

Fruit and Vegetable Preferences and Identification by Kindergarteners through 2nd-Graders With or Without the US Department of Agriculture *Fresh Fruit and Vegetable Program*

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ABSTRACT

Objective: The US Department of Agriculture *Fresh Fruit and Vegetable Program* (FFVP) allows schools to increase fruit and vegetable (FV) exposure by distributing FV as snacks. The objective of this study was to compare kindergarten through second (K-2nd)-graders who were exposed or not to FFVP for preferences and identification.

Design, Setting, Participants: The FV Preference Survey for K-2nd-graders contained 12 fruits and 12 vegetables, a 3-Likert scale (liked it, okay, don't like it), and an I don't know option. Data were collected from K-2nd-graders at 2 elementary schools near Chicago, IL (n = 435, FFVP school, n = 235 with 12 teachers; non-FFVP school, n = 200 with 10 teachers).

Main Outcome Measure(s): Mean preference scores.

Analysis: Chi-square, Mann-Whitney U, and multiple linear regression analyses compared school data ($P < .05$).

Results: There were significant differences in mean preference scores, with higher fruit scores at the FFVP school (1.8 ± 0.6) than at the non-FFVP school (1.7 ± 0.6). In contrast, there was a higher vegetable score for the non-FFVP school (1.3 ± 0.9) than for the FFVP school (1.2 ± 0.9). The school variable had weak impact on fruit ranking (multivariate coefficient = 0.01; $P < .05$). For fruits and vegetables and combined, there were fewer I don't know responses in the FFVP ($\chi^2 = 149.080$; $P < .01$).

Conclusions and Implications: At the FFVP school, fewer I don't know responses suggested better FV identification. Non-FFVP students had higher vegetable preferences than did FFVP students. Tasting a variety of FV may help with identifying FV, but more research is needed to determine the impact on preferences.

Key Words: fruits, vegetables, preferences, school, child, survey (*J Nutr Educ Behav.* 2017; ■:1-7.)

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INTRODUCTION

The benefits of fruits and vegetables (FV) on health are well known because they aid in preventing weight gain by causing satiety and reducing energy intake¹ and lowering the risk of cancer and coronary heart disease.^{2,3} Whereas all age groups can benefit from FV, the health benefits for children may have the longest impact, because food preferences and habits established in childhood may predict higher FV consumption as adults.² Given that neophobia increases during the preschool years, increasing FV exposure at a younger age at school or at home may facilitate more positive preferences for FV.^{4,5} Because many students consume at least one-third their total food intake from school

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meals, schools serve as an opportunity to introduce more FV to increase intake.⁶ School interventions to increase FV consumption focused on repeating taste exposures and modeling healthy behaviors.⁷⁻⁹

The US Department of Agriculture enacted the *Fresh Fruit and Vegetable Program* (FFVP) in schools to increase exposure and intake of FV for children to establish healthier eating patterns.⁶ Funds are allocated to schools with the highest percentage of low-income students and to those that agree to distribute FV as snacks during times of the day that do not include lunchtime.⁶ There are no requirements for frequency of distribution or rules about what can be distributed; however, there is a limit to funds that are allocated to each student per year, ranging from \$50 to \$75.⁶ Because of the potential impact of this program and the need for fiscal responsibility, it is important to evaluate the FFVP's outcomes. As a mediator of food intake, preferences for vegetables may be the strongest predictor of actual vegetable consumption.¹⁰⁻¹² However, most studies that evaluated the FFVP did not assess younger children or their preferences.^{6,13,14}

The objective of this study was to assess whether the FFVP had an effect on children's FV preferences and identification. It was hypothesized that students who participated in the FFVP would report greater preferences and have higher identification of FV than would students at a non-FFVP school.

METHODS

Study Design and School Selection

Two schools were selected for this cross-sectional study based on their affiliation with the University of Illinois Extension, because that institution provided nutrition education for the 2 schools. In addition, the 2 schools were selected based on their similar demographic profile: Both had a predominantly Hispanic/Latino population and a similar percentage of children receiving free/reduced-price lunches. One school had the FFVP in place, with FV distributions beginning in August, 2014 and ending in spring, 2015.

Instruments

The Fruit and Vegetable Preference Survey developed for this study included 12 fruits and 12 vegetables (Figure) and was based on valid and reliable surveys used in previous studies with similar objectives and age groups ranging from preschool to high school.^{5,15,16} The researchers selected FV based on previous surveys and tools provided by *Team Nutrition*,¹⁷ proposed FV that would be served at the FFVP school, and inclusion of both commonly consumed and uncommonly consumed FV options. The Fruit and Vegetable Preference Survey included a pictorial 3-point Likert scale along with a question mark for students to select if they did not know what the FV was, for preference and implied identification, respectively.¹⁸ Survey scores ranged from 0 to 2 (0 for *I don't like it*, 1 for *It's okay*, and 2 for *I like it*). The survey was reviewed for content accuracy and readability by experts in the field of nutrition. The kindergarten through second (K-2nd)-grade teachers from each school received the surveys and administered the surveys at the end of the school year.

Participants

Participants were 235 students at the FFVP school and 200 students at the non-FFVP school in K-2nd grade. It was the first year that the FFVP school had the program in place. Informational letters were sent to parents, and children provided verbal assent. The study protocol was approved by the Institutional Review Board of the University of Illinois. There were no identifiers on the survey. Teachers were instructed to read the name of each FV aloud in both English and Spanish and show a color FV card to the class, and to instruct students to circle how much they liked each fruit or vegetable. If students did not know what the FV was or had never tried it, teachers were asked to instruct students to circle the question mark as the response.

Data Analyses

Descriptive statistics were used to determine frequencies of grade levels

and gender characteristics of the K-2nd-grade students. Chi-square test of homogeneity evaluated differences between the 2 schools and children's preferences for the FV. Mann-Whitney U tests determined whether there were higher rankings in preference scores for the FV among the students and between the schools. The researchers conducted Kruskal-Wallis H tests to assess differences in preferences among grade levels. The question mark and *I don't know* responses were excluded from analyses that included preference scores. Mean preference scores were determined for each individual FV item and across all 12 items aggregated for FV preferences of the students.^{5,16} Results were considered significant at $P < .05$. A Bonferroni correction was used for multiple comparisons because there 12 comparisons were conducted for fruits and 12 for vegetables; results were considered significant at $P < .002$. A multiple linear regression was used to evaluate predictive factors such as school and grade for FV preferences (version 23.0, IBM SPSS Statistics, IBM Corp, Somers, NY, 2015).

RESULTS

A total of 435 surveys were collected from students at the FFVP and non-FFVP schools ($n = 235$ and 200 ; 94% and 72.2% participation, respectively) at the end of the school year. Table 1 presents the characteristics of the students.

There were significant differences in mean preference scores ($P < .05$), with higher fruit scores at the FFVP school (1.8 ± 0.6) than the non-FFVP school (1.7 ± 0.6). In contrast, there was a statistically higher vegetable score for the non-FFVP school (1.3 ± 0.9) than the FFVP school (1.2 ± 0.9). Overall, students at both schools rated fruits with higher mean preference scores than they did vegetables; this was statistically significant ($P < .05$) (Table 1). Statistically significant differences in FV identification were found; more non-FFVP children selected *I don't know* for FV than did children at the FFVP school ($P < .05$) (Table 2). Overall, the percentage of *I don't know* for fruit ranged from 0% to 25.9% of children

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