall by 6.1 percent.

Key Findings

•Lower cigarette prices, self-service placement, higher levels of advertising and promotions were all found to be associated with increased youth smoking behavior.

•For uptake, results suggest POP advertising is associated with encouraging youth to initiate smoking, whereas cigarette promotions are associated with influencing those youth already experimenting with cigarettes to progress to regular smoking, with current established smokers being most influenced by promotional offers.

•Additionally, although we found differential effects for both advertising and promotions, results suggest higher cigarette prices are associated with discouraging youth from progressing on to established smoking at all levels of smoking uptake.

•Findings indicate that price-based marketing strategies have a strong impact on youth smoking behavior.

•Implies that the substantial increase in cigarette companies' price-related marketing in recent years reduced the rate of decline in youth smoking prevalence over the past several years.

•These results are of particular significance because no previous study has examined the association of objectively collected measures of cigarette marketing strategies on smoking behavior in a national sample of youth.

•Results provide evidence that restricting advertising will discourage youth from initiating smoking, and policies that raise cigarette prices and/or restrict price-based promotions will have a long-term positive impact on preventing youth from initiating smoking.

Study Limitations

•Use of cross-sectional data weakens the ability to make direct causal inferences about whether exposure to tobacco POP retail marketing measures directly influenced changes in youth smoking behavior.

•Analyses exclude information on the presence of local tobacco policies and state-funded tobacco control expenditure data.

•A number of the POP retail environment measures are limited in the amount of information they capture (i.e. advertising and promotions).

•However, even with these limitations, this study resulted in some important findings that will be useful for developing more effective national, state and local tobacco control programs and policies.