Research and Professional Briefs

# Existence and Predictors of Soft Drink Advertisements in Pennsylvania High Schools

CLAUDIA PROBART, PhD, RD; ELAINE McDONNELL, MS, RD; LISA BAILEY-DAVIS, MA, RD; J. ELAINE WEIRICH, MEd

**ABSTRACT**

The objective of this study was to describe the extent and locations of soft drink advertisements on high school campuses in Pennsylvania and identify factors related to extent of these advertisements. Surveys were distributed to 271 school foodservice directors in a random sample of high schools in Pennsylvania. These high schools were selected to be representative of the entire population of high schools in Pennsylvania based on chosen demographic characteristics. A three-phase survey strategy was used, involving distribution of a postcard reminder 1 to 2 weeks after the initial survey distribution, and mailing of a second survey to nonrespondents 1 to 2 weeks after mailing of the postcard. Two hundred twenty-eight school foodservice directors (84%) returned surveys. Linear multiple regression analyses were done using SPSS (version 11.5.1, 2002, SPSS Inc, Chicago, IL). Approximately two thirds (66.5%) of respondents indicated soft drink advertisements exist in at least one location in their school, with the most prevalent locations being on vending machines (62%) and school grounds, such as playing fields (27%). Slightly more than 10% of respondents indicated soft drink advertisements displayed in the cafeteria. Extent of soft drink advertisement locations was positively related to existence of a pouring-rights contract, subscription to Channel One, and receipt of incentives from soft drink bottlers based on sales, but negatively related to average daily participation in school lunch. These findings suggest that commercialization and sales incentives might interact to contribute to school environments that are not "nutrition-friendly." Schools' efforts to establish wellness policies as mandated by the Child Nutrition and WIC Reauthorization Act of 2004 provide ideal opportunities to examine school environments for advertising that might conflict with the healthful environments they are aiming to establish, and perhaps to develop policies to address these practices.
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*C. Probart is an associate professor, E. McDonnell is project coordinator, and J. E. Weirich is project manager, Department of Nutritional Sciences, Pennsylvania State University, University Park. L. Bailey-Davis is director of operations, Pennsylvania Advocates for Nutrition and Activity, Harrisburg; at the time of the study, she was chief of the Cardiovascular Health Section, Bureau of Chronic Diseases and Injury Prevention, Pennsylvania Department of Health, Harrisburg.*

*Address correspondence to: Elaine McDonnell, MS, RD, Department of Nutritional Sciences, Pennsylvania State University, 5 Henderson Bldg, University Park, PA 16802. E-mail: etm101@psu.edu*

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Concerns have been raised about the practice of advertising targeted to children because of children's inability to critically evaluate advertisements (1). Particular attention and criticism is being focused on exposure of children to promotion of foods high in calories and low in nutrient density (2,3). Soft drinks are singled out as being especially problematic because they are associated with higher energy intake (4) and increased likelihood of being overweight (5). Soft drinks are not only high in calories but have also been shown to replace milk in the diets of adolescents, therefore limiting calcium and potentially increasing risk for osteoporosis (6,7). Because of these issues, the practice of advertising soft drinks to adolescents deserves particular attention (1,3).

Food advertising to children results in brand preferences and increased requests for promoted foods (8-10) and appears to be directly related to energy imbalance, and increased risk for disease and obesity (11,12). A recent study suggests that children form incorrect opinions about foods' nutritional quality based on exposure to advertisements, rating the advertised foods to be of higher quality than justified (13).

Medical organizations, governmental agencies, and consumer advocacy groups have focused attention on increased levels of commercialization targeting children in schools (3,10,14). The American Psychological Association has identified concerns about commercialization within schools because attendance is mandatory, messages can be repeated daily, and the prestige and expertise of school personnel can become associated with the items being promoted (10). Examples of schools' involvement in commercial activities include subscription to Channel One and signing of pouring-rights contracts and sales incentives with soft drink distributors. Channel One's 12-minute broadcasts, consisting of 10 minutes of news and 2 minutes of advertisements, are delivered daily to nearly 8 million students in nearly 12,000 middle and high schools in the United States (15). Pouring-rights contracts are agreements between school districts and beverage distributors allowing exclusive sale of the distributor's product in schools and on school grounds (16). Some schools also enter into sales incentive programs to generate cash or other incentives based on soft drink sales.


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Little research has been done on the extent or location of advertisements for low nutrient density foods, such as soft drinks, or the relationship of these advertisements to other school health-related factors. Soft drink advertisements are located throughout school campuses, cutting across several areas of responsibility. Although not necessarily responsible for foods sold or advertised outside of the school cafeteria, school foodservice directors are affected by food advertisements located throughout schools because these foods compete with school meals and can decrease their revenue. This study provides information, from the perspective of school foodservice directors, on the degree to which soft drink advertisements are found on high school campuses, where they are located, and factors related to the extent of these advertisements.

## METHODS

As part of a larger school foodservice director survey examining the extent of competitive foods offered and sold in Pennsylvania high schools (17), specific questions were included relating to the extent of in-school soft drink advertisements. Items to assess information about the school, school foodservice program, vending machine access, and average daily participation in school lunch were also included in the survey. Questions about sales and revenue resulting from vending machines were not included because school foodservice directors often do not have access to that information. Using a random number generator, a random sample of 50% of public high schools in Pennsylvania was selected, weighted to represent state characteristics of region, free and reduced rate, enrollment, and rural/urban. High schools were the unit of analysis. Surveys, along with cover letters signed by the Secretaries of the Pennsylvania Departments of Health and Education, and $5 cash incentives were mailed to 271 school foodservice directors responsible for the foodservice at the selected schools. Following the methodology of Dillman (18), reminder/thank-you postcards were sent to the entire sample, followed by two additional mailings of survey forms to nonrespondents, within a 6-week period. A Web-based version of the survey was made available through a code on the cover letter. Telephone interviews were conducted with 16% of respondents to validate key variables. This research was approved by the Institutional Review Boards of both the Pennsylvania State University and the Pennsylvania Department of Health. Survey data were analyzed using SPSS (SPSS base 11.5 for Windows, 2002, SPSS Inc, Chicago, IL).

The variable "location score" was constructed by adding together all of the specific locations for soft drink advertisements that could be checked on the survey, with a range of 0 to 6. To determine factors predicting location score, the following variables were entered into a forward stepwise linear regression equation with location score as dependent variable: existence of pouring-rights contract, average daily participation, incentives from soft drink bottlers, subscriptions to Channel One, time of the first lunch period, and extent of vending machine access. Extent of vending machine access was a score (0-5) based on number of time periods selected during which students have access to vending machines. These independent variables were included because of their correlation with the dependent variable in correlation analyses and their theoretical association with advertisements.

**Table 1.** Demographic data of school foodservice directors responding to a survey about the existence and predictors of soft drink advertisements in Pennsylvania high schools (n=228)

| | | |
|---|---|---|
| **Mean (±standard deviation) time in current position (y)** | 9.0 (±7.2) | |
| | **n[a]** | **%** |
| **Sex** | | |
| Female | 154 | 67.8 |
| Male | 68 | 30.0 |
| **Job title** | | |
| Food service director | 194 | 85.5 |
| Cafeteria manager | 14 | 6.2 |
| Other | 9 | 4.0 |
| Business manager | 3 | 1.3 |
| **Level of education** | | |
| Less than high school | 6 | 2.6 |
| High school | 74 | 32.6 |
| Associate's degree | 42 | 18.5 |
| Bachelor's degree | 83 | 36.6 |
| Postgraduate degree | 17 | 7.5 |

[a]Values within categories do not total 228 because of missing data.

## RESULTS AND DISCUSSION

Of 271 school foodservice directors receiving surveys, 209 surveys were returned by mail and 19 responded via the Web-based option, for a total of 228 surveys, reflective of an 84% response rate. Demographic characteristics of respondents are provided in Table 1. Demographic data are reported for all returned surveys.

Schools represented included grades 9 (94%), 10 (98.7%), 11 (99.6%), and 12 (99.6%). (Respondents indicated all grades represented at their schools leading to multiple responses.) Average enrollment was 992.7±587.16 (range=137 to 3,400), and average free and reduced rate was 28.1%±22.5% (range=1 to 100).

Most respondents (94%) indicated existence of vending machines, including soft drink machines, accessible to students, with a school average of 5.9±4.3 (range=1 to 33) machines. Approximately two thirds (63.4%) indicated existence of soft drink machines owned by a soft drink company, for which their district/school receives funding as a percentage of sales revenue. An additional 36.6% indicated that their district/school receives cash or other incentives from soft drink bottlers based on sales quotas. Almost half (48.5%) indicated their district has an exclusive pouring-rights contract with a soft drink bottler. Sixty-eight percent indicated students have access to vending machines during lunch periods. Among schools with vending machines, 58.5% were reported to include carbonated beverages and 58% include sport drinks.

Respondents were asked about the existence of soft drink advertisements in six potential locations. Soft drink advertisements were most prevalent on vending machines, as indicated by 62% of respondents. Twenty-seven percent indicated soft drink advertisements were located on school grounds, such as playing fields. Soft

**Table 2.** Multiple regression with dependent variable "advertisement location score" in a survey about the existence and predictors of soft drink advertisements in Pennsylvania high schools[a]

| Predictive variables | $\beta$ coefficient | *t* | *P* value |
|---|---|---|---|
| Pouring-rights contract[b] | .310 | 4.468 | <0.001 |
| Soft-drink company incentives[c] | .182 | 2.563 | 0.01 |
| Subscribes to Channel One[d] | .225 | 3.417 | 0.001 |
| Average daily participation in school lunch[e] | −.229 | −3.458 | 0.01 |

[a]Adjusted $R^2$=0.283; N=177; significance level of model: $P$<0.001.
[b]Question was, "Does your district have a contract with a soft-drink bottler, such as Coca-Cola, Pepsi-Cola, or Dr. Pepper, giving the company exclusive rights to sell soft drinks at schools in your district?" Response categories were "Yes" and "No."
[c]Question was, "Does your district/school receive incentives (for example, cash rewards, donations of equipment, supplies, or other donations), from a soft-drink bottler based on sales?" Response categories were "Yes" and "No."
[d]Question was, "Does your high school subscribe to Channel One?" Response categories were "Yes," "No," and "Don't know."
[e]Question was, "What is your average daily participation in school lunch at the high school as a percent of enrollment?" Response was a percentage.

drink advertisements were also found in school cafeterias (10.6%) and other areas in school buildings (9.3%). Few or no soft drink advertisements were promoted in school newspapers or over school public-address systems (1.3%) or on buses (0%), although the number who indicated they "did not know" was highest for these potential locations (ie, in school newspapers, on public-address systems, or on buses). Approximately two thirds (66.5%) of respondents indicated soft drink advertisements exist in at least one location. Twenty-seven percent of school foodservice directors indicated their school subscribes to Channel One, while almost half (47.6%) indicated they "did not know."

The regression equation was significant, indicating that number of soft drink advertisement locations could be predicted by the independent variables entering the equation. The regression analysis included only those surveys with complete data for the analyzed variables. Four factors explained 28.3% of the variance in number of advertisement locations (adjusted $R^2$=0.283, $F$=18.477, $P$<0.001). The existence of a pouring-rights contract was positively related to location score ($t$=4.468, $P$<0.001), as was receiving incentives from a soft drink bottler based on sales ($t$=2.563, $P$=0.011) and subscription to Channel One ($t$=3.417, $P$=0.001). Average daily participation was negatively associated with location score indicating the higher the number of advertisement locations, the lower average daily participation ($t$=−3.458, $P$=0.001) (Table 2).

This study found soft drink advertisements to be ubiquitous on Pennsylvania high school campuses. The majority of soft drink advertisements were located on vending machines (62%), with more than one quarter of respondents (27%) indicating existence of soft drink advertisements on school grounds, including playing fields. A troubling finding was that >10% of respondents stated that soft drink advertisements exist in school cafeterias.

Effectiveness and consequences of advertising to children, particularly in schools, is currently the focus of debate (10,14). The advertising industry claims there is little effect of such advertising and that advertising is conducted to gain market share, rather than create demand for their products (19,20). Others point out that, considering the enormous amount of money being spent on advertising to children, it is unlikely that companies are not creating new markets and demand (3,10). Literature suggests both effectiveness of advertising in schools and negative health implications of food advertisements to children (10,11). However, few studies exist to quantify the extent and location of advertisements for foods of limited nutritional value, such as soft drinks, on school campuses, or factors associated with these advertisements.

Current research found that the number of advertisement locations around high school campuses in Pennsylvania is associated with several variables, including average daily participation. The negative association between number of soft drink advertisement locations and participation in school lunch is a disturbing finding, suggesting these advertisements, many of which are on soft drink vending machines, effectively compete with school-lunch participation. Reimbursable school meals are regulated for nutrient contributions, portion size, and fat content (21). Participation in school-meals programs has been shown to be associated with better diet quality and decreased potential for obesity (22,23). Practices that are associated with decreased participation in school-lunch programs should be reconsidered because of the consequences of poor diets to adolescents (24). Potential health problems include the immediate effects of obesity, including psychosocial disorders, and long-term health effects of poor nutrition, such as reproductive disorders, diabetes, osteoporosis, some cancers, and cardiovascular disease (25). The negative association of soft drink advertisement locations with participation in school meals could be important, as schools are being asked to lead efforts to prevent childhood overweight and obesity.

The number of soft drink advertisement locations was also predicted by the existence of pouring-rights contracts and incentives offered to schools for soft drink sales. These relationships suggest that when schools and bottlers collaborate and mutually benefit from soft drink sales, the environment favors placing advertisements for soft drinks throughout school campuses. Pouring-rights contracts have been the target of criticism because of the message given to students that their school is "endorsing" purchase of soft drinks and promoting a specific brand. The value of these contracts to schools is substantial, making them difficult for financially strapped schools to resist. A US Government Accounting Office study has found that nearly half of all schools, and 75% of high

schools, have pouring-rights contracts (26). Although slightly fewer such contracts were found in the high schools in this study, these schools indicated that they receive other financial incentives, either as a percent of sales or as a reward for reaching sales quotas.

An interesting finding in the current research was the positive association between number of soft drink advertisement locations and subscriptions to Channel One. The Channel One item was not included within the list of potential soft drink advertisement locations appearing on the survey, but was asked as a separate question. Channel One has been criticized as an example of commercialization in schools (19,20). Research on effects of Channel One showed the commercials were almost exclusively for clothing, food, and vanity items (27). Students in Channel One schools have been shown to have considerably more favorable attitudes toward advertised products and higher scores on "materialistic attitudes" than students from control schools (28,29), as well as mistaken impressions about their schools' approval of Channel One's commercials before they are shown (30). The association of Channel One with increased soft drink advertisement locations might indicate an environment of increased commercialization in certain high schools.

Use of self-report data from school foodservice directors, as well as the fairly high number who were unsure of the existence of advertisements in certain locations or whether or not their school subscribes to Channel One were limitations of this study. Despite these limitations, the analysis was able to detect important predictive relationships. These limitations point to the need for additional research, including physical inventories of commercialization on school campuses, to verify the associations found here.

## CONCLUSIONS

This study found widespread existence of advertisements for soft drinks on high school campuses, according to school foodservice directors. Associations were found between the number of soft drink advertisement locations and pouring-rights contracts, other incentives to sell soft drinks, and commercial-laden classroom television, as well as a negative relationship with average daily participation. These findings suggest that commercialization and sales incentives might interact to contribute to school environments that are not nutrition-friendly. The negative consequences of encouraging consumption of low-nutrient-density, high-calorie beverages on both the short- and long-term health of adolescents deserves additional attention, as schools are asked to become zones of good health and nutrition and provide leadership in the national effort to prevent childhood overweight and obesity. With the passage of the Child Nutrition and WIC Reauthorization Act of 2004 (Public Law 108-265), schools that sponsor school meals programs are required to establish wellness policies to address childhood obesity. This wellness policy requirement creates an ideal opportunity to examine school environments for advertising that might conflict with healthful lifestyles. This position was recently supported by the Institute of Medicine, which recommended that schools, in an effort to address the childhood obesity epidemic, develop, implement, and enforce policies to create advertising-free school environments (31).

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