Trigger Foods: The Influence of "Irrelevant" Alternatives in School Lunchrooms

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Rational choice theory commonly assumes that the presence of unselected choices cannot impact which among the remaining choices is selected—often referred to as "independence of irrelevant alternatives." We show that such seemingly irrelevant alternatives influence choice in a school lunch setting. In these lunchrooms, we provide evidence that the presence of specific side dishes—trigger foods—can strongly increase the sales of unhealthy à la carte options, even when the trigger foods are not selected. This behavioral anomaly can be exploited to lead children to healthier choices. We also offer a method that can be used to identify such foods.

Key Words: independence of irrelevant alternatives, linear probability model, child nutrition programs, food selection, à la carte item

The new U.S. Department of Agriculture school nutrition standards will dramatically change the composition of school lunches (USDA 2012). These changes require that both fruits and vegetables be offered each day, that milk with greater than 1 percent fat content be eliminated, and that more stringent limits on sodium, fat, and calorie contents be implemented. Importantly, these guidelines will apply to all foods offered in the school, including so-called competitive foods.

While it stands to reason that making an item available—such as the required daily serving of vegetables—would increase vegetable consumption, these foods may also have spillover effects either through substitution (Sorensen et al. 2003, Lamote et al. 2004) or through priming effects (Harris, Bargh, and Brownell 2009). In the case of substitution, making a particular fruit or vegetable available could lead students who purchase that food to purchase more of some foods (complements) and less of others (substitutes). In the case of priming, simply having the additional fruit or vegetable on the line may lead individuals to change their behavior *even if they do not purchase* the item that has been added. Priming is a purely behavioral phenomenon. Rational choice theory dictates that choices should be independent of irrelevant alternatives. That is, the presence or absence of unselected items should not influence a rational decision maker's choice.

In this article, we examine how the availability of specific side dishes that are available (such as bananas, or fruit cups) in the school lunch program influences the selection of starchy sides, or competitive foods (e.g., cookies and snack foods). While some prior research has examined the impact of offerings on the sale of competitive foods, no prior research has examined how offerings on the school lunch line may impact the selection of other foods when substitution effects are clearly eliminated.

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We introduce the notion of *trigger foods*, which we define as foods that either increase or decrease the selection of fruits, vegetables, or unhealthy sides such as French fries or ice cream, simply through their presence on the line. While substitution and complementarities can lead to changes in the consumption of other foods when selected, trigger foods act through priming. That is, they influence the selection of other foods independent of their being chosen themselves. In this study, we provide preliminary evidence that demonstrates the potential these foods have for altering what students select in a lunch line. In order to show this, we analyze school lunch purchase data from two schools located in upstate New York. We find that the sale of trigger foods had substantial effects on the nutritional content of the food selected.

Background

In 2010, Congress passed the Healthy, Hunger-Free Kids Act with a goal to ensure that children receive nutritious meals at school, especially since many of them eat most of their meals at school. As part of this effort, USDA was instructed to produce new school lunch guidelines—the first changes in these guidelines in 15 years. In January 2012, USDA announced that key provisions of the legislation had been finalized and will be set in place for the 2012–2013 school year. Standards set by these provisions include making fruit and vegetables available every day of the week, increasing whole grain offerings, limiting milk offerings to low-fat and fat-free varieties, requiring that served portions be age-appropriate, and setting limits on calories, sodium, and levels of saturated fat available in school lunches (USDA 2012).

The new school guidelines have two basic functions. First, the new guidelines require students to take additional foods in order to qualify for the reimbursable meal. Unfortunately, regulation designed to restrict behavior can have a negative impact on behavior. Research has demonstrated that restrictions on food choices for children can actually lead to increases in consumed calories and body mass in children (see Johnson and Birch 1994, Fisher and Birch 1999, Faith et al. 2004, Hurley, Cross, and Hughes 2011). Moreover, simply requiring that children have healthier foods on their plate does not ensure that children will actually eat the healthier items (Just and Wansink 2009, Price and Just 2009). Second, the new guidelines require schools to offer some foods that otherwise may not be there. This function can be seen at least partially as increasing the choice set, although some familiar items will be reformulated. In addition to increasing the choice set, we view these additional foods also as an important environmental change within the school lunch choice context.

A great deal of research has been dedicated to demonstrating how environmental cues can greatly affect food selection and consumption. In contrast to neoclassical consumer theory, findings in the behavioral sciences demonstrate how environmental cues—such as visibility, music, and lighting—that stimulate the senses affect consumer behavior in systematic ways (see Wansink 2004, Turley and Milliman 2000, Massara, Liu, and Melara 2010, Knoferle et al. 2012). These same cues can have profound impacts on food choices. For example, convenience can be used as a nearly costless tool to lead students to healthier choices. Simply moving the salad bar to a more convenient location increased salad selection by over 200 percent (Just and Wansink 2009). Alternatively, placing chocolate milk in a less convenient location increased white milk sales (Smith et al. 2011). Where foods are located on the line can also influence purchasing decisions. For example, placing the healthy entrée first in the line (Wansink and Just 2011) or locating healthy grab-and-go salads and sandwiches in a dedicated lunch line rather than mixed with other options (Hanks, Just, and Wansink 2012) may sound like superficial changes, but they can also have substantial effects. The dedicated healthy line, for example, decreased the consumption of less healthy foods by as much as 28 percent (Hanks et al. 2012).[1]

While convenience of a food would seem to be a conscious influencer of choice, the majority of people who choose the more convenient options

[1] For additional examples of cues that have resulted in changes in behavior, see Wansink, Payne, and North (2007) (sensory expectations), Wansink, Just, and Smith (2011a) (highlight fruit by making it more attractive and visible), Wansink, van Ittersum, and Painter (2005) and Wansink, Just, and Smith (2001b) (provide descriptive and exciting names for foods), and Wansink, Just, and McKendry (2010) and Hanks, Just, and Wansink (2012) (decreasing visibility of unhealthy foods, signage, offering a choice, providing smaller serving dishes, and verbal prompts).

seldom perceive that they were influenced by its convenience (Vartanian, Herman, and Wansink 2008). Trigger foods may also fly under the radar, influencing choice without overtly drawing the attention of the decision maker. Recent research has shown that competitive foods in the lunchroom detract from selection and consumption of healthier options available in school lunch program meals (Fox et al. 2005, Probart et al. 2006, Jensen et al. 2011). Though these effects were explained as traditional substitution effects, the literature on food choice environments suggests a potential that the very presence of junk foods may make one less likely to choose the reimbursable meal—even if the student does not buy or eat the junk food. Such an impact would be inconsistent with rational choice theory. In particular, this would violate the independence of irrelevant alternatives.

While inconsistent with rational choice, there is plenty of evidence that such violations of independence of irrelevant alternatives occur in practice (e.g., West 2004), as well as many other violations of rational behavior (Simonson and Tversky 1992, Camerer and Loewenstein 2004, Just and Wansink 2011, Waksberg, Smith, and Burd 2012). In one study, 120 junior high participants in a summer 4-H program were told they must take carrots with their lunch, while another 120 were given the choice of carrots or of celery (103 of 120 selected the carrots). Of those required to take the carrots, 69 percent (83 of 120) consumed the carrots, while 91 percent (94 of 103) of those choosing between carrots or celery consumed carrots. The mere presence of a choice of celery increased carrot consumption by 20 percent. Such results are suggestive that celery might have played a role as a trigger food for carrots. That is, celery's presence increased how many people ate carrots, and this increase was much larger than the increase in those selecting celery (Just and Wansink 2009). Simply being offered a less preferred choice led people to consume more of a food and to rate it as tastier. This study suggests that there is a strong benefit to trigger foods. Even in the cases where they do not directly lead to substitute or complementary selections, they can still influence behavior as a prime.

This study contributes to the literature by broadly examining the impact of trigger foods on the selection of other foods. We hypothesize that some foods serve as trigger foods that increase or decrease the selection of fruits and vegetables or unhealthy sides, without themselves necessarily having to be selected. A trigger food differs from a traditional complement or substitute in that it can influence choices of consumers who choose not to consume the trigger food. The presence of the trigger food can be seen as re-ordering the utility ranking of the other possible choices.

In the context of a field study, we demonstrate that specific side dishes we refer to as trigger foods have significant impacts on what students select for their school lunch meal. We show how trigger foods can effectively nudge students to take healthier foods, and at the same time, not lead students to feel as though their choices are being restricted.

Data and Methods

Food choice data were collected from March through June of 2011 in two upstate New York Schools: Addison and Campbell-Savona Central Schools. Both schools are located in less densely populated areas of western New York, and both are supplied lunch by the Greater Southern Tier Board of Cooperative Educational Services (GST-BOCES). GST-BOCES provides each school with similar menu items and similarly balanced and rotated menus. We sent trained research assistants to the cafeterias inside the two schools and recorded each student's waste on pre-made cards. The cards allowed them to quickly and easily mark whether a serving of a starchy side (mashed potatoes, French fries, rice, etc.), fruit, or vegetable was not eaten at all, half eaten, or completely eaten. These researchers also took note of each available side dish on the measurement days. This information made it possible for us to identify the trigger foods offered in the cafeterias.

At Addison, we collected waste data on March 15, 17, and 18, May 13 and 17, and June 8, 9, and 13. On March 15, options for fruit were not recorded, and thus we drop this date from our analysis. Also, on June 9, waste for one of the vegetable sides was not measured, so we drop the observations for this date. At Campbell-Savona we collected data on March 14, 16, and 21, May 19 and 20, and June 6 and 9. On March 14, none of the menu items were recorded, so we drop the observations for this date.

Table 1 reports the sample size on each of the observation dates. Before we drop March 14 and 15 for the regression analysis, we have 4,388 total observations over a span of fourteen days. When we drop the observations for March 14 and 15, we have 3,762 observations over a span of 12 separate measurement days.

In addition to the consumption data on these six dates, we also collected sales data for Addison and Campbell-Savona Central Schools over the period March 1, 2011, through June 23, 2011. Each observation represents an individual purchase and identifies a student with a unique number. We are able to use these unique identifiers to construct a panel of observations. These individual purchase records report, with some detail, what the student purchased, on what date, and in what school. These purchased items are designated as a school lunch program meal or another individual item, generally à la carte items, whole fruit, or other individual sales. Unfortunately, these data do not allow us to track which side items in a school lunch program meal a student selected; yet, we can determine which à la carte items, such as cookies, ice cream, Little Debbie snacks, and snacks in general, a student purchased. This limits the focus of our study to foods that trigger either more or less consumption of less healthy à la carte items.

The Impact of Availability

We begin the discussion of our results by examining the raw mean changes in selection of side items conditioned on the availability of other items resulting from a standard regression. In order to account for menu options in the analysis of the selection of starchy sides, fruits, and vegetables, we run three regressions, where the dependent variables are whether a starchy side, fruit, or vegetable was selected. In these regressions, we include dummy variables for whether celery, green beans, tomato soup, applesauce, fruit cocktail, bananas, canned peaches, and potatoes were offered.

In order to conduct this analysis we rely on the individual consumption dataset, which does not allow us to link observations to an individual across time. Thus, we pool cross-sections of data from each observation date to estimate the effect that available sides have on selection of starchy sides, fruits, and vegetables. Since we use binary count data, we rely on the probit estimation technique. As a result, the likelihood that a student selects or consumes a starchy side is given by the following equation:

$$(1) \qquad \begin{aligned} p_{ij} &= P(y_{ij}=1) \\ &= P(\alpha_{j0} + \beta_j^{'} X + \alpha_{j1} INT \\ &\quad + \alpha_{j3} SCH_i < \varepsilon_{ij}), \end{aligned}$$

where p_{ij} is the probability that the ith individual chooses the jth outcome, $j = \{1,2,\ldots,9\}$, $y_{ij} = 0$ when the ith individual does not choose the jth outcome, and $y_{ij} = 0$ when the ith individual chooses the jth outcome. Note that decision 1 corresponds to starchy side selection, decision 2 corresponds to fruit selection, and decision 3 corresponds to vegetable selection. The variable X is a vector of variables where each individual variable is an available side and is coded as 0 if it was not offered and 1 if it was offered on the observation dates. The variable *INT*[2] is coded as 0 for observation dates before the intervention period and 1 for observation dates after the intervention period. The variable *SCH* captures variation between schools, and ε_i is the random error associated with individual i's jth decision.[3]

In Table 2 we report the marginal effects of each regression variable and the predicted probabilities for selection and consumption of starchy sides before and after the intervention, as well as the predicted probability of selection and consumption of starchy sides, fruits, and vegetables when a particular side dish was offered. We also report the standard errors for the effects and denote statistical significance with asterisks.

Our results from these regressions demonstrate that the availability of sides *did* have a significant impact on the selection of starchy sides. First of all, the likelihood of selecting a starchy side increased from 33.7 percent when green beans were not offered to 44.4 percent (p-value < 0.000) when they were offered, and the likelihood of selection

[2] We do not report the impact of the intervention in this paper but it is reported in Hanks, Just, and Wansink (2012).

[3] When we conduct analysis for selection and consumption of starchy sides, we run into estimation problems if we include the dates when no starches were offered. Thus, we are able to include only one pre-observation date, March 16, in these regressions. As a result, the number of sides we were able to include in X decreases to five: celery, green beans, fruit cocktail, bananas, and potatoes.

Table 1. Dates and Sample Sizes for Observations at Addison and Campbell-Savona Central Schools

Addison	N	Campbell-Savona	N
15-Mar-11	379	14-Mar-11	247
17-Mar-11	388	16-Mar-11	251
18-Mar-11	359	21-Mar-11	259
13-May-11	367	19-May-11	242
17-May-11	376	20-May-11	244
8-Jun-11	373	6-Jun-11	283
9-Jun-11	352	9-Jun-11	249
13-Jun-11	371		

increased from 31.3 percent to 34 percent when any type of potatoes were offered (p-value = 0.001). On the other hand, the likelihood of selecting a starchy side decreased from 33.7 percent when celery was not offered to 26.7 percent when celery was offered (p-value < 0.001), and decreased from 32.8 percent when bananas were not offered to 28.4 percent when they were offered (p-value = 0.001).

When we analyzed the impact of side availability on the selection of starchy sides, we had to drop multiple observation dates since sides were not offered on certain dates. We included these dates, however, when we studied the impact that available sides had on fruit and vegetable selection and consumption. In terms of fruit selection, we find that the likelihood of selecting a fruit increased from 47.3 percent to 53.3 percent (p-value = 0.004) on days when tomato soup was offered, increased from 47.3 percent to 60.2 percent on days when applesauce was offered (p-value = 0.020), increased from 47.2 percent to 51.6 percent on days when bananas were offered (p-value = 0.010), and increased from 47.2 percent to 51.1 percent when peaches were offered (p-value = 0.040). The likelihood of fruit selection decreased from 47.3 percent to 42.5 percent when green beans were offered (p-value = 0.010) and decreased from 47.3 percent to 40.6 percent when fruit cocktail was offered (p-value < 0.001).

Now that we have identified sides that affect selection and consumption of fruit, we examine which sides affect vegetable selection. Specifically, the likelihood that students select a serving of vegetables increased from 24.8 percent to 28.3 percent when tomato soup was offered (p-value = 0.001), increased from 24.8 percent to 34.6 percent when applesauce was offered (p-value = 0.001), increased from 24.8 percent to 27.9 percent when fruit cocktail was offered (p-value < 0.001), increased from 29.4 percent to 31.7 percent when bananas were offered (p-value = 0.025), increased from 29.4 percent to 34.9 percent when peaches were offered (p-value < 0.001), and increased from 29.3 percent to 34.8 percent when potatoes were offered (p-value = 0.005). Likelihood of vegetable selection decreased, however, from 24.8 percent to 22.8 percent when green beans were offered (p-value = 0.025). These results demonstrate that the impacts of offering a single vegetable or fruit may have significant implications for the whole meal.

Testing for Triggers

While the results of the previous section show that certain sides may have direct impact on which other sides are taken, that may be due solely to substitution effects. In order to identify trigger foods, we must remove the possibility of substitution as a cause for the change in ordering of other items. A closer inspection of these results, however, suggests a more subtle behavior than the direct interactions we previously reported. For

Table 2. Green Beans and Potato Sides Increased Selection and Consumption of Starchy Sides

	Select a Serving of Fruit			Select a Serving of Vegetables			Select a Serving of a Starchy Side		
		Predicted Means			Predicted Means			Predicted Means	
Variable	Marginal Effect	Variable = 0	Variable = 1	Marginal Effect	Variable = 0	Variable = 1	Marginal Effect	Variable = 0	Variable = 1
Celery	-0.018 (0.060)	0.473 (0.050)	0.464	-0.050 (0.057)	0.248 (0.074)	0.235	-0.210*** (0.032)	0.337 (0.131)	0.267
Green beans	-0.101*** (0.039)	0.473 (0.050)	0.425	-0.078** (0.034)	0.248 (0.074)	0.228	0.315*** (0.028)	0.337 (0.131)	0.444
Tomato soup	0.127*** (0.044)	0.473 (0.050)	0.533	0.142*** (0.042)	0.248 (0.074)	0.283	-	-	-
Applesauce	0.272** (0.119)	0.473 (0.050)	0.602	0.398*** (0.108)	0.248 (0.074)	0.346	-	-	-
Fruit cocktail	-0.140*** (0.034)	0.473 (0.050)	0.406	0.127*** (0.034)	0.248 (0.074)	0.279	-0.010 (0.040)	0.337 (0.131)	0.334
Banana	0.093** (0.037)	0.472 (0.061)	0.516	0.079** (0.035)	0.294 (0.126)	0.317	-0.134*** (0.039)	0.328 (0.153)	0.284
Peaches (canned)	0.082** (0.041)	0.472 (0.061)	0.511	0.187*** (0.042)	0.294 (0.126)	0.349	-	-	-
Potatoes	0.109 (0.068)	0.476 (0.066)	0.528	0.186*** (0.066)	0.293 (0.128)	0.348	0.086*** (0.025)	0.313 (0.183)	0.340

Note: Each set of three columns includes results from a regression of the choice of selection or consumption of vegetables on available sides, the intervention treatment, and the school. In the first column of each set, the marginal effects are analogous to the marginal effects for continuous variables. The second and third columns in each set of three columns represent the predicted means of the respective dependent variable when the independent variable equals 0 or 1. Standard errors are in parentheses. * represents significance at the 0.10 level, ** represents significance at the 0.05 level, and *** represents significance at the 0.01 level.

example, when bananas were offered, students took more fruits and vegetables but fewer starchy sides. Yet the data do not specify whether an individual took a banana or not. It could be the case that even when a student does not select a banana, this same student could still take more fruits, vegetables, or fewer starchy sides. In other words, the banana triggered selection of fruits and vegetables but may not have been taken at all. We explore this idea of irrelevant, or trigger, foods with a new set of data that allows us to observe item selection with greater detail.

In order to detect the presence of trigger foods we combine information for available sides from our consumption data and sales data collected from Addison and Campbell-Savona Central Schools. We analyze the data using two separate approaches. In our first approach, we eliminate all students who potentially purchased a fruit or vegetable at least once during the March through June time period. We did this to ensure that for those students who remained in the data set, fruit or vegetables at school were not something they did select, and thus could not rationally influence their purchase decision. We then used information about available sides on the waste measurement days to track how the availability of fruits and vegetables impacts decisions even when the fruits and vegetables are not selected. We do not have information about menu options for any other days, and thus we may be excluding other days in which the same side was offered. Thus, the results we generate can act as a lower bound on the impact that availability of the sides can have.

In a second approach, we eliminate only the observations for students who purchased a meal, fruit, or vegetable on the waste observation dates. Even though they could have purchased fruits or vegetables at other times, we examine their behavior only on the days for which we have information about available sides. This latter approach may yield much larger effects, as those who never purchase anything (entirely avoiding the line) make up a much smaller percentage of the sample. Model 1 yields a dataset with 1,109 observations, while Model 2 yields a dataset with 28,639 observations. In both settings, the dependent variable is the number of cookies, ice cream bars, Little Debbie snacks, or general snack items taken by the student. Specifically, the number of cookies and ice cream bars purchased varies from 0 to 2, the number of Little Debbie Snacks purchased varies from 0 to 3, and the number of snacks purchased varies from 0 to 4. In our estimation technique, we use a linear random effects model to estimate the effect of available side dishes on the purchases of these items, with many zeros. Thus, our approach is somewhat akin to a linear probability model (Caudill 1988), which has advantages over a logit or probit regression (see Mullahy 1990, Klaassen and Magnus 2001, Horrace and Oaxaca 2006). While sign and significance of the coefficients are similar between the models, the magnitude of the effects must be interpreted with care. The regressors for this model are the same as those in equation (1), and we use robust standard errors to improve the efficiency of our results.

Results for these two regressions are in Table 3. In Panel A we report results for the regressions excluding students who purchased a meal, fruit, or vegetable at least once from March to June. In Panel B, we report results for the regressions excluding only students who purchased a meal, fruit, or vegetable on our waste measurement days. Our results are fairly consistent across the two regressions and suggest the presence of what we refer to as positive and negative trigger foods. Since we used unhealthy à la carte items as dependent variables, positive trigger foods decrease selection of these items and negative trigger foods increase selection of them.

In both panels, we find that green beans and bananas are positive trigger foods. In model 1, green beans decreased the number of cookies taken by 0.06 of one cookie per student, and in model 2 by 0.40 of one cookie per student. Bananas reduced the number of ice cream bars taken by 0.11 or 0.16 bars, reduced the number of Little Debbie Snacks taken by 0.05 items, and reduced the number of snacks taken by 0.30 servings.

Negative trigger foods, on the other hand, encouraged purchases of these items. We find that applesauce and fruit cocktail have the most consistent results across the two regressions. Applesauce increased the number of cookies taken by 0.07, or 0.42 servings, the number of ice cream bars by as many as 0.13, and the number of Little Debbie snacks by anywhere from 0.06 to 0.09. Fruit cocktail increased the number of ice cream bars taken by 0.09, increased the number of Little

Table 3. Certain Trigger Foods Decrease the Likelihood that Students Will Take Unhealthy à la Carte Foods (p-values in parentheses)

	Panel A				Panel B			
	Cookies	Ice Cream	Little Debbie Snacks	All Snacks	Cookies	Ice Cream	Little Debbie Snacks	All Snacks
	Positive Trigger Foods				Positive Trigger Foods			
Green beans	-0.06 (0.000)	ns	ns	-0.16 (0.000)	-0.40 (0.000)	ns	0.07 (0.000)	ns
Bananas	ns	-0.11 (0.000)	ns	ns	ns	-0.16 (0.000)	-0.05 (0.000)	-0.30 (0.001)
	Negative Trigger Foods				Negative Trigger Foods			
Celery	ns	ns	0.06 (0.000)	0.16 (0.000)	ns	ns	-0.05 (0.000)	ns
Apple sauce	0.07 (0.000)	ns	0.06 (0.000)	-0.13 (0.000)	0.42 (0.000)	0.13 (0.000)	0.09 (0.000)	ns
Fruit cocktail	-0.04 (0.000)	ns	0.07 (0.000)	0.15 (0.000)	-0.52 (0.000)	0.09 (0.000)	0.09 (0.000)	ns

Note: The entry "ns" refers to statistically insignificant results.

Debbie snacks taken by 0.07 or 0.09, and the number of snacks taken by 0.15. Even though these students did not take a fruit or vegetable, either in a meal or as a separate item, their choices of the less healthy à la carte items were still affected by the presence of fruits and vegetables.

Discussion

Despite predictions of the standard economic model of consumption, we provide evidence that irrelevant alternatives affect what foods students purchase in cafeterias. While these results are most likely specific to the school in which we studied them, the way we defined our irrelevant, or trigger, foods can be applied broadly. This broad application of the principles we discuss can be most useful for food service directors as they strive to identify which options will help students make the most healthful choices.

Our investigation into potential trigger foods was motivated by the relationships we encountered in examining the impact of available sides on selection of starchy sides, fruits, and vegetables. While these results did not provide conclusive evidence for trigger foods, they did suggest their potential impact given the nature of the regressions we ran. We found strong evidence that certain foods, such as bananas, tomato soup, and canned peaches, increased selection of fruits and vegetables, but since we were not able to observe whether a student selected the actual side, it is very possible that they affected behavior without being a relevant alternative.

In order to identify trigger foods, we used a whole new set of data—panel data—that tracked selection of specific items. Since we did not have selection data for individual fruits or vegetables, we studied how trigger foods affected the sales of unhealthy à la carte items. We omitted all observations for sales of fruits and vegetables so that we could confidently claim them as irrelevant alternatives and thus refer to them as potential trigger foods.

Results demonstrate that green beans and bananas are positive trigger foods—they decrease sales of the unhealthy items we studied. This could very well be the result of a priming effect that has been documented in the literature (Harris, Bargh, and Brownell 2009). For example, simply seeing green beans or bananas could lead a student to think about healthier foods. On the other hand, we identified celery, applesauce, and fruit cocktail as negative trigger foods—they increased the servings of unhealthy items taken. This could be due to the sweet nature of applesauce and fruit cocktail. For example, a student who sees applesauce might be reminded of the sweet taste of applesauce and then be drawn to other items with greater sugar content. While this mechanism is speculative, the evidence we present for trigger foods demonstrates that irrelevant alternatives can influence food choice.

While our findings are promising, the study does have limitations. As discussed previously, we collected data only on fruit, vegetables, and starchy sides consumed instead of specific types of items consumed. Thus, the analysis was restricted to studying selection of the general categories of fruits, vegetables, and starchy side groups instead of specific items. This also limited our ability to identify trigger foods.

Another limitation to our study is the lack of information regarding available items in a cafeteria. While such information requires additional labor to collect, it could be very useful for research purposes and for food service directors for menu planning purposes. Nonetheless, resource constraints limit what information can be collected in lunchrooms.

Conclusion

With childhood obesity on the rise, there is a strong urge for policymakers to enact legislation that is designed to reverse, or at least slow, the trend. While much of the focus has been on restricting access to competitive foods, very little has been done to identify foods that can help students make healthier choices on their own—trigger foods.

Field and sales data from two schools in western New York provide evidence for the presence of these trigger foods—foods that affect choices without themselves being selected. The data suggest that green beans and bananas improve students' lunches by discouraging sales of unhealthy à la carte items, whereas celery, applesauce, and fruit cocktail encourage sales of these items. Since we dropped observations that measured fruit and vegetable selection, availability of fruits and vegetables can with much greater confidence be called irrelevant alternatives, and thus trigger foods.

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