

Marketing Vegetables in Elementary School Cafeterias to Increase Uptake

Andrew S. Hanks, PhD,^a David R. Just, PhD,^b Adam Brumberg, BS^b

abstract

OBJECTIVES: Children do not eat enough servings of vegetables, underscoring the need for effective interventions encouraging this behavior. The purpose of this research was to measure the impact that daily exposure to branded vegetable characters has on vegetable selection among boys and girls in elementary schools.

METHODS: In a large urban school district, 10 elementary schools agreed to participate in the study. They were randomly assigned to a control condition or 1 of 3 treatment conditions: (1) a vinyl banner displaying vegetable characters that was fastened around the base of the salad bar; (2) short television segments with health education delivered by vegetable characters; or (3) a combination of the vinyl banner and television segments. We collected 22 06 student-day observations over a 6-week period by tallying the number of boys and girls taking vegetables from the school's salad bar.

RESULTS: Results show that 90.5% (from 12.6% to 24.0%; $P = .04$) more students took vegetables from the salad bar when exposed to the vinyl banner only, and 239.2% (from 10.2% to 34.6%; $P < .001$) more students visited the salad bar when exposed to both the television segments and vinyl banners. Both boys and girls responded positively to the vinyl banners ($P < .05$ in both cases).

CONCLUSIONS: Evidence from this study highlights the positive impact of branded media on children's vegetable selection in the school cafeteria. Results from this study suggest potential opportunities for using branded media to encourage healthier choices for children.

FREE

^aDepartment of Human Sciences, The Ohio State University, Columbus, Ohio; and ^bCharles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, New York

Dr Hanks conceptualized and designed the study, trained researchers in data collection methods, analyzed and interpreted the data, drafted the initial manuscript, and critically reviewed the manuscript; Dr Just conceptualized and designed the study, interpreted the data, and critically reviewed the manuscript; and Mr Brumberg conceptualized and designed the study, trained researchers in data collection methods, and critically reviewed the manuscript. Drs Hanks and Just and Mr Brumberg accept full responsibility for all aspects of the manuscript, and all 3 authors approved the final manuscript as submitted.

DOI: 10.1542/peds.2015-1720

Accepted for publication May 3, 2016

Address correspondence to Andrew S. Hanks, PhD, Department of Human Sciences, The Ohio State University, 130A Campbell Hall, 1787 Neil Ave, Columbus, OH 43210. E-mail: hanks.46@osu.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2016 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

WHAT'S KNOWN ON THIS SUBJECT: Children do not eat enough fruits and vegetables and are often inundated with advertisements for less nutritious foods. In fact, many experts have called for bans on food advertising to children.

WHAT THIS STUDY ADDS: This research builds on previous work that illustrates how branded media that appeal to children can lead both boys and girls to take more fresh vegetables.

To cite: Hanks AS, Just DR, Brumberg A. Marketing Vegetables in Elementary School Cafeterias to Increase Uptake. *Pediatrics*. 2016;138(2):e20151720

Despite the health benefits of fruits and vegetables,¹ children still do not eat the recommended amounts.² To increase fruit and vegetable intake in school-aged children, lawmakers passed the Healthy, Hunger-Free Kids Act of 2010, which granted the US Department of Agriculture authority to update nutrition regulations for the National School Lunch Program. All public and nonprofit-private schools are eligible to participate in the National School Lunch Program, and if they choose to participate, they are required to comply with the prescribed standards.

Nutrition requirements associated with the new act include increasing the variety of vegetables served, ensuring that each lunch includes a serving of fruit or vegetables, serving more whole grain breads and pastas, and serving only 1% and fat-free milk varieties and only fat-free flavored milk.³ These new requirements aim to increase students' exposure to healthier foods at lunch with the expectation that increased exposure will lead to increased intake.⁴⁻⁷ Recent research highlights some success in low-income schools,^{8,9} although the evidence indicates that more food is wasted when choices are eliminated.¹⁰

In contrast to the regulatory approach, modifications to a child's external environment can influence food choice. For example, retrofitting 1 of 2 lunch lines to serve healthier foods only can decrease caloric intake among children,¹¹ and simply paying children to eat their vegetables can also be effective.¹² Furthermore, there is evidence that peer pressure and serving foods in more attractive bowls increase fruit and vegetable uptake.^{5,13,14} However, there is less evidence documenting the impact of conventional marketing techniques in increasing fruit and vegetable selection among children. The primary objective of the present research was to measure the effect of a vegetable marketing campaign

in elementary school cafeterias to increase uptake of salad and other vegetables.

Influential individuals and organizations have recently advocated for marketing healthy food choices. In the same year (2013) the Institute of Medicine called for companies and marketers to promote healthier diets,¹⁵ the Produce Marketing Association joined forces with Sesame Workshop and the Partnership for a Healthier America in a 2-year collaborative effort to promote fruit and vegetable consumption among children through a no-licensing fee use of the Sesame Street brand. This collaboration stems in part from research illustrating the positive impact media can have on consumption of fruits and vegetables.¹⁶⁻¹⁸ In addition, use of iconic characters can also increase fruit and vegetable consumption in children,¹⁹⁻²¹ although these studies often have small sample sizes and limited scope. Furthermore, there is mixed evidence documenting the differential impact of marketing interventions among boys and girls.^{22,23} At baseline, however, boys often eat fewer vegetables than girls^{24,25}; thus, it is worth studying if an asymmetric response to marketing technique exists between sexes.

Despite the evidence supporting marketing strategies to encourage healthier food choice among children, critics such as Susan Linn of Campaign for a Commercial-Free Childhood, Michele Simon of Eat Drink Politics, and others continue to push for complete elimination of marketing to children.²⁶⁻²⁸ These critics argue that children are already too frequently exposed to advertisements, especially for energy-dense foods,²⁹⁻³³ leading to poor food choices.^{6,34,35} Consistent, however, with the Institute of Medicine call, a more general consensus is to regulate marketing to children for the time being, leaving open the option to advertise healthy

foods to them.^{24,36} Thus, there is opportunity to build on previous research by identifying effective marketing tactics to promote vegetables to children on a larger scale than has previously been done.

In a collaborative effort between Cornell University's Center for Behavioral Economics in Child Nutrition Programs, Founder's Farms, Super Sprowtz, and schools in a large urban school district, researchers worked with 10 elementary school cafeterias to study the impact marketing media using branded vegetable characters have on vegetable uptake, and if boys and girls respond differently to the media.

METHODS

Study Design

This study was conducted over 6 weeks (April 8, 2013–May 24, 2013). Researchers' availability for collecting data and schools' willingness to participate limited the duration of the study to this time frame. In weeks 1 and 2, no changes were made, and data were collected for baseline measures. The interventions were then implemented and maintained throughout weeks 3 through 6. A 4-week intervention period was scheduled to minimize novelty effects.

A total of 12 schools initially agreed to participate in the study, although 2 schools chose to withdraw during the data collection phase. To identify the causal impact of branded media on student behavior, schools were randomly assigned into a control condition ($n = 2$) or 1 of 3 treatment conditions: (1) a vinyl banner ($n = 2$); (2) television segments ($n = 3$); or (3) a vinyl banner and television segments ($n = 3$). The weekend before the treatment period began, volunteer researchers visited the schools assigned to a treatment and assisted food service staff in



FIGURE 1
Example of media in schools.

installing the banners and televisions, which remained in the cafeterias during the entire treatment period. Students enrolled in the schools were blinded to the group assignments. With this study design, the following hypotheses were generated:

Hypothesis 1: Children in schools with the vinyl banners will select more vegetables.

Hypothesis 2: Children in schools with the television segments playing will select more vegetables.

Hypothesis 3: Children in schools with both types of media will select more vegetables, although the effects are not additive.

Given the mixed results in previous research illustrating sex differences in behavioral responses to interventions,^{24,25} the goal of the analysis was to help us understand what differences, if any, might arise.

Branded Media Interventions

For this study, the branded media consist of a vinyl banner with vegetable characters printed across

the front and short segments shown on a flat screen television. Researchers fastened each vinyl banner to the metal casing on the lower portion of the salad bar just below the area where the salad components are served and wrapped the banner around the whole salad bar. They also placed small stands above the sneeze shield to hold a second rectangular banner (Fig 1). Second, flat screen televisions were placed on small tables near the school's salad bar to attract children's attention. Short video segments with the branded vegetable characters delivering nutrition education messages ran on the televisions. In all the intervention schools, small decals printed with the vegetable characters were placed on the floor to direct traffic to the salad bars.

The characters shown in the branded media are vegetables with human attributes such as arms, legs, and a mouth, as well as super-human strength. Vegetables promoted by the characters are broccoli, carrots, spinach, peas, onions, garlic, zucchini, tomatoes, eggplant, and mushrooms.

Independent from this research, these vegetable characters were conceived, developed, and licensed by Super Sprowtz. Through Founder's Farm, Super Sprowtz donated the vinyl banners, televisions, television segments, and floor decals to the participating schools. In addition, Founders Farm recruited volunteers to assist in carrying out the study.

School Characteristics

Schools in this study were selected from a large urban northeastern US school district and agreed to participate in a randomized controlled field study. Median household income in this district is just under \$52,000, and 82% of the students receive a free or reduced price lunch.^{37,38} Schools in the control group had the lowest average enrollment at 465 students, whereas schools in the combined intervention had the highest enrollment at 668 students. Furthermore, the percentage of students receiving a free or reduced price lunch was lowest in the schools with the

combined intervention at 70% and highest in schools with the television segment-only intervention at 91%. Finally, the percentage of black or Hispanic students in the schools varied from 73% in the control schools to 94% in the schools with a vinyl banner. These summary statistics suggest systematic differences in the sampled treatment schools, although it is not clear how these differences affect the direction of changes under the treatments. It is difficult to claim our comparisons as a complete randomization check,³⁹ but it does suggest some caution in interpreting the results. The Cornell University institutional review board approved this research.

Data and Analysis

Two types of data were collected to measure the impact of media on student behavior. First, food preparation records were collected for all 10 schools. These records report the number of servings taken for each food item as well as the number of children receiving lunch. Vegetable servings taken met the requirement that children in grades kindergarten through 8 receive three-quarters cup of vegetables each day.³ The outcome measures of interest are the number and percentage of students taking salad and vegetables during lunch. The percent measure was calculated by dividing the number of students taking salad and vegetables by the number of students receiving lunch.

We also collected counts of the number of boys and girls serving themselves vegetables at the salad bar. To collect these counts, trained researchers visited 4 randomly selected schools (1 from each treatment condition or the control condition) during the school's lunch period. With a hand clicker in each hand, these researchers used the right clicker to tally male students and the left clicker to tally female students visiting the salad bar.

These data were collected during the baseline period on April 16–17 and during the treatment periods on April 25–26, April 30, May 1, May 6–7, and May 14–15.

The count data generated 3 outcome measures: (1) number of students taking vegetables from the salad bar; (2) percentage of students taking vegetables from the salad bar, calculated by dividing count values by the total number of children receiving lunch; and (3) separate counts of girls and boys taking vegetables from the salad bar. Because the total number of boys or girls in the school was not provided, we could not calculate the percentage of boys or girls visiting the salad bar. Based on the total number of lunches taken each day, the total number of student-day observations was 22 206. Notably, the count data are different from the food preparation records because the count data only tally the number of students taking vegetables from the salad bar. In contrast, food preparation records track the number of vegetable and salad servings taken from both the salad bar and from the lunch line.

For analysis, we used a random effects regression model with random effects at the school level. A random effects model was considered appropriate to adjust the SEs based on unobservable characteristics at the school level and because there was no a priori reason to test for significance of school-level fixed effects. The independent variables in the model indicate the intervention group to which a school is assigned, whether the observation is measured during the intervention or baseline period, and the interaction between these 2 variables; no other covariates were included. We report results first for food preparation records and then for the count data. Reported values in the figures and calculated percent changes were derived from estimated means resulting from the fitted regression model. Reported

P values correspond to interaction effects from the regressions.

RESULTS

The data reported in Fig 2 were extracted from food preparation records, and they illustrate the increase in average daily vegetable and salad servings taken. Most notable is the increase in vegetable and salad servings taken by students in schools with the branded media relative to schools in the control group. Analyses of food preparation records reveal an increase from 60 to 185 in average daily vegetable and salad servings taken ($P = .028$) by students in schools with vinyl banners and television segments. Although schools with only the vinyl banners or television segments experienced increases in servings of salad and vegetables taken, the increases were not statistically significant. These percent increases were compared with a statistically insignificant change in vegetable and salad servings taken in the control schools.

Different than food preparation records, count data measure the frequency of children taking vegetables from the salad bar only. In schools with the vinyl banners, an increase from 12.6% to 24.0% ($P = .04$) (Fig 3) of students took vegetables from the salad bar. In schools with both television segments and vinyl banners, there was an increase from 10.2% to 34.6% of students taking vegetables from the salad bar ($P < .001$). These increases are compared with a statistically insignificant change in the percentage of students taking vegetables from salad bars in control schools.

The count data also differentiate students according to sex. Specifically, more girls took vegetables from the salad bar (from 42 to 95; $P = .02$) (Fig 4) when vinyl banners were installed, and

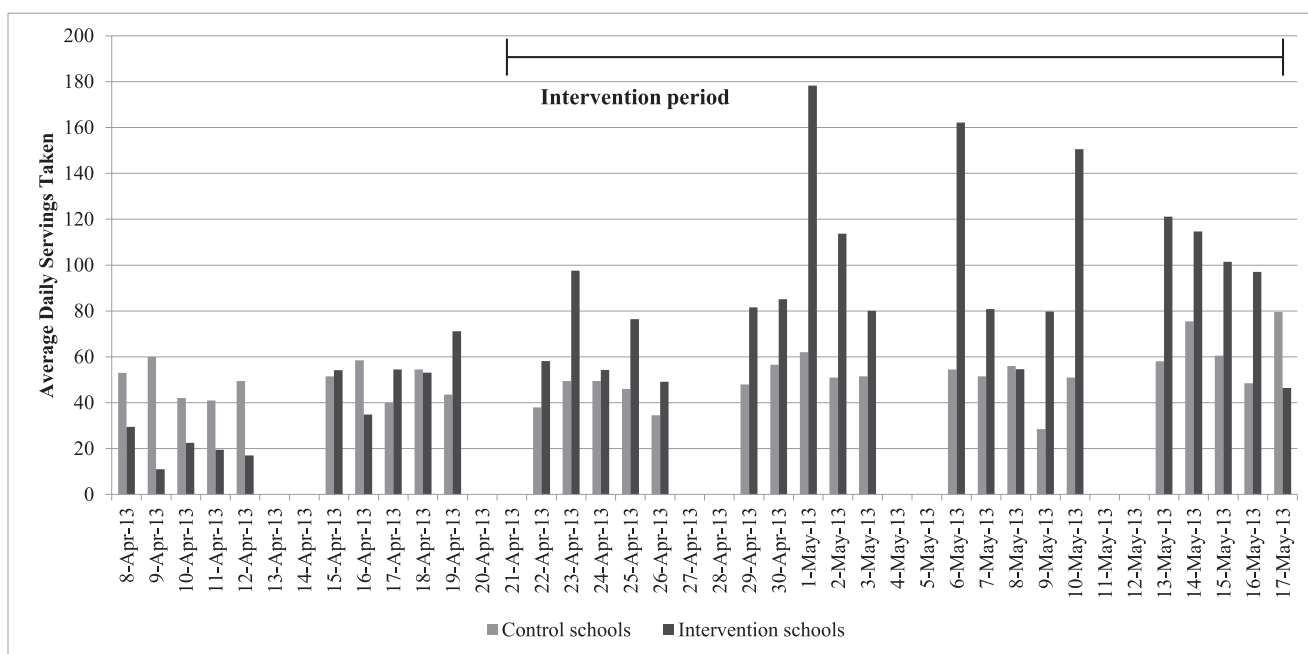


FIGURE 2 Average daily vegetable servings taken. The first 2 sets of 5-day intervals were the baseline period; sets 3 through 6 of the 5-day intervals were the intervention period. Data used to generate this graphic are from daily food preparation records supplied by each school's cafeteria.

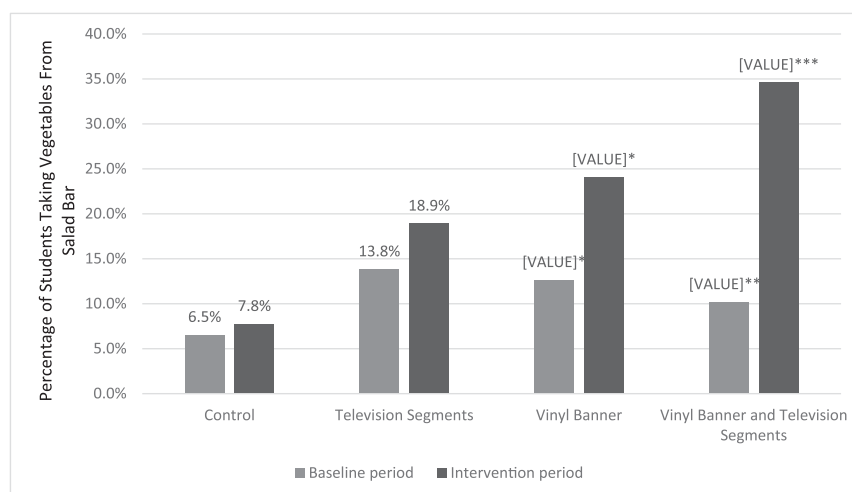


FIGURE 3 Average daily percentage of students taking vegetables from the salad bar. Count data were collected in each school. Data values are based on predicted percentages from a random effects regression model. * $P < .05$, ** $P < .01$, *** $P < .001$.

more girls took vegetables from the salad bar (from 35 to 126; $P < .001$) when both television segments and vinyl banners were installed. Male students were only influenced by vinyl banners such that in schools with this intervention alone, an increase from 25 to 66 took vegetables from the salad bar ($P = .01$) (Fig 5).

DISCUSSION

In this field experiment, branded media exposure dramatically increased the percentage of students taking vegetables overall and at the salad bar. In fact, across all media types, there was a 134.6% increase in the percentage of students taking vegetables from the salad bar, and

schools with the vinyl banners only and those with both media types experienced the most significant behavioral response, supporting hypothesis 1. Given that the television segments alone did not have a significant impact, we do not have evidence to support hypothesis 2. It thus seems that the increase resulting from the combined intervention is mostly driven by exposure to the vinyl banner, which supports hypothesis 3. Some marketing research suggests print advertising is more effective at capturing attention relative to television advertising.⁴⁰ In addition, the vinyl banners were consistently located at the point of selection, whereas the television location was constrained by space and available power outlets.

This 6-week field study builds on previous research^{16-19,21,22,29} by studying how children respond to new branded media in a familiar food environment. In addition, exposure lengths of 4 weeks exceed media exposure in previous research. The strongly positive results highlight the value of marketing healthy options

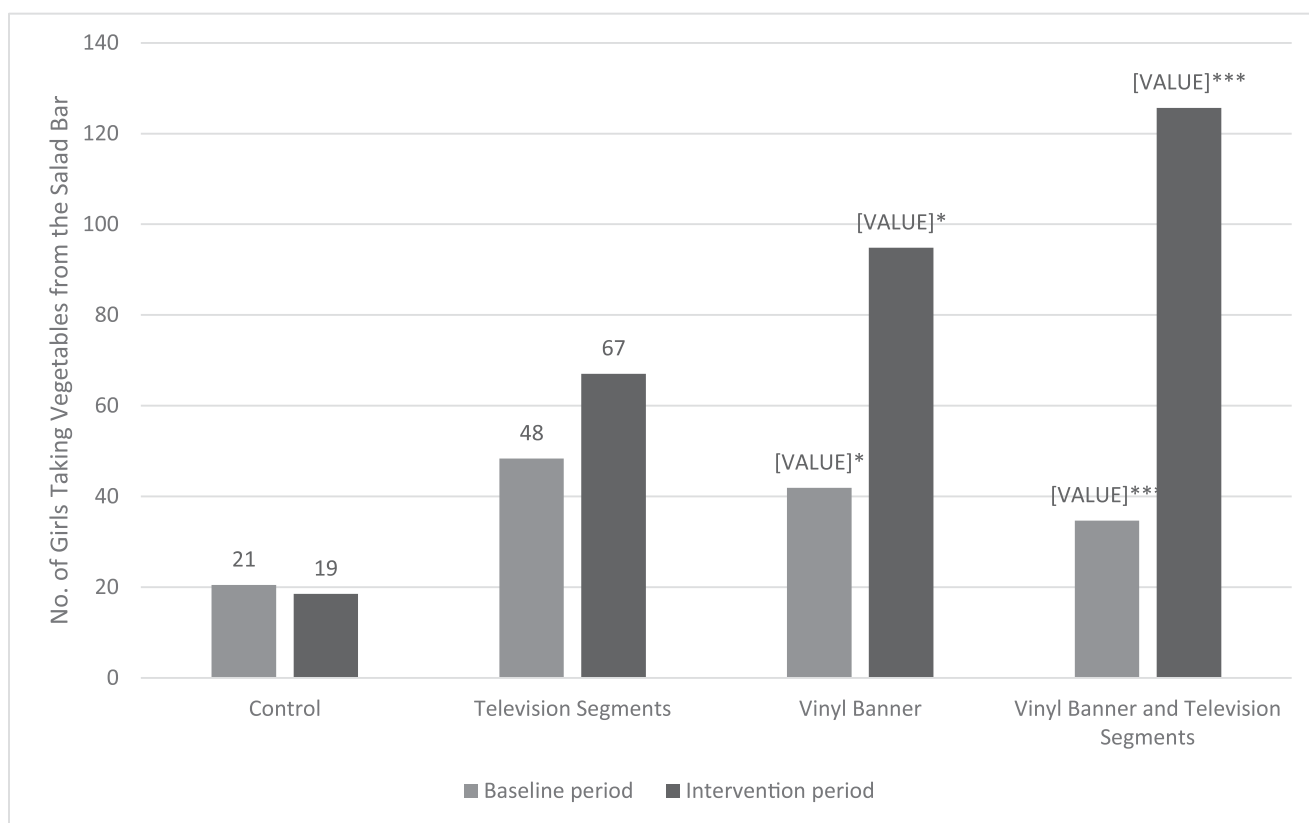


FIGURE 4
Number of girls taking vegetables from the salad bar. Data values are based on predicted means from a random effects regression model. * $P < .05$, ** $P < .01$, *** $P < .001$.

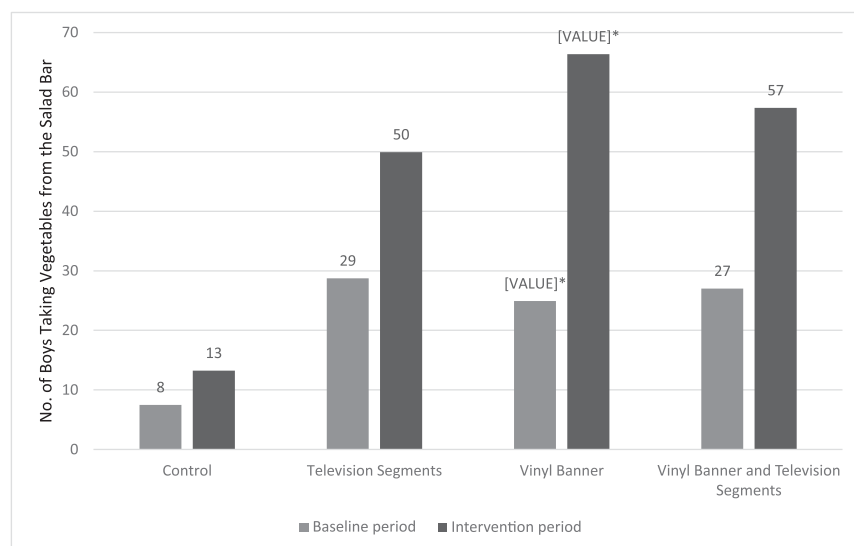


FIGURE 5
Number of boys taking vegetables from the salad bar. Data values are based on predicted means from a random effects regression model. * $P < .05$, ** $P < .01$, *** $P < .001$.

to children and are consistent with the suggestions from groups such as the Institute of Medicine to leverage marketing strategies in a positive way.¹⁵

Similar to previous literature, the present study found differences at baseline in vegetable selection among boys and girls.^{24,25} We also

found some differences in their responses to the branded media. Specifically, both boys and girls were more likely to take vegetables from the salad bar when a vinyl banner is in place, but only girls responded when both the television segments and vinyl banners were used. Because data from the food preparation records (Fig 2) indicate that the combination of the 2 media methods is effective for all children combined, it is possible that this combination is effective for boys in terms of increasing the overall amount of vegetables taken. Finally, in a separate set of analyses testing for a novelty effect, we found that boys responded positively to the combination of media types in weeks 1 and 2 of the intervention, but this effect wore off by the third week. These discrepancies in the results provide interesting avenues for research, at least in terms of

identifying if and when boys and girls respond differently to various types of media.

Most of the Super Sprowtz characters used in this study represent food items often found on school lunch lines and in school salad bars. Notably, the vegetable characters represent 3 of the categories outlined in the new requirements, promoting uptake of a variety of vegetables. Each week schools are required to serve dark greens such as spinach or broccoli, red and orange vegetables such as tomatoes or carrots, beans or peas (or other legumes such as lentils), or starchy vegetables such as corn or potatoes.³ Furthermore, based on data from preparation records, there is general consistency between what children saw through the branded media and what was offered both on the lunch line and in the salad bars, resulting in increases in vegetable uptake among the children.

The strength of these findings should be considered in context of the following limitations. First, the 4-week intervention may not have been long enough to eliminate novelty effects, and thus there is need for additional research to test longer term effects of similar interventions. In addition, actual food and nutrient intake and longer term habit-forming measures were not gathered, but they are of great interest given the importance of child nutrition and the need to help children develop

healthy eating habits. Furthermore, this study did not examine the potential link between media in the school lunch room and behavior outside of school or the potentially differential impact of animal versus vegetable characters, both of which are interesting areas for future research. In addition, the characters in this study are less well known relative to other characters, such as those from Sesame Street, and it is unknown whether the familiarity of the characters has an impact on food choice.

We note that in the participating schools, 82% of students receiving lunch received it for free or at a reduced price, thus biasing the results toward lower income children. We also note that the small sample of schools limits the generalizability of the results and renders it difficult to determine how well balanced the treatment groups are. Finally, even though all 10 schools in the study already had a salad bar before the study, this feature is uncommon (although advocates are pushing to bring salad bars to more schools).^{41,42}

CONCLUSIONS

The research presented here highlights an opportunity for marketers and children to both benefit from branded media. Persuasive influences of marketing

media can be leveraged in a positive way, encouraging children to make more nutritious choices. In addition, school food service managers can use these findings and other marketing opportunities in relatively inexpensive ways, such as providing descriptive names for the foods they offer and making them more convenient to take.^{14,43} With childhood nutrition as the ultimate goal, the synergistic combination of marketing strategies and healthy choices has great potential for improving what children take and eat, both in and out of school.

ACKNOWLEDGMENTS

Researchers at the Cornell Food and Brand Laboratory and Cornell Center for Behavioral Economics in Child Nutrition Programs designed the study, entered and analyzed the data, and drafted the manuscript. Researchers recruited by Founders Farm implemented the interventions and collected the data. The authors thank Super Sprowtz, who created the characters used in the study and supplied the media materials. The authors also thank Founders Farms volunteers Annette Gonzalez, Amy Rose, Alexandra Anelli, Ali Nasi, and Ellen Winston for their help installing the media and collecting data. Finally, they thank Megan Reardon and Liz McKneeley for their help in preparing the manuscript and Liam Wickes-Do for his help with data entry.

FUNDING: All phases of this study were supported by the Cornell Food and Brand Lab, the Cornell Center for Behavioral Economics in Child Nutrition Programs (USDA ERS/FNS grant 59-5000-0-0090) and Founders Farm. Super Sprowtz branded materials for the interventions were provided by the Bernard Group.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

1. Rolls BJ, Ello-Martin JA, Tohill BC. What can intervention studies tell us about the relationship between fruit and vegetable consumption and weight management? *Nutr Rev*. 2004;62(1):1–17
2. Guenther PM, Dodd KW, Reedy J, Krebs-Smith SM. Most Americans eat much less than recommended amounts of fruits and vegetables. *J Am Diet Assoc*. 2006;106(9):1371–1379
3. United States Department of Agriculture, Food and Nutrition Service. Nutrition standards in the National School Lunch and School Breakfast Programs. Available at: www.gpo.gov/fdsys/pkg/FR-2012-01-26/pdf/2012-1010.pdf. Accessed December 12, 2014
4. Wardle J, Cooke LJ, Gibson EL, Sapochnik M, Sheiham A, Lawson M. Increasing children's acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite*. 2003;40(2):155–162

5. Horne PJ, Tapper K, Lowe CF, Hardman CA, Jackson MC, Woolner J. Increasing children's fruit and vegetable consumption: a peer-modelling and rewards-based intervention. *Eur J Clin Nutr*. 2004;58(12):1649–1660
6. Blanchette L, Brug J. Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *J Hum Nutr Diet*. 2005;18(6):431–443
7. Lakkakula A, Geaghan J, Zanovec M, Pierce S, Tuuri G. Repeated taste exposure increases liking for vegetables by low-income elementary school children. *Appetite*. 2010;55(2):226–231
8. Cohen JF, Richardson S, Austin SB, Economos CD, Rimm EB. School lunch waste among middle school students: nutrients consumed and costs. *Am J Prev Med*. 2013;44(2):114–121
9. Schwartz MB, Henderson KE, Read M, Danna N, Ickovics JR. New school meal regulations increase fruit consumption and do not increase total plate waste. *Child Obes*. 2015;11(3):242–247
10. Just D, Price J. Default options, incentives and food choices: evidence from elementary-school children. *Public Health Nutr*. 2013;16(12):2281–2288
11. Hanks AS, Just DR, Smith LE, Wansink B. Healthy convenience: nudging students toward healthier choices in the lunchroom. *J Public Health (Oxf)*. 2012;34(3):370–376
12. Just DR, Price J. Using incentives to encourage healthy eating in children. *J Human Resources*. 2013;48(4):855–872
13. Hoffman JA, Franko DL, Thompson DR, Power TJ, Stallings VA. Longitudinal behavioral effects of a school-based fruit and vegetable promotion program. *J Pediatr Psychol*. 2010;35(1):61–71
14. Hanks AS, Just DR, Wansink B. Smarter lunchrooms can address new school lunchroom guidelines and childhood obesity. *J Pediatr*. 2013;162(4):867–869
15. Institute of Medicine. Challenges and opportunities for change in food marketing to children and youth: workshop summary. Available at: www.iom.edu/Reports/2013/Challenges-and-Opportunities-for-Change-in-Food-Marketing-to-Children-and-Youth.aspx. Accessed December 12, 2014
16. Foerster SB, Gregson J, Beall DL, et al. The California Children's 5 a Day-Power Play! Campaign: evaluation of a large-scale social marketing initiative. *Fam Community Health*. 1998;21(1):46–64
17. Perry CL, Bishop DB, Taylor G, et al. Changing fruit and vegetable consumption among children: the 5-a-Day Power Plus program in St. Paul, Minnesota. *Am J Public Health*. 1998;88(4):603–609
18. Anderson AS, Porteous LE, Foster E, et al. The impact of a school-based nutrition education intervention on dietary intake and cognitive and attitudinal variables relating to fruits and vegetables. *Public Health Nutr*. 2005;8(6):650–656
19. Wansink B, Just DR, Payne CR. Can branding improve school lunches? *Arch Pediatr Adolesc Med*. 2012;166(10):967–968
20. Wansink B, Shimizu M, Camps G. What would Batman eat?: priming children to make healthier fast food choices. *Pediatr Obes*. 2012;7(2):121–123
21. Upton D, Upton P, Taylor C. Increasing children's lunchtime consumption of fruit and vegetables: an evaluation of the Food Dudes programme. *Public Health Nutr*. 2013;16(6):1066–1072
22. Foster GD, Sherman S, Borradaile KE, et al. A policy-based school intervention to prevent overweight and obesity. *Pediatrics*. 2008;121(4). Available at: www.pediatrics.org/cgi/content/full/121/4/e794
23. Keller KL, Kuilema LG, Lee N, et al. The impact of food branding on children's eating behavior and obesity. *Physiol Behav*. 2012;106(3):379–386
24. Gootman JA, McGinnis JM, Kraak VI, eds. *Food Marketing to Children and Youth: Threat or Opportunity?* Washington, DC: National Academies Press; 2006
25. Lehto E, Ray C, Haukkala A, Yngve A, Thorsdottir I, Roos E. Do descriptive norms related to parents and friends predict fruit and vegetable intake similarly among 11-year-old girls and boys? *Br J Nutr*. 2016;115(1):168–175
26. Linn S. *Consuming Kids: The Hostile Takeover of Childhood*. New York, NY: New Press; 2004
27. Simon M. The fallacy of marketing 'healthy' foods to youths. Available at: <http://america.aljazeera.com/opinions/2014/2/junk-food-marketing-sesame-street-subway-michelle-obama-boycott-move.html>. Accessed May 14, 2014
28. Gosliner W, Madsen KA. Marketing foods and beverages: why licensed commercial characters should not be used to sell healthy products to children. *Pediatrics*. 2007;119(6):1255–1256, author reply 1256
29. Matthews AE. 'Children and obesity: a pan-European project examining the role of food marketing'. *Eur J Public Health*. 2008;18(1):7–11
30. Linn S, Novoset CL. Calories for sale: food marketing to children in the twenty-first century. *Ann Am Acad Pol Soc Sci*. 2008;615(1):133–155
31. Powell LM, Schermbeck RM, Szczypka G, Chaloupka FJ, Braunschweig CL. Trends in the nutritional content of television food advertisements seen by children in the United States: analyses by age, food categories, and companies. *Arch Pediatr Adolesc Med*. 2011;165(12):1078–1086
32. Campbell S, James EL, Stacey FG, Bowman J, Chapman K, Kelly B. A mixed-method examination of food marketing directed towards children in Australian supermarkets. *Health Promot Int*. 2014;29(2):267–277
33. Strasburger VC; Committee on Communications, American Academy of Pediatrics. Children, adolescents, and advertising. *Pediatrics*. 2006;118(6):2563–2569
34. Jones SC, Kervin L. An experimental study on the effects of exposure to magazine advertising on children's food choices. *Public Health Nutr*. 2011;14(8):1337–1344
35. Roberto CA, Baik J, Harris JL, Brownell KD. Influence of licensed characters on children's taste and snack preferences. *Pediatrics*. 2010;126(1):88–93
36. Eisenhut M. Mycoplasma pneumoniae encephalitis and reactivation of herpes simplex virus. *Pediatrics*.

- 2007;119(6):1256–1257, author reply 1257–1258
37. US Census Bureau. State and county quick facts. Available at: <https://www.census.gov/quickfacts/table/PST045215/00>. Accessed October 21, 2015
 38. Keaton P. *Documentation to the NCES Common Core of Data Local Education Agency Universe Survey: School Year 2012-13 Provisional Version 1a (NCES 2015-008)*. Washington DC, US Department of Education: National Center for Education Statistics; 2014. Available at: <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015008>. Accessed October 21, 2015
 39. Mutz D, Pemantle R. Standards for experimental research: Encouraging a better understanding of experimental methods. *J Experimental Political Sci.* 2015;2(2):192–215
 40. Spielmann N, Richard MO. How captive is your audience? Defining overall advertising involvement. *J Bus Res.* 2013;66(4):499–505
 41. US Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation. *School Lunch Salad Bars*. Nutrition Assistance Program Report Series. No. CN-02-SB. Alexandria, VA: US Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation; 2002
 42. Harris DM, Seymour J, Grummer-Strawn L, et al. Let's move salad bars to schools: a public-private partnership to increase student fruit and vegetable consumption. *Child Obes.* 2012;8(4):294–297
 43. Wansink B, Just DR, Payne CR, Klinger MZ. Attractive names sustain increased vegetable intake in schools. *Prev Med.* 2012;55(4):330–332

Marketing Vegetables in Elementary School Cafeterias to Increase Uptake

Andrew S. Hanks, David R. Just and Adam Brumberg

Pediatrics; originally published online July 5, 2016;

DOI: 10.1542/peds.2015-1720

Updated Information & Services

including high resolution figures, can be found at:
</content/early/2016/07/01/peds.2015-1720.full.html>

References

This article cites 34 articles, 11 of which can be accessed free at:
</content/early/2016/07/01/peds.2015-1720.full.html#ref-list-1>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Community Pediatrics

/cgi/collection/community_pediatrics_sub

School Health

/cgi/collection/school_health_sub

Nutrition

/cgi/collection/nutrition_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
</site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
</site/misc/reprints.xhtml>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2016 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Marketing Vegetables in Elementary School Cafeterias to Increase Uptake

Andrew S. Hanks, David R. Just and Adam Brumberg

Pediatrics; originally published online July 5, 2016;

DOI: 10.1542/peds.2015-1720

The online version of this article, along with updated information and services, is located on the World Wide Web at:

[/content/early/2016/07/01/peds.2015-1720.full.html](http://content.early/2016/07/01/peds.2015-1720.full.html)

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2016 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

