# Store Impulse Marketing Strategies and Body Mass Index

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*Objectives.* We quantified the use of placement and price reduction marketing strategies in different food retail outlets to identify associations between these strategies and the risk of overweight and obesity among customers.

*Methods.* In 2011 we collected dietary and health information from 1372 residents in "food deserts" in Pittsburgh, PA. We audited neighborhood restaurants and food stores (n = 40) including 16 distant food venues at which residents reported shopping. We assessed end-aisle displays, special floor displays, cash register displays, and price reductions for sugar-sweetened beverages (SSBs); foods high in saturated oils, fats, and added sugars; and nutritious foods such as fruits, vegetables, and products with at least 51% whole grains.

*Results.* Supermarkets and superstores had the largest numbers of displays and price reductions for low-nutrient foods. Exposure to displays of SSBs and foods high in saturated oils, fats, and added sugars and price reduction of SSBs was associated with increased body mass index.

*Conclusions.* In-store marketing strategies of low-nutrient foods appear to be risk factors for a higher body mass index among regular shoppers. Future research is needed to confirm the causal role of marketing strategies in obesity. (*Am J Public Health.* 2015;105:1446–1452. doi:10.2105/AJPH.2014.302220)

Although environmental health research has examined the consequences of a wide variety of ambient exposures on human health, there are limited efforts to quantify the impact of human exposure to in-store marketing strategies. Business practices do not fit neatly within the realm of what environmental health usually focuses on: pollutants, tobacco smoke, sanitary practices, and conditions that lead to physical injuries. Yet if an exposure to some external factor increases the risk of a negative health outcome, especially a factor that a person cannot easily avoid or control at the individual level, it should be considered fair game for the field of environmental health.

Although many laud supermarkets as vital in addressing obesity because of the large variety of fresh fruits and vegetables available,[1–3] supermarkets also stock large quantities of low-nutrient foods that contribute to unnecessary weight gain. Historically, research in the 1970s suggested that increasing shelf space and placement of goods in prominent locations were key factors in increasing their sales.[4–7] A recent study investigated the promotional strategy of merely placing different beverages on end-of-aisle displays and found that such placement increased sales of carbonated drinks by 51.7% ($P < .001$), an effect size equivalent to a price reduction of 22%.[8]

Finding that store factors were more important than individual factors in influencing what people purchased[4–7] led to a dramatic acceleration in the use of "slotting contracts" in the early 1980s, a practice whereby manufacturers paid retailers to display their goods in specific spaces in the store.[9] However, the main concern about these practices was not how they manipulated consumers or influenced the American diet, but whether such practices constituted unfair competition for small manufacturers who could not afford to pay for the space.[9] It may be no coincidence that between 1980 and 2000, while the food industry learned how to sell larger quantities of low-nutrient processed foods merely by manipulating their placement,[10,11] rates of obesity in the United States doubled.[12,13]

To capitalize on the sales boost from placing goods at the cash register, the end aisles, or on special floor displays[4,6,8,14] over the past few decades, the size of supermarkets expanded to supply more shelf space, especially more of the valuable end-aisle facings that could be leased to vendors.[9] Today, an estimated 30% of all supermarket sales can be attributed to end-aisle displays.[14]

If food marketing efforts had no impact on people's dietary behaviors, we would see no correlation between these efforts and health outcomes. Yet associations between food marketing efforts and food shopping behaviors and dietary outcomes could indicate that (1) the marketing influenced people's dietary choices, (2) marketing is strategically responsive to people's dietary choices, or (3) the relationship is a proxy for other unrecognized factors.

The extent to which marketing may interfere with individuals' long-term goals has not been quantified. Although popular perspectives on obesity, espoused by the US House of Representatives through the Personal Responsibility of Food Consumption Act,[15] that the full responsibility falls on individuals to limit what they purchase and what they consume, there is strong evidence that people are influenced by marketing tactics in ways they cannot easily recognize or resist.[16] Moreover, many marketing efforts are not always perceived as such, often resulting in consumers being influenced outside of awareness.[17] For example, few people would recognize that the physical location of an item in a store would increase their odds of buying it.[14,18] In this case, individuals may have less ability to counter the influence of this "hidden" marketing.

The second explanation, that marketers are responsive to people's diets, is also likely to be true. Knowing that individuals like sweets[19] and foods high in fats and salt, many companies develop novel products to suit these innate preferences.[20] Yet if people desired these foods in and of themselves, no special promotional efforts might be necessary, as individuals would seek them out, regardless of how they were presented. Nevertheless, many companies find it highly worthwhile to spend the extra

money to underwrite marketing strategies that increase product salience and accessibility,[11] thus making the claim that marketers are merely being responsive less plausible.

Bruyneel et al. and Wang et al. have shown that shopping is a cognitively depleting activity, explaining why, at the end of the trip, people become more vulnerable to displays at the cash register.[21,22] Mullainathan and Shafir have suggested that persons with limited incomes are particularly vulnerable to price reductions and other impulse marketing strategies, because of a preoccupation with limited funds.[23] When the mental demands of decision-making are overwhelming, the capacity for self-control is significantly diminished.[24]

However, the evidence that a particular promotion actually affects the routine diets of individuals is lacking, as individuals may buy promoted items, but not consume them right away, stockpile them and consume them slowly over time.[25] Or they may buy them for individuals other than themselves.

It behooves researchers to investigate whether in-store factors should be considered risk factors for poor health. To see whether there is evidence of a dose–response relationship between common in-store marketing strategies, dietary outcomes, and body mass index (BMI; a measure of overweight and obesity defined as weight in kilograms divided by the square of height in meters [kg/m$^2$]) we sampled a population of low-income individuals and the food stores at which they shopped in the past month.

## METHODS

As part of the baseline data collection for a study on the impact of a new neighborhood supermarket (May to December 2011), we collected dietary intake and health information from a cohort of residents in 2 Pittsburgh, Pennsylvania, neighborhoods considered to be "food deserts"— areas that typically lack easy access to fresh fruits and vegetables. We audited all stores that sold food within the neighborhoods (n = 40), including 16 food venues outside both neighborhoods at which residents most frequently reported doing their food shopping. We classified stores using the Food Marketing Institute and the North American Industry Classification System. Categories included full-service supermarkets (national or regional chains),[26] neighborhood stores (small individual- or family-owned stores), discount grocery stores (e.g., dollar stores that offer a limited assortment of low-priced and perishable items), superstores (department stores that also offer full lines of groceries and produce), wholesale clubs (e.g., Sam's Club, Costco), chain convenience stores (including gas stations), and specialty stores (e.g., Whole Foods, Trader Joe's) and meat or seafood markets.

Trained field staff conducted the store audits by using an adapted version of the Bridging the Gap—Community Obesity Measures Project Food Store Observation Form.[27] We also included an assessment of 3 types of food displays: end-aisle displays, special floor displays, and cash register displays. We documented the foods in each display and categorized them as sugar-sweetened beverages (SSBs); discretionary foods, including candy, sweetened baked goods, or salty snacks (foods high in solid oils, fats, and added sugars [SOFAS]); or nutritious foods, such as fruits, vegetables, and foods with at least 51% whole grains. We also documented price reductions and promotions (indicated by a newer lower price compared with a previous higher price), and whether these discounts were for SSBs, foods high in SOFAS, or nutritious foods.

During the same period in which the stores were audited, we selected a stratified random sample of 2900 addresses zoned as residential from a list of addresses obtained after merging Allegheny County Office of Property Investment data with the Pittsburgh Neighborhood and Community Information System. Field staff went door to door reaching 1956 of the 2900 households. Of these, 1649 were eligible to participate and 1434 (87%) agreed to do so. Incentives for participation included $45 for an extensive interview and the first 24-hour recall, and then another $15 for the second 24-hour recall—$60 in total.

Data collectors interviewed the main food shopper of each household and collected information on food purchasing and sociodemographic characteristics. They weighed and measured the height and weight of 84% of participants; the remaining participants provided a self-report. Interviewers administered the Automated Self-Administered 24-Hour Dietary Recall, once in person and the second time via telephone 7 to 10 days later.[28] We averaged the 2 recalls and used this information to calculate the Healthy Eating Index.[29]

We also defined 2 types of shopping, (1) major food shopping and (2) convenience food shopping, to respectively describe either purchases of large quantities of food, or small quantities (e.g., for a few items such as bread, milk, or eggs). We asked participants to name the stores where they did their food shopping for both major and convenience shopping. We included data only from individuals who visited stores for which store audits were available. We matched the reported frequency of shopping at a particular store with the audits of that store's marketing practices. We defined exposure to marketing per store by multiplying the frequency of shopping in the past month by the number of the respective displays in the store visited. For total exposure, we summed the exposure scores for each type of shopping and store visited in the past month. We then modeled the relationship between exposure to marketing and the shopper's BMI and dietary intake.

## RESULTS

We analyzed complete, individual-level data from 980 participants who shopped at stores that were also audited. Among participants, 73.7% were female; more than 75% were older than 40 years; 93.5% were African American; 46.7% had completed some college or higher; and 16.3% did not complete high school. Compared with neighborhood census data, our survey had a higher proportion of persons aged 56 years or older and fewer aged 25 years or younger. Educational levels were similar, but participants had higher rates of unemployment, probably because of the higher proportion of significantly older persons (Table 1). Because there were no supermarkets in the local neighborhood, nearly all participants reported shopping in stores located more than 1.5 miles from where they lived.

Table 2 describes the findings from the 40 stores we audited. The top half of the table shows the percentage of end-aisle and special floor displays by store type, including the percentage of displays with SSBs, candy, salty snacks, or sweetened foods, and the percentage

**TABLE 1—Participant and Neighborhood Sociodemographic Profile of Residents in Food Deserts: Pittsburgh, PA, 2011**

| Characteristic | Participants, % (n = 980) | Census Data for Neighborhoods Studied, % |
|---|---|---|
| Gender | | |
| Male | 26.3 | 44.7[a] |
| Female | 73.7 | 55.3 |
| Age group, y | | |
| 18–25 | 8.1 | 22.5[a] |
| 26–40 | 16.7 | 17.7 |
| 41–55 | 25.6 | 23.9 |
| 56–70 | 29.1 | 20.0 |
| > 70 | 20.5 | 15.8 |
| Race/ethnicity | | |
| African American | 93.5 | 87.3[b] |
| Other | 6.5 | 12.7 |
| Education level | | |
| < High school | 16.3 | 15.8[b] |
| High school | 36.9 | 40.5 |
| Some college | 32.2 | 30.5 |
| Completed college or higher | 14.5 | 13.2 |
| Employment | | |
| Not employed | 69.1 | 39.8[b] |
| Employed part time | 11.3 | 20.6 |
| Employed full time | 19.2 | 39.6 |
| On government assistance program (SNAP) | 50 | 41.9[b] |
| HEI score[c] | 48.8 | |
| Daily servings of fruit and vegetables, no. | 2.3 | |
| Average daily consumption of SSBs, ounces | 11.9 | |

*Notes.* HEI = Healthy Eating Index; SNAP = Supplemental Nutrition Assistance Program; SSB = sugar-sweetened beverages. Food desert is defined as an area that typically lacks easy access to fresh fruits and vegetables.
[a]US Census Bureau.[30]
[b]US Census Bureau.[31]
[c]Range from 1-100.

with fruit, vegetables, or products with at least 51% whole grains.

Neighborhood stores and chain convenience stores had the highest percentage of end-aisle and special floor displays with low-nutrient foods (at least 75%–77%) and none of their displays had fruits, vegetables, or whole grains, whereas specialty stores had the highest percentage of end-aisle and special displays with fruits, vegetables, or whole-grain products (31%). Price reductions were relatively common for SSBs, candy, and other sweetened and salty foods, but only full-service supermarkets and specialty stores offered price reductions on fruits, vegetables, and 51% or more whole-grain products. Similarly, 47% to 100% of the cash register displays in all the stores had candy, salty snacks, and sweetened foods for sale, but only specialty stores had any cash register displays with any fruits, vegetables, or whole grains.

Table 3 shows the exposure to the stores. For the highest exposure, 81% of participants did their primary shopping at full-service groceries about 3.2 times a month, followed by 16% of respondents who visited supercenters and wholesale clubs about 2.3 times per month. Only 3% of the participants did their primary shopping at a specialty store about 2.4 times per month. Less regular visits were made to dollar stores, neighborhood stores, and chain convenience stores. Surprisingly, 96% of respondents reported that they never shopped for food at a neighborhood store.

Table 4 shows the association between individual BMI and the exposure to each of the types of displays in the different stores that participants visited, weighted by the frequency of their visits. Exposure to higher numbers of displays of SSBs, foods high in SOFAS, and price reductions in SSBs was associated with increased BMI, but there was no association between exposure to displays of nutritious foods and BMI. Overweight and obese individuals did not, in general, shop more often than those whose BMI was less than 25 (normal weight; data not shown).

Exposure to displays of SSBs was associated with BMI. For example, the coefficient of 0.008 for SSBs in model 1 can be interpreted as an association of 0.008 higher BMI in $kg/m^2$ for every exposure to a single display of SSBs in 1 month. Our average participant shopped at a full-service grocery store about 3.2 times per month and was likely exposed to multiple salient displays at that store. Combining all end-aisle displays, floor displays, and cash register displays, the average grocery store has 14.6 salient displays of SSBs, 28 salient displays of foods high in SOFAS, and 4.4 SSB price reductions. When we multiply the coefficients by the frequency of shopping and number of displays present in the store, the effect size is an increase of about 0.37 BMI units per month associated with exposure to SSB displays, 0.18 BMI units per month for displays of foods high in SOFAS, and 0.41 BMI units per month for SSB price reductions. A BMI unit for a person who is 5-feet, 5-inches tall is equivalent to 6 pounds, so the effect size could be between 1 and 2.7 pounds per month, or theoretically 12 to 32 pounds per year, if the effect of exposure on BMI were cumulative.

We also ran the models of the association between BMI and exposure to the stores including only those individuals whose weight was objectively measured (n = 814). The coefficient values were all similar, except for the impact of exposure to displays of SSBs. Here the magnitude of association was 32% greater, with a higher *P* value (b = 0.01; *P* = .007 for those with an objectively measured BMI vs b = 0.008; *P* = .02 for all participants).

Displays of SSBs, foods high in SOFAS, and nutritious foods were not associated with dietary intake of SSBs, fruit and vegetable intake,

**TABLE 2—In-Store Placement and Price Reductions of Low-Nutrient and Nutritious Foods: Pittsburgh, PA, 2011**

| Variable | Full-Service Supermarket | Neighborhood Store | Supercenters or Wholesale Clubs | Chain Convenience Store | Discount Grocery (Dollar Store) | Specialty Meat, Seafood, or Fruits and Vegetables |
|---|---|---|---|---|---|---|
| No. audited | 8 | 18 | 5 | 4 | 1 | 4 |
| End-aisle displays | | | | | | |
| Average no./store | 25 | 1 | 31 | 3 | 4 | 7 |
| % with SSBs | 24 | 42 | 10 | 77 | 0 | 8 |
| % with candy, salty snacks, sweetened baked goods | 25 | 75 | 18 | 23 | 100 | 27 |
| % with fruit, vegetables, or whole grains | 17 | 0 | 8 | 0 | 0 | 31 |
| Special floor displays | | | | | | |
| Average no./store | 32 | 2 | 29 | 2 | 0 | 11 |
| % with SSBs | 7 | 5 | 11 | 0 | 0 | 2 |
| % with candy, salty snacks, or sweetened baked goods | 38 | 95 | 29 | 100 | 0 | 12 |
| % with fruit, vegetables, or whole grains | 36 | 0 | 15 | 0 | 0 | 42 |
| Cash register displays | | | | | | |
| Average no./store | 15 | 3 | 28 | 2 | 5 | 4 |
| % with SSBs | 43 | 0 | 38 | 0 | 0 | 18 |
| % with candy, salty snacks, or sweetened foods | 64 | 100 | 47 | 56 | 100 | 47 |
| % with fruit, vegetables, or whole grains | 0 | 0 | 0 | 0 | 0 | 6 |
| Price reductions | | | | | | |
| Average no./store | 13 | 0.3 | 5 | 0 | 1 | 4 |
| % with price reductions of SSBs | 34 | 20 | 30 | 0 | 0 | 0 |
| % with price reduction of candy, salty snacks, or sweetened foods | 36 | 40 | 30 | 0 | 100 | 20 |
| % with price reductions of fruit, vegetables, or whole grains | 26 | 0 | 17 | 0 | 0 | 60 |

*Notes.* SSBs = sugar-sweetened beverages.

or dietary quality as measured by the 2005 Healthy Eating Index based upon participant's dietary recall (data not shown).

## DISCUSSION

There is good reason to expect that marketing strategies that rely on the placement of products in prominent locations could influence diet, and through diet influence BMI. Eye tracking studies show that there is something about the arrangement of end-aisle displays that automatically attracts attention, and that when people pay attention to a product, they are more likely to buy it.[32,33] If people buy more of a food product, they will likely consume it. If people consume too many foods that have deleterious effects on health, they will likely experience health problems.

We found that patronizing a full-service grocery store has a larger magnitude of association with BMI than a superstore, even though the superstore has more displays of unhealthy items. The larger magnitude is explained because the frequency of shopping in the superstore is lower, resulting in fewer overall exposures to unhealthy salient food displays. In addition, the impact of explicit price reduction on SSBs is greater in grocery stores, because they have relatively more price reductions than superstores, probably because overall prices are routinely lower in superstores.

**TABLE 3—Food Outlet Utilization by Participants in Food Deserts: Pittsburgh, PA, 2011**

| Store Types | No. | Residents Who Do Primary Shopping in Outlet Type, No. (%) | Frequency of Primary Shopping, Per Month | Residents Who Ever Visit Outlet Type, No. (%) | Residents Who Never Visit Outlet Type, No. (%) |
|---|---|---|---|---|---|
| Full service supermarket | 8 | 790 (81) | 3.2 | 935 (95) | 45 (5) |
| Neighborhood store | 18 | 0 | | 43 (4) | 937 (96) |
| Supercenters or wholesale clubs | 5 | 159 (16) | 2.3 | 312 (32) | 668 (68) |
| Chain convenience store | 4 | 0 | | 18 (2) | 962 (98) |
| Discount grocery (dollar store) | 1 | 1 (0) | 3 | 102 (10) | 878 (90) |
| Specialty meat, seafood, or fruit and vegetable | 4 | 30 (3) | 2.4 | 139 (14) | 841 (86) |

*Notes.* Food desert is defined as an area that typically lacks easy access to fresh fruits and vegetables.

**TABLE 4—Associations Between Exposure to In-Store Marketing Strategies and Body Mass Index Among Residents of Food Deserts: Pittsburgh, PA, 2011**

| Variable | Model 1: SSBs | Model 2: Foods High in SOFAS | Model 3: Fruits, Vegetables, and Whole Grain Products | Model 4: SSBs + SOFAS | Model 5: SSB Price Reduction |
|---|---|---|---|---|---|
| Intercept | 30.69 | 30.82 | 31.07 | 30.77 | 30.86 |
| Sociodemographic characteristics | | | | | |
| Age | −0.01 | −0.01 | −0.01 | −0.01 | −0.01 |
| Gender (male) | −2.14** | −2.11** | −2.06** | −2.12** | −2.08** |
| Completed high school | 0.02 | 0.03 | 0.03 | 0.02 | 0.05 |
| Some college | 1.02 | 1.00 | 0.99 | 1.01 | 1.06 |
| Has college degree | −1.34 | −1.34 | −1.36 | −1.35 | −1.30 |
| Income | −0.001 | −0.001 | 0.000 | −0.001 | 0.002 |
| Has children | 1.24 | 1.28 | 1.33* | 1.26 | 1.31* |
| Exposure | | | | | |
| Per SSB display | 0.008* | | | | |
| Per candy, salty snack, and cookie display | | 0.003 | | | |
| Per healthy food display | | | 0.003 | | |
| Per low-nutrient food special display | | | | 0.002* | |
| Per SSB price reduction | | | | | 0.029 |

*Notes.* SOFAS = foods high in solid oils, fats, and added sugars; SSBs = sugar-sweetened beverages. Food desert is defined as an area that typically lacks easy access to fresh fruits and vegetables. *$P$ = .05; **$P$ = .01.

An analysis of the economics of "slotting contracts," the means by which manufacturers pay retailers to display their products in prominent locations, indicated that this strategy does indeed increase sales of the product, and the profits more than make up for the fees paid for this space.[9] The chain of events from marketing to diet to health seems logical, yet the causal evidence that food marketing is an underlying risk for chronic disease is lacking. If marketing could be proven to be a bona fide risk factor for obesity and chronic diseases, this could herald the imposition of standards and regulations that would curtail marketing strategies that compromise individual health, especially if these are difficult for individuals to detect or defend against.

Because our data are cross-sectional we can only conclude that in-store marketing strategies of low-nutrient foods are associated with higher BMI among regular shoppers, and thus comprise risk factors rather than causal factors. If exposure to food displays had an immediate impact, we might expect to see higher consumption of SSBs and SOFAS associated with greater exposure to the displays. Yet we did not see such a relationship as measured by 24-hour dietary recalls. This may be attributed in part to the relatively low accuracy of 24-hour dietary recall,[34] or because the dietary recalls were not done in conjunction with audits or reported food shopping trips. We objectively measured both BMI and in-store marketing strategies, but these also may be more stable than dietary recalls, which can fluctuate greatly over time, and in our case, were based upon consumption over two 24-hour periods.

Another troubling finding is the relatively large magnitude of association between the placement of products in a store and BMI. Our analysis and interpretation assume that exposure to a food environment that promotes the purchases (and thus consumption) of unhealthy foods is cumulative. We analyzed the data by using counts, because theoretically every time someone confronts tempting displays, it will increase the saliency of these foods, stimulate desire, and undermine the ability to resist. Studies of priming on appetite and food consumption have shown that for restrained eaters, persons who are concerned about their weight and are trying to diet, being exposed to palatable foods can lead to consumption of a greater volume of calories immediately thereafter.[35,36] Furthermore, there is a strong literature indicating that self-control is compromised when people are mentally depleted, stressed, or overwhelmed.[22,37–39] Several studies have documented that more choices and greater cognitive loads lead to more mental depletion and impulsive purchases.

## Limitations

Although this study shows a significant correlation between BMI and reported individual exposure to specific stores with multiple low-nutrient food displays and price reductions, the measures that we have of the in-store marketing strategies are relatively crude. We conducted assessment of the in-store environment in the same period as when the questionnaires were fielded among participants, but they were not tightly contemporaneous. Nevertheless, it is likely that although the specific products displayed on the end aisles may change, the type of products (e.g., cookies, chips, sodas) are likely to be relatively stable. We also did not account for other types of marketing—for example, flyers or ads posted on the store windows—or for individual-level correlates of BMI such as physical activity, means of transportation, and proximity to the store. However, adding too many variables to

the model could increase the risk of a type I error as well as reduce power.

Another limitation of our study is the inclusion of only residents of food deserts, a group that may be more vulnerable to impulse marketing strategies, given their socioeconomic circumstances and the demands to make trade-offs because of limited income. (A trade-off means giving up one item to get another.) Having to make trade-offs has also been associated with reductions in self-control and making less-nutritious dietary choices.[24,39] Furthermore, we only counted shopping trips to locations for which we had in-store audit data, so it is possible that unmeasured exposures in other venues could also contribute to the findings.

Finally, our design cannot specify causality or rule out the influence of a third factor that could explain apparent correlations between marketing exposure and BMI. However, we have controlled for several confounding variables and, as articulated previously, view it as unlikely that marketing is solely responsive to preference for unhealthy foods, except in trying to shift brand preferences among such foods.

## Conclusions

Manipulations of products on end-aisle displays have been shown to be associated with changes in purchasing,[7,40] but to date no studies have been able to follow a cohort of shoppers to determine whether routine exposure to in-store marketing strategies has a long-term effect on diet or health. The strong associations we have found in this study call for more longitudinal studies to obtain an accurate measure of the contribution of in-store marketing strategies to diet and chronic diseases. A more precise measurement of the relative risk is necessary to inform public health policy.

This is one of the few studies to show a relationship between in-store marketing strategies and BMI. Because obesity is such an enormous public health problem, more studies to understand the magnitude of impact of in-store marketing are necessary. Marketing strategies are potential targets for regulation, and have been successfully curtailed to limit the consumption of other substances known to lead to poor health outcomes, namely tobacco and alcohol. Tobacco is no longer displayed prominently in markets. Many states prohibit the sale of alcohol within 5 feet of a cash register, and others restrict alcohol sales only to state-owned outlets.[41] Some stores, especially in the United Kingdom (e.g., Lidl, Tesco), have voluntarily removed candy from the check-out aisles, in part because of complaints from parents,[42] but, to our knowledge, no one has yet removed low-nutrient foods like chips and soda from end-aisle displays.

Future research should focus more on the in-store marketing strategies and their differential impact on subpopulations. Exploring how differences in expendable income have an impact on impulsive shopping could shed light on health disparities. In addition, whether the presence of children during shopping has a negative impact on the quality of food purchased and subsequent habits should be investigated. Until more work is done to understand how marketing influences choice at the point of purchase, we will fail to have a cogent scientific basis for advancing public policy to stem the obesity epidemic in the United States. ■


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## Contributors

All coauthors participated in drafting the article. In addition, D. A. Cohen conceptualized the analysis and helped develop the assessment tools. R. Collins assisted in assessment tool development and data interpretation, and also contributed to guiding the analysis. G. Hunter ran all the analyses and constructed the tables. B. Ghosh-Dastidar was the statistician who helped guide the analysis. T. Dubowitz, the principal investigator of the parent study, took the lead in developing the assessment tools and made the data available.


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## Human Participant Protection

All study protocols were approved by the human participants protection committee at RAND.

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