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Attractive Names Sustain Increased Vegetable Intake in Schools

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Abstract

Background: Attractive names have been shown to increase the selection and consumption of healthy foods with adults. Could the selective use of such names 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.

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 persistently – for two months – were 16% more likely to choose more hot vegetable dishes ($p<0.001$) when they were given fun or attractive names such as Veggie Dunker or Power Punch Broccoli.

Conclusion: 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.

Key words: Food intake, obesity, school lunches, nutrition, healthy

Can children be influenced to prefer vegetables in school lunches? Thanks to the popular cartoon character "Popeye the Sailorman," who increased his strength by eating spinach, the third favorite food of children in 1928 was canned spinach –trailing only ice cream and turkey (Oxford Encyclopedia, 2004; Lovett, 2005). Having such powerfully attractive associations with Popeye made canned spinach a favorite. Yet even simple attractive or descriptive words can make a food seem more appealing and desired. Research with adults has repeatedly shown that giving descriptive names to healthy foods in cafeterias increases their selection by 28% (Wansink, Painter, and van Ittersum 2005). Here we examine three key questions: 1) Can attractive names be used to increase the choice and intake of vegetables in school lunchrooms? 2) Would this effect persist over time, and 3) would attractive names be easily implemented on a wide scale?

Attractive and descriptive names have been shown to be effective with adults for two reasons. First, they raise the salience or awareness of the food (Cardello, 1996). Second, such names increase one's taste expectations, and it is generally believed that people have a confirmatory sensory bias, leading them to "taste what they expect" (Francis, 1995; Tuorila, Meiselman, Cardello, & Lesher, 1998). That is, once positive expectations of a food are made, favorable affective assessments of it are generated before it is even consumed (Mela, 1999). Indeed, cafeteria studies have showed that attractively named food not only increased sales, but they also improved taste ratings of the food and evaluations of the cafeteria.

Yet despite encouraging results of attractive labels in cafeterias and restaurants,

they are nearly non-existent in children's schools—even though they cost little to implement (Campbell, Waters, O'Meara, & Summerbell, 2001). This work examines how attractive naming can be implemented in schools to encourage healthier eating. If successful in changing children's eating habits, the benefits could last into adulthood (Dietz & Gortmaker, 2001).

After discussing how attractive naming is believed to influence one's selection and consumption of foods, two field studies in elementary schools will be described. Study 1 examines whether attractively naming carrots will increase preschoolers likelihood of choosing and consuming them. Study 2 examines whether this impact of attractive names is generalizable across other vegetable dishes, whether it persists, and whether it can be scalable. Importantly, Study 2 is designed to be conducted for an extended period of time (two months) to assess the persistence and sustainability of the effect. Furthermore it was designed to be conducted at negligible cost by a high-school student volunteer to assess the scalability of this intervention.

Study 1: How Attractive Names Impact the Intake of Healthy Foods

After obtaining Institutional Review Board approval at Cornell and after obtaining parental consent, 147 (78 female) children ranging from 8-11 years old were recruited from five ethnically and economically diverse schools. The study occurred during lunchtime on five days (Monday through Friday) for a week at each location. The menu items for each lunch were unchanged except for the addition of carrots. Although it would be ideal to control all of the meal, our discussions with food service directors indicated there would be too much resistance to serving the same meal four times in a

week. Given the expected strength of this manipulation and given its testing across five schools, we believed differences in the accompanying foods did not confound the use of the names, which were simply hand printed on 3x5-in index cards and placed in front of the carrots.

Method

On four different days at each school, carrots were offered in addition to whatever else the school had scheduled to offer. On the first (Monday) and last (Friday) days of the study, carrots were served as they normally were (without any name). These two days served as pre-test control and post-test control, respectively. On the second day (Tuesday) of the study, carrots were served and given an attractive name "X-ray Vision Carrots," or as simply being "The Food of the Day," or without any name (control). This enabled us to compare those three conditions to see if carrots named with "X-ray Vision Carrots" were more likely to be taken and eaten by children than those carrots named as "The Food of the Day" or those without a name.

For the 113 students who were present on all four days of the study, their choices for each entire meal were unobtrusively recorded. If carrots were selected, they were served into a separate dish and unobtrusively weighed by a hidden scale. Following lunch, the weight of any remaining carrots was subtracted from its starting weight to determine the actual amount eaten.

Results and Discussion

The results from Analysis of Variance (ANOVA) indicated that the three different

naming conditions had no impact on how much of the carrots students selected ($p = .47$). Yet as Table 1 indicates, the names had a significant impact on how much of their carrots they ate. When named X-Ray Vision Carrots, children ate 11.30 carrots compared to only 4.68 when named Food of the Day and 6.65 when given no name (F (2, 111) = 3.226, $p = .04$). Subsequent one-tail t tests revealed that children were more likely to eat carrots named X-ray Vision Carrots than carrots when named as Food of the Day (t (112) = -2.260, $p = .02$) or when unnamed (t (112) = -1.554, $p = .06$).

[Insert Table 1]

These results indicated that whereas children took the same amount of carrots irrespective of names, children ate a greater percentage of the carrots when named as X-ray Vision Carrots than when they had no name. Indeed, whereas 66% of the carrots named with X-ray Vision Carrots were eaten, only 32% of carrots named as the Food of the Day were eaten and 35% of carrots without any name were eaten. As a percentage, when paired with an X-Ray Vision name, children ate nearly twice the percentage of their carrots when compared to those named Food of the Day ($p < .05$) or those that were unnamed $p < .05$). It is important to note that the mere salience of having a name (i.e., Food of the Day) was not enough to increase the intake of healthy foods. Positive expectation evoked by the attractive name (i.e., X-ray Vision Carrots) played a crucial role in increasing the intake.

To assess the carry-over effects of names, we analyzed students who had seen the X-Ray carrots on Thursday to see how many more or less they ate on Friday (compared to the Monday control). As depicted in Figure 1, children who were not exposed to carrots named "X-ray Vision Carrots" on Thursday were less likely to take carrots in the

Friday post-test session compared to the Monday pre-test session (M = -3.04, SD = 11.69). Conversely, those who were exposed to carrots with "X-ray Vision Carrots" name on Thursday were more likely to take carrots (M = 4.53, SD = 17.66), t (76) = -1.947, p = .03 (1-tailed). This also directionally influenced how much students age. That is, children who were not exposed to carrots named as "X-ray Vision Carrots" on Thursday were marginally less likely to eat them during the Friday post-test session compared to the Monday pre-test session (M = -3.54, SD = 7.74) compared to those who were (M = 1.04, SD = 15.12), t (76) = -1.448, p = .08 (1-tailed).

[Insert Figure 1]

Study 2:
A Longitudinal Study of Attractively-Named Vegetables in Middle Schools

Method

Participants in this study were drawn from two neighboring elementary schools outside of a large US city. The study was conducted for two months over 40 school lunch days. These two schools are serviced by the same food preparation facility and had nearly identical menus. Thus, the vegetable side dishes offered in one school on a particular day will also be offered in the other school on the same day. The menu was coordinated so that items offered over the first 20 days of the study were repeated in the second 20-day period. The focus of the study was on three items that were most frequently served – carrots, green beans, and broccoli.

Both schools were willing to modify their cash registers to record the purchase of hot and cold vegetable dishes separately. After obtaining approval from the Institutional

Review Board at Cornell, we began collecting de-identified student level purchase data. The data include purchase observations for 1,552 students, with 54.3% being male and 47.8% attending the treatment school.

For the first 20 days (the pre-treatment period), both schools offered their food items as usual, without any creative naming of vegetables or other items. In the second 20-day period, hot vegetables in the treatment school were each given a name selected by a high school student volunteer. These included names such as X-ray Vision Carrots, Veggie Dunkers, Super Salad, Power Punch Brocolli, and Tiny Tasty Tree Tops. They were displayed on printed cards that were 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 patterns of each child was recorded in both schools over the course of the study, including whether they purchased a hot or cold vegetable or not. Note that cold vegetables – such as carrots, celery or salad – did not receive names. Thus, we were able to determine whether increases in consumption of hot vegetables were simply due to children switching from other vegetables, or by creating new vegetable consumers. In total, 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 and Discussion

Table 2 presents summary statistics of student selections by treatment and month. The proportion of students taking a hot vegetable in the treatment school increased by 99.0% in the treatment month, where the proportion taking hot vegetables in the control school declined by 16.2%. Both differences are significant at the $p<0.01$ level, and the difference between the two is also highly significant ($p<0.01$). The selection of broccoli increased by 109.4% ($p<.001$), the selection of green beans by 176.9% ($p<.001$), and the selection of carrots by 30.2% (ns).

[Insert Table 2]

Because our data were collected as a panel, we can conduct individual level analyses of food choice behavior over time. Data was analyzed through estimation of an OLS model, where a dummy variable indicating whether the student took the hot vegetable is the dependent variable, and school, month and treatment dummy variables (named vs. not named) are included on the right hand side. The treatment variable is equal to 1 only for the treatment school in the treatment month. We report the regression coefficients in Table 3. Employing an OLS model with just the dummy variables for school month and treatment period (Model 1), we find that giving the hot vegetables attractive names increases the number of students taking the vegetable by 6.1% ($p < 0.001$). Similarly, if we employ a linear regression model including individual random effects (Model 2), we find that the number of students choosing the hot vegetable also increases by 6.1% ($p<0.001$). The high degree of consistency between these two estimates suggests our findings are relatively robust to model choice at an individual level.

[Insert Table 3]

If attractive names can be used to increase hot vegetable consumption, this raises an important question. Is such an increase due to greater vegetable hot *and* cold vegetable consumption or simply a tradeoff between cold and hot vegetables? Using regression analysis similar to that presented in Table 3, we find that the number of students purchasing cold vegetables decreases (by 1.8%, $p = 0.033$ in Model 1, by 2%, $p=0.011$ in Model 2). As Table 4 indicates, some of the effect of naming is due to students substituting named vegetables for un-named vegetables (and perhaps other healthy foods). Overall, however, the total number of vegetables purchased increases significantly by around 4% using either model. Simply put, approximately two-thirds of the increase in hot vegetable selection is due to a total increase in vegetables and one-third is due to a trade-off with cold vegetables. This increase persists over the 20 day treatment period using several different vegetables, including some vegetables that are commonly thought of as less popular, such as broccoli.

General Discussion

In combination, these studies demonstrate that subtle environmental interventions influence healthy foods consumption. Study 1 found that children were more likely to take and eat carrots if carrots were attractively named as "X-ray Vision Carrots." Importantly, it underscored that it was not simply the mere salience of having a name but the content of the name played a crucial role in increasing the intake. That is, whereas there was no major difference in the selection and consumption of unnamed carrots and carrots named with "Food of the Day," children were more likely to eat carrots named as

"X-ray Vision Carrots." In addition, this attractive name had a residual effect such that children were more likely to take and eat carrots days after the intervention was over. Children exposed to more appealing name, "X-ray Vision Carrots," were actually more likely to take and eat carrots relative to the pre-test control session.

The importance of Study 2 is three-fold. First, it shows that the simple use of names its robustly effective, persistent, and scalable with little or no money or experience. These names were *not* carefully crafted, discussed in focus groups, and then pretested. These names were a student volunteer's best guess as to what sounded attractive. In aggregate they were effective, and perhaps more carefully crafted or designed names would have been even more effective.

Second, this study shows that the impact of attractive names is not ephemeral. Over the course of two months, choice probabilities were consistent. This is in contrast to many one-shot studies which use a brief, one-day intervention. Such studies often have compromised policy relevance because it is not known whether the effect will persist or whether it is simply due to novelty or a to a demand effect. While it would be good to have many months worth of data, to isolate this with one cohort within one semester, the focus was on one full month of intervention.

Third, this study shows that a attractive name intervention is scalable. The instructions and guidance for this study were developed with the intent that any cafeteria worker or student volunteer could implement the changes. To this end, the student volunteer generated the names, created the names, 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.

References

Atkin, C. & Heald, G. (1977). The content of children's toy and food commercials. *Journal of Communication, 27*, 107-114.

Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition, 19*, 41-62.

Campbell, K., Waters, E., O'Meara, S., and Summerbell, C. (2001). Interventions for preventing obesity in childhood. A systematic review. *Obesity Reviews, 2*, 149-157.

Cardello, A. V. (1996). The role of the human senses in food acceptance. In H.L. Meiselman and H.J.H. Macfie (Eds.), *Food Choice Acceptance and Consumption*. London: Blackie Academic.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*, 627-688.

Dietz, W. H. & Gortmaker, S. L. (2001). Preventing obesity in children and adolescents. *Annual Review of Public Health, 22*, 337-353.

Flynn, M. A. T., McNeil, D. A., Maloff, B., Mutasingwa, D., Wu, M., Ford, C., & Tough, S. C. (2006). Reducing obesity and related chronic disease risk in children and youth: A synthesis of evidence with 'best practice' recommendations. *Obesity Reviews, 7*, 7-66.

Lovett, L. (2005). The Popeye Principle: Selling child health in the first nutrition crisis. *Journal of Health Politics, Policy and Law, 30*, 803-838.

Mela, D. J. (1999). Food choice and intake: the human factor. *Proceedings of the Nutritional Society, 58*, 513-521.

Nikerson, R. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2*, 175-220.

Newman, J. & Taylor, A. (1992). Effect of a means-end contingency on young children's food preferences. *Journal of Experimental Child Psychology, 64*, 200-216.

Oxford Encyclopedia of Food and Drink in America. (2004). *Spinach.* Oxford: Oxford

University Press.

Tuorila, H. M., Meiselman, H. L., Cardello, A. V., & Lesher, L. L. (1998). Effect of expectations and the definition of product category on acceptance of unfamiliar foods. *Food Quality and Preference, 13*, 561-569.

Wansink, B. (2003). Overcoming the taste stigma of soy. *Journal of Sensory Studies, 68*, 2604-2606.

Wansink, B., van Ittersum, K. & Painter, J. E. (2005). How descriptive food names bias sensory perceptions in restaurants. *Food Quality and Preference, 16*, 393-400.

Wilson, P., O'Meara, S., Summerbell, C., & Kelly, S. (2003). The prevention and treatment of childhood obesity. *Quality and Safety in Health Care, 12*, 65-74.

Table 1

Elementary Students ate 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)		
	M	*SD*	*M*	*SD*	*M*	*SD*	
Number Taken	17.13	17.58	14.60	14.46	19.36	19.86	F = .751
Number Eaten	11.30	16.25	4.67	6.65	6.80	8.73	F = 3.23*
Number Uneaten	6.67	9.45	10.32	12.54	13.18	16.89	F = 2.00
% Eaten	65.9%		32.0%		35.1%		χ^2 = 15.9***

*p < .05. ** p < .01. *** p < .001.

Table 2

More Students Choose Hot Vegetables with Attractive Names.

	Treatment			Control			P-Value
	Month 1 (SD)	Month 2 (SD)	% Change	Month 1 (SD)	Month 2 (SD)	% 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

Each child-day is treated as a single observation.

*$p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

A Higher Percentage of Students Chose Hot Vegetables with Attractive Names.

	Model 1: Not Controlling For Individual Students		Model 2: Controlling for Individual Students	
	Coefficient	SE	Coeffeicient	SE
Attractive Names	0.061***	0.008	0.061***	0.008
School	-0.066***	0.005	-0.066***	0.005
Month	-0.019***	0.005	-0.019***	0.005
Constant	0.083***	0.004	0.083***	0.004

*$p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

A High Percentage of Students Also Choose Cold Vegetables when Hot Vegetables are Given Attractive Names

	Model 1: Not Controlling For Individual Students		Model 2: Controlling for Individual Students	
	Coefficient	SE	Coeffeicient	SE
Names	-0.018**	0.009	-0.020**	0.008
School	0.020* **	0.006	0.020**	0.008
Month	0.010*	0.006	0.010**	0.005
Constant	0.055***	0.004	0.055***	0.005
Controls for Individual			X	

*$p < .05$. ** $p < .01$. *** $p < .001$.

Figure 1. More Carrots were Taken and Eaten When Given a Attractive Name Than When Unnamed or Named "Food of the Day"

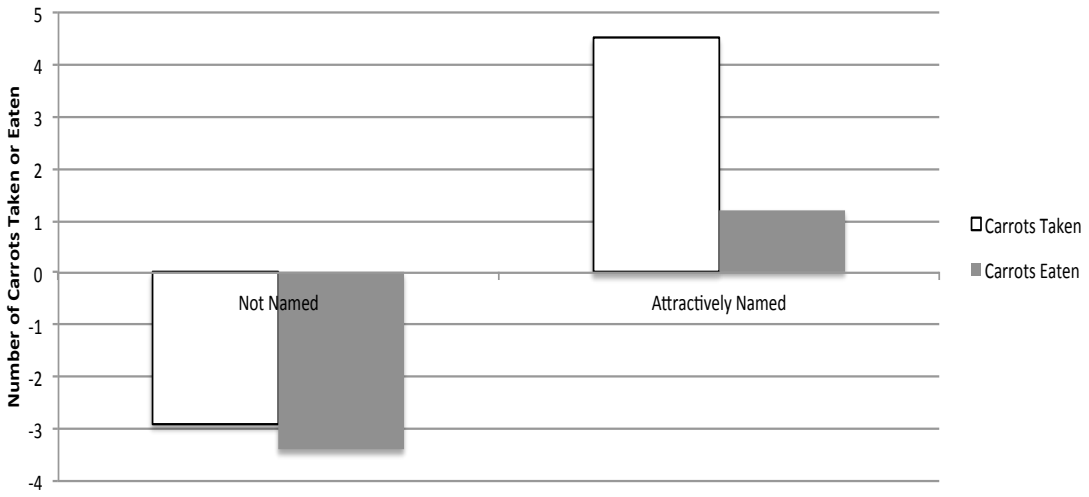

Figure 2. Percent Change in the Proportion of Students Taking Hot Vegetables.