



## Attractive names sustain increased vegetable intake in schools

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### ARTICLE INFO

Available online xxxx

**Keywords:**

Food intake  
Obesity  
School lunches  
Nutrition  
Healthy

### ABSTRACT

**Objective:** This study will determine if the selective use of attractive names can be a sustainable, scalable means to increase the selection of vegetables in school lunchrooms.

**Methods:** Study 1 paired an attractive name with carrots in five elementary schools ( $n=147$ ) and measured selection and consumption over a week compared to controls. Study 2 tracked food sales of vegetables in two elementary schools ( $n=1017$ ) that were systematically attractively named or not named over a two-month period. Both studies were conducted in New York in 2011.

**Results:** Study 1 found that elementary students ate twice the percentage of their carrots if attractively named as "X-ray Vision Carrots," than if un-named or generically named as the "Food of the Day." Study 2 found that elementary school students were 16% more likely to persistently choose more hot vegetable dishes ( $p<0.001$ ) when they were given fun or attractive names.

**Discussion:** Attractive names effectively and persistently increased healthy food consumption in elementary schools. The scalability of this is underscored by the success of Study 2, which was implemented and executed for negligible cost by a high school student volunteer.

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### Introduction

Can children be influenced to prefer vegetables in school lunches? Research with adults has shown that giving descriptive names to healthy foods in cafeterias increases their selection by 28% (Wansink et al., 2005). Similar results have not always generalized to child behavior (e.g., Keren et al., 2004). Here we examine three key questions: 1) Can attractive names increase the choice and intake of vegetables in school lunchrooms? 2) Would this effect persist over time? 3) Would attractive names be easily implemented on a wide scale?

Attractive and descriptive names not only raise the salience or awareness of the food (Cardello, 1996), but also raise one's taste expectations (Wansink, 2003; Wansink and Park, 2002; Tuorila et al., 1998). The resulting confirmatory sensory bias has been shown to lead people to "taste what they expect" (Wansink et al., 2001). Yet, despite encouraging results of attractive names in cafeterias and restaurants, they are rarely used in schools (Campbell et al., 2001). This work examines how attractive naming can be implemented in schools to encourage healthier eating in a cost-effective and scalable way.

### Study 1: how attractive names impact the intake of healthy foods

After obtaining Institutional Review Board approval from Cornell University and parental consent, 147 (78 female) children ranging from 8 to 11 years old were recruited from five ethnically and economically diverse schools. The menus for each lunch were unchanged except for the addition of carrots.

#### Methods

On three different days at each school, carrots were offered in addition to the school's scheduled offerings. On the first and last days of the study (Monday and Friday), carrots were served as they normally were, unnamed. These two days served as pre- and post-test controls, respectively. On the second day of the study (Thursday), carrots were served and given an attractive name "X-ray Vision Carrots," a simple name "The Food of the Day," or unnamed (control).

For the 113 students who were present for all three study days, their choices at each meal were unobtrusively recorded. Following lunch, the weight of any remaining carrots was subtracted from their starting weight to determine the actual amount eaten.

#### Results

The results from Analysis of Variance (ANOVA) indicated that the three different naming conditions had no impact on the amount of

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**Table 1**

Study 1: elementary students consumed more carrots when attractively named.

	Named as "X-ray Vision Carrots" (n=32)	Named as "Food of the Day" (n=38)	Unnamed (Control) (n=45)	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	
Number taken	17.1 (17.6)	14.6 (14.5)	19.4 (19.9)	0.47
Number eaten	11.3 (16.3)	4.7 (6.7)	6.8 (8.7)	0.04
Number uneaten	6.7 (9.6)	10.3 (12.5)	13.2 (16.9)	0.14
% Eaten	65.9	32.0	35.1	<0.01

Study conducted in New York in 2011.

carrots students selected ( $p=0.47$ ) but they did influence how much was eaten. As Table 1 indicates, children ate more of their carrots when named "X-ray Vision Carrots" than when named "Food of the Day" ( $p=0.02$ ) or when unnamed ( $p=0.06$ ).

Indeed, whereas 66% of carrots named "X-ray Vision Carrots" were eaten, only 32% of carrots named "Food of the Day" were eaten and 35% of unnamed carrots were eaten ( $p<0.05$ ). It also influenced carry-over effects. Children who were not exposed to carrots named "X-ray Vision Carrots" on Thursday were less likely to take carrots on Friday's post-test session compared to Monday's pre-test session ( $Mean=-3.04$ ,  $SD=11.69$ ). Conversely, those who were exposed to carrots named "X-ray Vision Carrots" on Thursday were more likely to take carrots ( $Mean=4.53$ ,  $SD=17.66$ ),  $p=0.03$  (1-tailed).

## Study 2: a longitudinal study of attractively-named vegetables in middle schools

Participants were drawn from two neighboring elementary schools outside New York City. The study was conducted for two months (40 school lunch days). The schools were similar and the menus identical. The study focused on the three items that were most frequently served—carrots, green beans, and broccoli.

### Methods

Both schools modified their cash registers to record the purchase of hot and cold vegetable dishes separately. After obtaining approval from Cornell University's Institutional Review Board, we collected de-identified student level purchase data. The data include purchase observations for 1552 students (54.3% male) of which 47.8% attended the treatment school.

For the first 20 days (pre-treatment period), both schools offered food items as usual, without any creative naming of vegetables or

other items. In the second 20-day period, the same hot vegetables served in the treatment school were given names selected by a high school student volunteer. These included names such as X-ray Vision Carrots, Power Punch Broccoli, Silly Dilly Green Beans, and Tiny Tasty Tree Tops. They were displayed on printed cards placed next to the food items in the line. The control school served the same items as the treatment school but did not provide any such names.

The purchase pattern of each child was recorded in both schools over the course of the study. Our study included 40,778 total child-day observations, with roughly half in the treatment group. To investigate the ease of implementation and potential scalability of this method, a high school student was recruited to conduct the study. He received school credit for his work.

### Results

Table 2 presents summary statistics of student selections by treatment and month. Compared to the baseline results of Month 1, the proportion of students taking a hot vegetable during the attractive names intervention (Month 2) increased by 99.0%. On the other hand, the proportion of students taking a hot vegetable in the control school declined by 16.2% from Month 1 to Month 2. Both differences are significant at the  $p<0.01$  level and the difference between the two is also highly significant ( $p<0.01$ ). Selection of broccoli increased by 109.4% ( $p<0.001$ ), selection of green beans by 176.9% ( $p<0.001$ ), and selection of carrots by 30.2% (ns). Significance is based on an F-statistic of differences in percentage purchasing in Month 1 and Month 2.

By employing a binary logistic model with just the dummy variables for school month and treatment period, we find that giving the hot vegetables attractive names increases the number of students taking them by 12% ( $p<0.001$ ) and decreases the amount of cold vegetables taken by 1.7%. Given the low base-rate incidence of vegetable selection, this represents nearly a 100% increase.

### Discussion

In combination, these studies demonstrate that using an attractive name to describe a healthy food in a cafeteria is robustly effective, persistent, and scalable with little or no money or experience. These names were not carefully crafted, discussed in focus groups, and then pre-tested. Additionally, this study shows that the impact of attractive names lasts. Over the course of two months, the selection of hot vegetable side dishes went up 99% in the treatment school while declining 16% in the control school.

Most importantly, this study shows that an attractive name intervention is scalable for little or no cost. The instructions and guidance for this study were developed with the intent that any cafeteria worker or high school student volunteer could implement the changes. To this end, the sophomore student volunteer generated the names,

**Table 2**

Study 2: more hot vegetables were selected during the month they were attractively named.

	Treatment group			Control group			P-value	
	Month 1	Month 2	% Change	Month 1	Month 2	% Change		
All hot vegetables	0.018 (0.133)	0.054 (0.227)	99.0***	0.086 (0.281)	0.062 (0.241)	-16.2***	<0.01	
Broccoli	0.021 (0.145)	0.073 (0.260)	109.4***	0.120 (0.325)	0.018 (0.136)	-73.3***	<0.01	
Green beans	0.002 (0.045)	0.033 (0.178)	176.9***	0.047 (0.211)	0.099 (0.298)	35.7***	0.19	
Carrots	0.017 (0.128)	0.023 (0.149)	30.2	0.030 (0.171)	0.046 (0.209)	41.5	0.52	

Study conducted in New York in 2011. Means represent fraction of students selecting. Each child-day is treated as a single observation.

Significance based on an F-statistic of percent purchasing between Month 1 and Month 2. \*\*\* indicates  $p<0.001$ .

created the name cards, and executed the study at a negligible cost. Many of the interventions for school lunchrooms are not scalable because they are either too complicated, too labor-intensive, or too costly. The success of one student who implemented this at a negligible cost is a testament to its scalability across other schools.

#### Conflict of interest statement

The authors declare no conflicts of interest.

#### Acknowledgments

The authors thank Julia Hastings-Black for editorial assistance. Study 1 was funded by the Robert Wood Johnson Foundation through its Healthy Eating Research program. Study 2 was funded by the United States Department of Agriculture's Food Nutrition Service and Economic Research Center.

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