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Review Article

Does Positioning of a Spokes-Character Improve Selection and Consumption of Vegetables Among Fourth Grade School Lunch Participants?

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Abstract

Background: This study evaluated the impact of using a celebrity spokes-character on selection and consumption of green beans among fourth grade children in a National School Lunch Program in the United States of America.

Methods: A pre-experimental study was conducted in 4 elementary schools within a Midwest school district. Selection and consumption of green beans were measured during a single lunch meal without a picture of a spokes-character (Time 1). When the identical menu was offered again three weeks later (Time 2), the same green beans were served with an 8x10 inch graphic of a spokes-character captioned "Got Beans?" prominently displayed. Descriptive statistics were used to compare rates of selection. The Mann-Whitney-Wilcoxon Test and the two-sample median test was used to measure differences in median consumption intakes between time 1 and time 2 for both the boys and the girls. Four different levels of consumption (little, some, over half, or all/close to 100% consumption) were compared using the Chi square test.

Results: During the initial lunch (Time 1) 73 (32 boys, 41 girls) out of 256 students selected green beans, compared to 92 (44 boys, 48 girls) out of 237 students at Time 2. Participation varied from 78% (Time 1) to 72% (Time 2) in school lunch (256 or 237 out of 329 possible grade 4 students). A total of 125 (ounce) oz of beans were consumed without the spokes-character compared to 145 oz consumed with the picture of a spokes-character. However, the average amount consumed per serving decreased significantly ($p<0.05$) from 1.71 to 1.57 oz.

Conclusions: Health and nutrition professionals should recognize children as consumers, including how they react to specific marketing techniques. Promoting healthful foods improves selection of that food which could result in increased consumption. Health educators should develop marketing methods for nutritious food that are targeted towards children utilizing the persuasive nature of some of the advertisements.

BACKGROUND

The prevalence of overweight and obesity especially among children has become a major public health issue [1,2]. This is particularly problematic as obesity in childhood typically persists into adulthood [3]. Since children spend a significant amount of time at school, school programing to promote healthy lifestyles would increase practice of health promoting behaviors [4]. Nevertheless, factors found both in and outside of school, such as advertising, influence children to make their choices. Exposure to high levels of advertising of unhealthy foods is correlated with weight gain in children [5,6]. This likely occurs since food advertising and marketing influences children's food preferences and eating behaviors leading to weight gain [7,8].

In addition, exposure to media may increase children's requests for advertised products increasing the likelihood of parental purchasing of the advertised food [9,10]. This is problematic since food and beverages advertised on television are generally high calorie but of low nutritional value [11,12]. Children who watch more television and advertisements were more likely to have stronger preferences for the foods advertised [13]. Almost all food advertisements on television (86%) viewed by 2-11 year olds are high in fat, calories, and sodium [12]. Sugared cereals (33-47% sugar by weight) account for most frequently advertised foods while low calorie, nutrient dense fruit and vegetable advertisements are negligible [12]. In 2006, only $11.5 million of the $2.1 billion in youth directed expenditures (0.6%) was for fruits and vegetables. In 2009, that figure dropped in both absolute ($7.2 million) and relative terms (0.4%) [14]. Nevertheless, exposure to television advertisements of fruits and vegetables was positively related with reported intake of fruits and vegetables [15].

Children, on average, spend seven and a half hours a day using media, more than half of it watching television [16]. In the United States, children aged 6-11 years view an average of 12.7 minutes of food-related television advertising per day [12]. In an earlier report, children and adolescents viewed more than 40,000 advertisements per year on television alone [17]. Television viewing is inversely related to fruit and vegetable intake [18]. For each additional hour of television watched per day, intake of fruits and vegetables decreased by up to half a serving per day [19]. It is estimated that reducing exposure to unhealthy food advertisements on television would result in a lowering of body weight by 5.6% and prevalence of obesity by 6.8 and 6.0% for boys and girls, respectively [8]. Even parental influence does not mitigate the effect of advertising on young children [20].

In recent years, marketing to children has undergone remarkable changes [21]. Television viewing only accounts for half the media use by children [16]. As rules become more stringent on television advertising to children, other marketing tools are being created. These include placement in stores, special packaging, promotional sales, in-school, public relations, internet marketing and advergaming [6,21,22].

Another marketing technique is the use of spokes-characters to brand food products. Spokes-characters are used to create brand awareness and are usually designed to be fun and attractive to children [22]. The mere appearance of a spokes-character on a product can substantially affect a child's perception of the product [23]. In advertising, characters add a certain connection of familiarity and fun. According to one advertising agency, the list of spokes-characters is extensive and includes familiar "faces" such as Tony the Tiger, the M&M characters, the Trix Rabbit, Sponge Bob, and Cap 'n Crunch [24]. In a legal opinion Campbell noted that the use of popular characters from movies and television shows to promote products are misleading when used to market to children [25] but nonetheless are currently strategically used to sell products.

Recently, food manufacturers have positioned spokes-characters from popular television networks on fruits and vegetables in order to improve purchase of these fruits and vegetables by consumers. Several studies have explored children's perception on whether or not they would select a fruit or vegetable when it is "branded" compared to a "plain" fruit or vegetable (no brand or spokes-character). In one study, a spokes-character positioned to advertise a branded fruit, influenced young children (aged 3-5) to be able to identify the name of the brand associated with the spokes-character (i.e., Dora from *Dora the Explorer* or SpongeBob from *SpongeBob SquarePants*), and also positively influenced their selection of the branded fruit to a level similar to candy [26]. Another study conducted by Robinson et al., [27] found that children reported that they preferred the food more in a famous-brand fast-food package as compared to food in a plain package even though the same food was presented, whether it was a fast-food burger or fresh baby carrots. One more study conducted among pre-school children found that participants liked snack foods more when they were in containers that had licensed cartoon characters on them as compared to ones that were in plain containers [28]. As part of the current study (reported elsewhere), a sample of children from 4 different elementary schools did not perceive that a spokes-character would be relevant to their choice of the fruits or vegetables they consume [30]. However, many others have shown a positive impact of a spokes-character to choose and *plan* to consume branded vs. non-branded same foods, such as for apples and grapes [30]. The impact of the branding technique (e.g. use of a spokes-character) to improve a*ctual consumption* of fruits and vegetables among children has not been rigorously investigated.

The purpose of this pre-experimental study was to determine whether a spokes-character had an influence on (1) selection and (2) consumption of green beans among fourth grade students in a National School Lunch Program (NSLP) environment in one community in the Midwest.

METHODS

Participants

Four schools were randomly selected from eight within one Midwest school district. The study was approved by the North Dakota State University Institutional Review Board (IRB) and the participating school district. Data was collected during the 2009-2010 school year. All fourth graders enrolled at the four schools (N=329) were eligible participants. Potential participant race/ethnicity and school-lunch eligibility, compared to within study state data are listed in (Table 1).

Although each of the four schools were similar in size, and had similar numbers of grade 4 students in each classroom, there were some differences, such as among gender and the total enrollment in the school. This data is listed in (Table 2).

Procedure

In grocery stores in close proximity to the study schools, packages of frozen green beans featured pictures of the previously tested Dora the Explorer and Sponge Bob Square Pants [24,29]; therefore, green beans were selected to test the effect of the positioning of celebrity spokes-characters on vegetable selection and subsequent consumption. During both experimental periods, bowls of 2 oz pre-portioned green beans were set on a tray. Each served portion of green beans was 2 oz or about 1/3 cup. Staff

Table 1: Race/ethnicity among students in study schools compared to elementary-aged children within all elementary schools in North Dekots.

School	White, Not Hispanic		Black, Not Hispanic		Hispanic		American Indian/Alaskan Native		Asian/Pacific Islander		Students Eligible for Free/ Reduced –Price Lunch	
	School	State	School	State	School	State	School	State	School	State	School	State
School 1	78%	85%	13	2%	3%	2%	3%	9%	3%	1%	41%	32%
School 2	81%	85%	5%	2%	4%	2%	5%	9%	5%	1%	42%	32%
School 3	80%	85%	9%	2%	3%	2%	3%	9%	5%	1%	31%	32%
School 4	93%	85%	4%	2%	2%	2%	1%	9%	<1%	1%	17%	32%

Source: National Center for Education Statistics (2009-2010)

Table 2: Gender among study eligible children compared to enrollment-based size of study schools and proportion of grade 4 within total students enrolled.

School	Grade 4 students eligible for study		Total children enrolled in school, grade 1-5	
	Boys	Girls	Total students	Grade 4 %
School 1	45	49	526	`18%
School 2	31	40	446	16%
School 3	44	43	444	20%
School 4	40	37	439	17%
TOTALS	160	169		

Source: Participating School District

were trained to accurately measure each portion per portion control guidelines.

All study schools used a cycle menu which included green beans as a vegetable offered with either chicken pasta with Alfredo sauce or pepperoni pizza. No competitive foods were available, so NSLP participants had to choose one entrée plus either the green beans or a salad/veggie bar (plus other components). Regardless of their selection, the cost of the "meal" was the same.

When a student selected green beans, a gender specific sticker was placed on the bottom of the bowl by the lunch-line cashier who normally worked in the lunch room. After lunch, students were asked to place all the bowls that had contained green beans on a tray. Subsequently researchers weighed the remains (i.e. plate waste) of the uneaten green beans using a Precision Plus digital scale accurate to within 0.07 oz (Mahwah, NJ) to estimate amount consumed (consumed=starting portion-waste). At Time 1, green beans were served without a picture of a spokes-character. The next cycle on three week menu rotation (Time 2), the same brand and preparation of green beans were served with an 8x10 inch graphic picture of a spokes-character saying "Got Beans?" prominently displayed by the green beans on the lunch lines. The picture was positioned at child-level, eye-level, right beside the green beans. Staff were instructed to follow their normal routine, so that children could make their selections at their own will.

Data analysis

For the variable 'selection', a percentage of those students that selected green beans and frequencies were tracked for boys, girls, and total students compared to eligible participants. A univariate analysis revealed deviations from normality in the variable 'consumed' (SAS Institute, Cary, NC, 2009). Subsequently, non-parametric test equivalents, the Mann-Whitney-Wilcoxon Test and the Two-Sample Median Test plus Satterthwaite t were used to measure differences in median consumption intakes between Time 1 and Time 2 for both the boys and the girls. The differences at $P < 0.05$ were considered significant. Next, green bean consumption was divided into 4 different categories (0-0.7 oz "little", 0.8-1.2 oz "some", 1.3-1.7 oz "over half" and 1.8-2.0 oz "close to or 100% consumption"). Then, Chi square tests were done to compare differences among the four categories between boys and girls and at time 1 and time 2.

RESULTS

During Time 1 and Time 2 lunches, 256 (78%) and 237 (72%) students in grade 4 participated in the school offered NSLP. (Tables 3 and 4) list detail for boys and girls that chose green beans during Time 1 and Time 2. Each served portion of green beans was 2 oz or about 1/3 cup. Combined, 73 students of a possible 256 (29%) selected green beans at Time 1 (no spokes-character); 92 students of a possible 237 (39%) selected green beans at Time 2 (with spokes-character). At Time 1, the overall average consumption was 1.71 oz for those that selected green beans; at time 2, that rate decreased to 1.57 oz (Satterthwaite t 2.99, p=.0038; Mann-Whitney-Wilcoxon Test p-value for boys p=0.0328 and for girls p=0.2235; Two-Sample Median Test p-value for boys p=0.0210 and for girls p=0.1667).

As seen in (Table 3 and 4), green beans were taken by 32 boys and 41 girls at Time 1. At Time 2, 44 boys and 48 girls selected green beans. This is a 38% increase in the number of boys and 17% in number of girls who selected green beans. Although there was an increase in the number of boys who selected green beans with spokes-characters, average consumption decreased by 0.40 oz. However, among the girls, not only was there was an increase in the number who selected green beans, average consumption also increased, but not significantly.

Figure 1 shows that with the presence of the spokes-character (Time 2), the number of boys consuming green beans in the "zero to little range" from 0.3 oz to 0.7 oz was much higher than at Time 1. On a positive note, none of the boys (or girls) among study participants had a measured zero consumption rate, i.e. every child in the study at least *tried* the green beans (see figure 1 and 2 "little" range *starts* at 0.3 oz).

Moreover, fewer boys consumed 1.8-2.0 oz "close to or 100% consumption" of the green beans at Time 2 ($\chi^2 = 0.76$, $p = 0.38$).

Figure 2 shows that the consumption of green beans among the girls increased in the "zero to little range" from 0.3 oz to 0.7 oz, "over half" from 1.3-1.7, and "close to or 100% consumption" ranges but decreased slightly in the "some" 0.8-1.2 range with the presence of the spokes-character (χ^2= 3.66, p = 0.06).

Although it is important to determine if advertising with a spokes-character increases the number of students selecting green beans, it is probably more important to know if total consumption increased. A total of 125 oz of green beans were consumed without the spokes-character compared to 145 oz that was consumed with the picture of a spokes-character.

DISCUSSION

The purpose of the present study was to examine the effect of the presence of a single spokes-character on selection and consumption of green beans among children in a NSLP environment. This study showed a significant increase in the number of overall children selecting, and number of boys consuming green beans after exposure to the spokes-character. Even with less children participating at Time 2, with the spokes-character, more students selected green beans. The spokes-character may have been "fun" and attracted the children to the green beans as suggested by researcher [22] but more measured exposures or a follow-up survey or focus group with student participants may have revealed other motivations. Children may have perceived a better "fit" with the green beans and chicken alfredo, and nixed the green beans when choosing the popular pepperoni pizza.

Table 3: Numbers of boys that selected green beans and the amount consumed.

Time period	(n)	Amount consumed (oz)	Average consumption per student (oz)
Time 1	32	58	1.81[a]
Time 2	44	64	1.41[b]

[ab] *Values with different letters within the columns are significantly different. P < 0.05*

Table 4: Numbers of girls that selected green beans and the amount consumed.

Time period	(n)	Amount consumed (oz)	Average consumption per student (oz)
Time 1	41	67	1.63[a]
Time 2	48	81	1.69[a]

[ab] *Values with different letters within the columns are significantly different. P < 0.05*

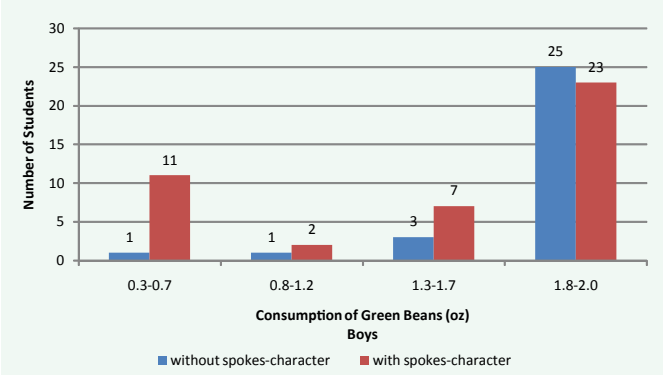

Figure 1 Consumption of green beans by boys with and without the presence of spokes-character.

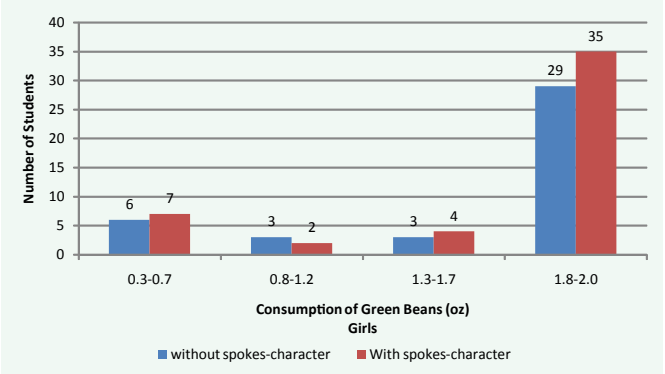

Figure 2 Consumption of green beans by girls with and without the presence of spokes-character.

Even though the number of students selecting green beans was higher with a spokes-character present, average consumption per person was generally lower. This suggests that once the green beans were selected, students consumed a smaller portion of them. Taste preference is most consistently and positively related to consumption [31]. According to children's response to a survey asking about fruit and vegetable choice (reported elsewhere), taste and nutrition were viewed as more important than the presence of a spokes-character [30] Current results suggest that behavior does match what the students said they would do in the survey (reported elsewhere [30]): even though the students said that selection was not influenced by a spokes-character more students in this study selected green beans when they were promoted by a spokes-character. It is interesting to note that grade 4 children reported that the presence of a spokes-character on labeling is not even a consideration when they choose fruit and vegetables [30]. This research agrees with others who determined that adding a spokes-character to healthier foods indeed improved their chances of selection [32] but motivations for consumption require further study.

The usefulness of a spokes-character to market products to children is debatable. Some argue that it boosts sales and consumption of the products, while others consider it unethical to use a spokes-character to market any products to children. In a legal opinion Campbell noted that the use of popular characters from movies and television shows to promote products are misleading when used to market to children [25]. The basis for this argument was that the children do not perceive spokes-characters to be advertisements. Moreover, this form of advertising has been used frequently to market unhealthy food to children. Although a spokes-character may draw the attention of children to the advertisement, and even develop a positive attitude towards the product, the relation between a spokes-character and a child's preference, intention, and choice of a product do not always coincide [33].

LIMITATIONS

There are several limitations in this study. First, there are differences between the present sample and a nationally representative school sample with respect to ethnicity which limits generalizability. Evidence suggests the use of a spokes-character impacts selection and planned consumption among younger children differently [27]. Although the researchers limited accompanying foods offered in the lunch by comparing consumption with the same menu, other influences such as

consumption of breakfast, availability of other foods or nutrition education may have influenced selection and consumption of the green beans. The green beans were pre-portioned in disposable bowls and set on a tray, which may have resulted in a rapid temperature drop. As a result, the beans may be viewed as unpalatable or not tasty resulting in decreased consumption.

CONCLUSIONS

Previous studies have also shown that advertising affects dietary selection and planned consumption patterns of children. The results of the present study demonstrated that more students selected green beans when there was spokes-character present. Although, more boys selected green beans when the spokes-character was present, the average consumption went down for boys. This may imply that the presence of a spokes-character may influence a child to choose an advertised food, but not necessarily to increase consumption. Nevertheless, consumption increased slightly, but not significantly, among the girls, and overall as a group (boys and girls eligible to consume green beans). Taste, presentation and other unknown factors may have a greater determining role in consumption of vegetables than the presence of spokes-character at point of selection.

IMPLICATIONS FOR SCHOOL HEALTH

Increasing fruit and vegetable consumption among children remains a challenge for nutrition professionals and NSLP personnel. The product should be appealing to the children when they select it. Moreover, the children must like the taste and appearance when they consume it. The first step in the process is for students to select the fruit or vegetable. Advertising the vegetable with a simple recognizable spokes-character can increase selection. Intuitively, repeated exposure in a similar NSLP environment, would result in more student selection, but this needs to be studied.

Nutrition educators should be cognizant that advertising vegetables can increase the number of students selecting vegetables and resulting in increased consumption. Health professionals working in the schools must understand children as consumers, including how they react to specific marketing techniques. Keeping in mind the persuasive nature of some of the advertisements, health educators and school foodservice personnel can develop pictures with positive and simple messages for nutritious food that are targeted towards school children (e.g. “GOT BEANS?”). More child targeted advertisements on the benefits of consumption of fruits and vegetables should be developed.

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