Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Promoting Fruit and Vegetable Consumption by Offering Healthy Appetizers and Increased Item Choice in School Cafeterias

- Jessica Green, Robin McClave, MS, CHES, Charis V. R. Edwards, Travertine Garcia, MPH, RD, Samantha Reilly, MS, RD

KEYWORDS: childhood obesity, fruit and vegetable consumption, lunchroom choices, healthy food choices, behavioral economics

INTRODUCTION:

Consistent access to nutritious and affordable foods and beverages is critical to student health and academic success (Community Preventative Services Task Force, 2022). Fruit and vegetable consumption are essential for growth and development and prevention of excess weight gain and chronic disease, yet more than 90% of children fail to meet recommended intake of fruits and vegetables (Folkvord et al., 2021).

Schools provide a practical and structured environment to promote healthy eating (Gold et al. 2017). A child's health and nutritional status are heavily influenced by their environment (Brown 2019), and youth spend a significant portion of their day in school. Factors that have been shown to affect school-age children's dietary attitudes, preferences, and health-related behaviors include social support; peer norms and beliefs; behaviors modeled by parents, teachers, and fellow students; and repeated exposure and opportunity to sample new foods (Snelling et al., 2012, 2013, Gold et al., 2017). For example, previous research has indicated that after taste-test interventions, which encouraged students to try vegetables multiple times in different recipes, participating students were more likely to choose and eat vegetables when researchers followed up weeks or months later (Snelling et al., 2017, Reynolds et al., 2000, Wardle et al., 2003). Multicomponent interventions that target students' knowledge, attitudes, values, and beliefs; reinforce positive behaviors in the school and home environments; and provide students a chance to experience new foods, have been shown to increase nutritional intake (Gold et al., 2017).

Food consumed during the school day accounts for nearly half of children's daily caloric intake (Schwartz and Wootan, 2019). Stronger nutrition standards set by the Healthy, Hunger Free Kids Act of 2010 (HHFKA) ensure high nutritional quality of meals and snacks served through federally funded Child Nutrition Programs, such as the National School Lunch Program (NSLP). The NSLP serves more than 30 million students each school day in approximately 95,000 public and private schools nationwide (United States Department of Agriculture, 2022). As a result, many U.S. children are served their most nutritious meals at school (Liu, Micha, and Mozaffarian,

SCHOOL NUTRITION ASSOCIATION

2021). Receiving a reliable, nutritious meal at school can improve academic achievement, help maintain student health and play a role in combatting food insecurity (Snelling et al., 2015).

When it comes to implementing school-based child nutrition programs, however, urban and rural schools face unique socioeconomic barriers to achieving the nutritional goals set out in federal and local policies (Hamdi et al., 2020). Even when fruits and vegetables are offered to students as part of a reimbursable meal, previous research in DC schools indicated that only 60-75% of students consume offered fruits and only 35-40% of students consume offered cooked vegetables, thus not receiving the nutritional benefit of these items (Young et al., 2013). One increasingly popular solution, due to feasibility and low cost of implementation, is environmental change-style interventions, which modify the physical environment to promote and facilitate healthy eating behaviors (Hamdi et al., 2020). A behavioral economic concept called "nudging" works to influence behavior by altering the environment in subtle yet meaningful ways (Hamdi et al., 2020, Snelling and Kennard, 2009). In a school-based nudge intervention, desirable health-related behaviors are encouraged by making healthy choices easy, convenient, and appealing. Research indicates that principles of environmental change drive the positive results of the *Smarter Lunchrooms* framework, including visibility, convenience, and social norms, improve fruit and vegetable consumption (Green et al., 2017, Snelling et al., 2009).

In the current study, the research team evaluated the efficacy and feasibility of improving fruit and vegetable consumption by altering the timing of serving a fruit and vegetable item and expanding fruit and vegetable options. The research team worked closely with the Food Service Management Company (FSMC), including administrative and front-line school-based staff to assess feasibility of intervention methods, following a Community-Engaged Research model.

METHODOLOGY:

Study Design

The two-year, baseline and follow-up-style intervention was conducted at two public elementary schools in Washington, DC. Schools were chosen by the FSMC, based on their capacity to amend existing cafeteria protocols and practices for the purposes of the study. The schools were comparable in number of students, demographics, and geographic location, and both provided all school meals for free through the Community Eligibility Provision (CEP), as represented in Table 1 (District of Columbia Public Schools, n.d., Office of the State Superintendent of Education, 2023, S. Reilly, personal communication, April 5, 2024). The study was conducted in grades three through five in two public elementary schools in an urban school district during the 2021-2022 and 2022-2023 school years. Over the course of two academic years, data collectors tracked student fruit and vegetable selection and consumption from a total of 636 lunch trays.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Table 1. *Participant School Characteristics*

School	***School 1***	***School 2***
Enrollment	285	281
CEP Identified Student Percentage (2022-2023)	66.92%	67.99%
All meals reimbursed by CEP?	Yes	Yes
Average NSLP Participation Rate	82%	85%
Grades Served	PreK3 - 5th	PreK3 - 5th
English Language Learners	7%	1%
Special Education	19%	22%
Racial Demographics	90% Black 9% Hispanic/Latino 1% Multiple Races	94% Black 4% Hispanic/Latino 2% Multiple Races

Intervention

Guided by *Smarter Lunchroom* strategies, the intervention used environmental cues to promote increased fruit and vegetable selection and consumption. Mealtime variables included timing of when the fruit or vegetable was offered, number of choices, preparation method, and social norming/engagement. The intervention design was further informed by the operational knowledge of the Food Service Staff (FSS), lessons learned during the baseline visits, and feedback from FSS and the research team throughout year one.

In Fall 2021, the FSS placed whole bananas on the lunch tables as an "appetizer" for students to eat while waiting to be called to go through the lunch line. In Spring 2022, students were offered a small disposable cup filled with five baby carrots and a side of dressing (Italian or Ranch) as an appetizer prior to going through the lunch line. In Fall 2022, students were greeted by FSS as they entered the cafeteria and offered a choice between two whole fruits as appetizers. In Spring 2023, students were offered a third vegetable choice (instead of the usual choice between two vegetable options) in the meal service line. Intervention components and timelines are represented in Table 2.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Table 2. *Intervention Components*

Time	Intervention	Principles Tested	Description
Fall 2021	Banana Appetizer	Timing Preparation	Whole, unpeeled bananas were available on lunch tables when students arrived
Spring 2022	Carrot Appetizer	Timing Preparation	Cups with five carrots and ranch dressing were available on lunch tables when students arrived
Fall 2022/Winter 2023	Choice of Fruit Appetizer	Timing Choice Preparation	Pear and Apple offered when students arrived for students to choose one
Spring 2023	Choice of additional Cooked Vegetable	Choice Preparation	Cooked Peppers & Onions, Pinto Beans, and Green Beans were available in the lunch line for students to choose one, two, three or none (only Green Beans were measured)

Staff Trainings and Feedback

Each school year, the research team engaged the FSS team in the Fall and Spring to discuss and identify feasible lunchtime serving modifications. Trainings provided an opportunity to introduce *Smarter Lunchroom* Framework and build awareness among FSS of their influential and critical role in student health and nutrition.

Data Collection Methods

Baseline Observations

Data collectors conducted baseline observations at Schools 1 and 2 a few weeks before each intervention took place. Collectors attended one standard lunch period and all usual lunchroom rules and norms were followed during this period. Students entered the cafeteria at their assigned lunch time, waited at their assigned tables for permission to join the lunch line (wait times vary between schools based on number of lunch tables), entered the lunch line, and were required to select at least three of the five item types available: milk, fruit, vegetable, carbohydrate, or protein, and at least one of those items had to be a serving of fruit or vegetables, per USDA NSLP guidelines. The students then returned to their tables with their meals and ate as usual. The data collection team stood at the waste bin area and used the Lunch Crunch application (described below) to document how many students had selected each fruit or vegetable and how much of each fruit and/or vegetable each student had consumed prior to disposal.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Fruit & Vegetable Selection and Consumption Data Collection

Data was collected using Lunch Crunch, a visual measurement app created by the University's Lab to assess selection and consumption at baseline (November 2021, April 2022, November 2022, and the beginning of April 2023) and follow-up (December 2021, May 2022, March 2023, and the end of April 2023). Data collectors were present in the cafeteria throughout the lunch period. As students finished their lunch and approached the waste bin, data collectors recorded: (1) whether the student selected each fruit or vegetable offered, and (2) the amount of each fruit or vegetable consumed. Collectors could record 0, 50, or 100% consumption using a reliable and validated half-waste method (Hanks, Wansink, and Just, 2014). Students that selected but did not eat the fruit or vegetable were recorded as "0%." Consumption of one bite or more, but less than the entire portion were recorded as "50%," while full completion was recorded as "100%." Previous studies indicated the half-waste method yielded superior inter-method reliability for visual measurement with a proven 0.83 reliability measure of vegetables based on three vegetable food items (Hanks, Wansink, and Just, 2014). The following consumption scale for baby carrots was used for consistency: 0-1 = 0%; 2-4 = 50%; 5+ = 100%.

Data Analysis

Research assistants exported data from Lunch Crunch for further analysis in Microsoft Excel. Data were organized into two-by-two contingency tables by exposure and outcome. For analysis of fruit and vegetable selection, possible outcomes were "Did not select item" and "Selected Item." For analysis of fruit and vegetable consumption, possible outcomes were "Did not consume" which corresponded with the 0% consumption numbers from Lunch Crunch and "Consumed" which corresponded to the sum of the 50% and the 100% consumption numbers from the Lunch Crunch app.

In the Spring 2023, at baseline, students were allowed to choose or decline both of the two vegetables available in the lunch line. During the intervention students were allowed to choose one, two, all three, or none of the vegetables offered in the lunch line (choice among pinto beans, steamed green beans, and peppers and onions.) To maintain comparability between these two events, the analysis used only carrot selection at baseline and green bean selection and consumption as indicator choices (the most popular vegetable items by selection totals). In this case the exposure options were "Choice of 3 Vegetables" and "Choice of 2 Vegetables," the selection outcomes were "Selected Vegetable" and "Refused Vegetable," and the consumption options were "Consumed 50-100% of the Vegetable" and "Consumed 0% of the Vegetable" with the vegetable in all cases being steamed carrots at baseline or steamed green beans at intervention.

An odds ratio was calculated for each of these exposures based on the selection and consumption outcomes. The contingency tables were analyzed via uncorrected chi-squared test in R for significance.
Data contained no identifying information about the students and students could verbally opt to not have data on their meal recorded. The study was approved by the University's Institutional Review Board, IRB-2022-105. The IRB waived the any requirement for further documentation of consent due to the low risk the study posed to all involved students and the fact that the program was in line with existing educational initiatives implemented by the FSMC.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

RESULTS AND DISCUSSION:

Year One

The 2021-2022 intervention strategy of offering a fruit or vegetable as an appetizer to students was significantly associated with higher consumption of the fruit or vegetable appetizer when compared to consumption of fruits and vegetables taken in the normal lunch line during the baseline measurement. (Odds Ratio= 1.8, X^2 = 6.0, p = 0.014). The availability of the fruit or vegetable as an appetizer did not increase or decrease selection of these fruits and vegetables when compared to the baseline. (OR = 1.1, X^2 = 0.077, p = 0.78).

While it was slightly outside of the scope of the primary research question, the availability of the vegetable appetizer was associated with an increase in selection of the other vegetables available in the standard lunch line (OR=11, X^2 = 32, p = 1.8E-8). However, the availability of the appetizer had no significant association with a change in consumption of these normally available vegetables (OR=0.64, X^2 = 0.87, p = 0.35). The results from year one are summarized in Table 3.

Table 3. *Year 1 Results*

Time Period	Exposure	Event	Odds Ratio	X^2	p-value
Year 1 New Item Overall	Healthy item offered as appetizer	Selecting healthy item	1.1	0.077	0.78
Year 1 New Item Overall	Healthy item offered as appetizer	Consuming healthy item	1.8	6.0	0.014

Year Two

A combined analysis of the two periods of the 2022-23 intervention indicates that the overall exposure to a choice between types of healthy item has a significant association with the likelihood that an exposed student will actually eat 50-100% of the item they have selected (OR = 4.5, X^2 = 22, p = 2.2E-6). The availability of choice is, however, associated with lower odds that the students will take the items in the first place (OR = 017, X^2 = 41, p = 1.4E-10). The results from year 2 are summarized in Table 4.

Table 4. *Year 2 Results*

Time Period	Exposure	Event	Odds Ratio	X^2	p-value
Year 2 Overall	Offered additional choice of healthy options	Selecting a healthy option	0.17	41	1.4E-10
Year 2 Overall	Offered additional choice of healthy options	Consuming a healthy option	4.5	22	2.3E-06

Nutritional policies, such as the federal HHFKA and the DC HSA have improved school meal nutritional standards through increased availability of fruits, vegetables, and whole grains, expanded access to school meals, and reduced barriers to participation. The existence of these policies, however, does not ensure consumption (Schwartz and Wootan, 2019). Research indicates behavioral and environmental change strategies in the school environment support students in making healthier choices (Greene et al., 2017). The Smarter Lunchrooms Movement, rooted in the principles of environmental nudges, offers low- or no-cost strategies for increasing fruit and vegetable consumption. The present study indicated that behavioral economic strategies that build off Smarter Lunchroom techniques successfully increased fruit and vegetable consumption. The results demonstrated that students are much more likely to consume a fruit or vegetable when they are served these items as a first course or are given additional choices between items in the same food group.

Behavior change is more likely to occur when the intervention addresses multiple levels of influence. This study underscores the value and importance of using a combination of strategies to nudge students towards fruit and vegetable consumption through (1) timing; (2) choice; (3) preparation; and (4) staff training and engagement.

Timing

Fruit and vegetable selection and consumption are influenced by timing, when in the lunch period a student is offered the food and how much time they have to eat it, as well as placement, the location of the food in the lunchroom and how much it appeals to a hungry student (Marcano-Oliver et al., 2019). Offering fruits and vegetables as an appetizer prior to the entrée without the distraction of other enticing foods encourages increased consumption of target foods. Similarly, placing fruits and vegetables on the tables for students or handing them out upon entering the lunchroom, makes the healthy choice easy and automatic, especially for popular vegetables like baby carrots. Students who were offered an option of additional healthy choices in line, however, were still not very likely to take the item, possibly due to decision fatigue or a norm of refusing the vegetable in line every day. This study uniquely took advantage of lunch line modifications during the COVID-19 pandemic and capitalized on student down time while individual tables were called to go through the meal service line. Food service teams and schools should work together to consider novel lunch schedules that might encourage fruit and vegetable consumption, even as lunch routines return to pre-COVID-19 norms.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Choice

Research and guidance from a local Food and Nutrition Service Director encouraged autonomy and preference in making selections at mealtimes (Cohen et al., 2021). Furthermore, children may require the opportunity to sample a food 10-15 times before deciding whether they like it (Healthy Eating Research, 2022). In this study, consumption rates increased when students were empowered to choose between two fruits and witnessed their peers selecting fruits, regardless of the fruit selected, due in part to repeated exposure through school meals. While fewer students selected the pear at follow-up, those who chose a pear consumed larger portions of the fruit than at baseline. Even when timing changed, students consumed more of the vegetable they selected as part of their meal, when given the choice of taking neither, one, or both of the vegetables.

Preparation

Food preparation, personal preference, and presentation play an important role in student selection. Improving vegetable and fruit selection and consumption requires learning which food students prefer and whether they favor a vegetable cooked or raw. FSS are positioned to gather verbal and observational feedback. Baby carrots, which were served pre-portioned and ready-to-eat were selected at a higher rate than the banana as an appetizer, which was served whole and unpeeled. While whole fruits are served more easily and require less preparation by FSS, they may be more challenging for elementary students to eat. Elementary school students may struggle to peel a banana or whole orange, and thus, are discouraged from eating it, whereas pre-portioned baby carrots are more easily consumed.

Staff Training and Engagement

Successful interventions require thoughtful input from those most familiar with the students and environment. School FSS play a critical role in the production and consumption of healthy meals (Stephens and Byker Shanks, 2015). The dedicated FSS for the schools in this study are committed to the organization's mission and the provision of scratch-cooked meals using locally sourced ingredients from family farms. Routine engagement with these trusted individuals and repeated exposure to fruits and vegetables fosters a positive food environment and culture.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

CONCLUSIONS AND APPLICATIONS:

Further research is needed to determine how to increase initial selection of fruits and vegetables, while retaining the observed consumption benefits of timing and choice. Possible areas to investigate are time allotted for eating, presentation and marketing of fruit and vegetable options, popularity of and preference for specific fruits and vegetable options, and limitations of offer-vs-serve protocols that currently govern school lunch lines. The expertise and buy-in of menu planners and FSS are critical for long-term success and sustainability of environmental changes due to their role in embedding these strategies in everyday operations. Additional research is needed to investigate the feasibility and effects of fruit and vegetable appetizers with choice during lunch periods to assess if this intervention format consistently leads to higher fruit and vegetable consumption.

This study had the strength of looking at both the levels of healthy item selection *and* consumption. Consumption of a healthy item was positively correlated with the intervention techniques of presenting the item as an appetizer *and* offering students a choice over whether to take the item or not. This technique had a negative correlation, however, with the likelihood that a student would select the healthy item in the first place, indicating that further research is needed to elucidate the differences in these decision-making processes for students selecting and eating lunchtime meal options. An additional strength was the inclusion of FSS in the planning, design, and implementation of the intervention. While it is known that social and environmental reinforcement by FSS and teachers also increases consumption, this study supports involvement of FSS in the planning and implementation of nutrition intervention (Chinchanachokchai, Kamelske, and Vernon, 2022). Engagement with the FSS is critical both in the short and long-term as early buy-in increases likelihood of long-term program success and sustainability.

There were a few limitations to this study: The small sample size and lack of a comparison school that never received any intervention made it difficult to compare these interventions to previous work in this field. Another limitation was a lack of communication between the FSS and students around the appetizer intervention amidst sudden departure from familiar lunch service processes. Confusion arose in the first semester at one school with the banana appetizer when students arrived at their tables and found the banana sitting on the table but received no explanation. As such, students were confused as to whether the bananas were meant for their consumption, especially students who brought their own lunch. This miscommunication was resolved in later semesters of the project.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

ACKNOWLEDGEMENTS:

The authors wish to acknowledge the DC Central Kitchen staff for their assistance in designing and implementing this program.

DECLARATION OF INTEREST STATEMENT:

The authors declare no conflicts of interest.

ABSTRACT

PURPOSE/OBJECTIVES

While recent policy changes have expanded the nutritional value of lunchroom food offerings, low levels of fruit and vegetable consumption at school remain a problem. This intervention was designed to assess whether low-cost changes could be employed to increase student selection and consumption of fruits and vegetables during elementary school lunch times.

METHODS

The intervention was designed in partnership with a local food service provider in the District of Columbia and took place at two public elementary schools over the course of two years. Each semester, researchers visited schools to conduct a baseline assessment before the intervention was introduced. In two semesters, students were presented with a single fruit or vegetable appetizer. In the third semester, students could choose one of two fruit appetizers. In the fourth semester, students were offered a third choice of cooked vegetables in the hot food line at lunch. Researchers recorded whether students had selected a fruit or vegetable item and recorded how much of the item they had consumed at the end of the lunch period. This data was analyzed to see if the odds of students selecting or consuming a fruit or vegetable on intervention days increased significantly when compared to the baseline.

RESULTS

Offering a fruit or vegetable as an appetizer to students was significantly associated with higher consumption of the fruit or vegetable appetizer when compared to consumption of fruits and vegetables taken in the normal lunch line during the baseline measurement. (Odds Ratio= 1.8, X^2 = 6.0, p = 0.014). Exposure to a choice between types of healthy items has a significant association with the likelihood that an exposed student will actually eat 50-100% of the item they have selected (OR = 4.5, X^2 = 22, p = 2.2E-6).

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

APPLICATIONS TO CHILD NUTRITION PROFESSIONALS

The results, combined with behavioral economic research, suggest innovative, low-cost strategies for increasing fruit and vegetable consumption among students during school mealtimes. Adjustments to variables of timing and choice may have a significant impact on selection and consumption of fruits and vegetables by students, leading to improved markers of nutrition quality and security.

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

REFERENCES

Brown, J. E. (2019). *Nutrition Through the Life Cycle* (7th ed.). Cengage Learning, Boston, MA.

Chinchanachokchai, S., Jamelske, E. M., & Vernon, E. (2022). Impact of teacher encouragement on children's consumption and non-eating behaviour in a Wisconsin elementary school vegetable snack programme. *Health Education Journal*, *81*(3), 265–279. https://doi.org/10.1177/00178969211073293

Cohen J. F. W., Hecht A. A., Hager E. R., Turner L., Burkholder K., Schwartz M. B. (2021). Strategies to Improve School Meal Consumption: A Systematic Review. *Nutrients; 13*(10):3520. https://doi.org/10.3390/nu13103520

Community Preventive Services Task Force (CPSTF). (July 2022) Social Determinants of Health: Healthy School Meals for All. https://www.thecommunityguide.org/findings/social-determinants-health-healthy-school-meals-all.html

District of Columbia Public Schools, Student Life, Food and Nutrition, Free and Reduced Meals (FARM). "Community Eligibility Provision (CEP) Schools." https://dcps.dc.gov/page/community-eligibility-provision-cep-schools

Folkvord, F. Naderer, B., Coates, A., & Boyland, E. (2021). Promoting Fruit and Vegetable Consumption for Childhood Obesity Prevention. *Nutrients*, *14*(1). https://doi.org/10.3390/nu14010157

Gold, Larson, M., Tucker, J., & Strang, M. (2017). Classroom Nutrition Education Combined with Fruit and Vegetable Taste Testing Improves Children's Dietary Intake. *The Journal of School Health*, *87*(2), 106–113. https://doi.org/10.1111/josh.12478

Greene, K. N., Gabrielyan, G., Just, D. R., & Wansink, B. (2017). Fruit-Promoting Smarter Lunchrooms Interventions: Results from a Cluster RCT. *American Journal of Preventive Medicine*, *52*(4), 451–458. https://doi.org/10.1016/j.amepre.2016.12.015

Hamdi, N., Ellison, B., McCaffrey, J., Metcalfe, J. J., Hoffman, A., Haywood, P., & Prescott, M. P. (2020). Implementation of a multi-component school lunch environmental change intervention to improve child fruit and vegetable intake: A mixed-methods study. *International Journal of Environmental Research and Public Health*, *17*(11), 1–17. https://doi.org/10.3390/ijerph17113971

Hanks, A. S., Wansink, B., & Just, D. R. (2014). Reliability and accuracy of real-time visualization techniques for measuring school cafeteria tray waste: validating the quarter-waste method. *Journal of the Academy of Nutrition and Dietetics*, *114*(3), 470–474. https://doi.org/10.1016/j.jand.2013.08.013

Healthy Eating Research. (2022). *Encourage your child to try and taste new healthy food.* Healthyeatingresearch.org. http://healthyeatingresearch.org/wp-content/uploads/2021/10/HER-Healthy-Eating-Guidelines-Tipsheet-Try-and-Taste.pdf

Liu J, Micha R, Li Y, Mozaffarian D. Trends in Food Sources and Diet Quality Among US Children and Adults, 2003–2018. *JAMA Netw Open.* 2021;*4*(4):e215262. https://doi.org/10.1001/jamanetworkopen.2021.5262

Marcano-Olivier, M., Pearson, R., Ruparell, A., Horne, P. J., Viktor, S., & Erjavec, M. (2019). A low-cost Behavioural Nudge and choice architecture intervention targeting school lunches increases children's consumption of fruit: a cluster randomized trial. *The International Journal of Behavioral Nutrition and Physical Activity*, *16*(1), 20–20. https://doi.org/10.1186/s12966-019-0773-x

Office of the State Superintendent of Education, DC.gov, "National School Lunch Program, 2022-23 School Year DC Schools Eligible for Community Eligibility Provision (Excel file download from site)" https://osse.dc.gov/service/national-school-lunch-program-nslp

Reynolds, K. D., Franklin, F.A., Binkley, D., et al. (2000) Increasing the Fruit and Vegetable Consumption of Fourth-Graders: Results from the High-5 Project. *Preventative Medicine.* 30:309–319. https://doi.org/10.1006/pmed.1999.0630

Schwartz C, Wootan M. G. (2019). How a Public Health Goal Became a National Law. *Nutrition Today*, https://doi.org/10.1097/NT.0000000000000318

Snelling, A. M., Kennard, T. (2009) The Impact of Nutrition Standards on Competitive Food Offerings and Purchasing Behaviors of High School Students. *Journal of School Health*. 79(11):541–546. https://doi.org/10.1111/j.1746-1561.2009.00446.x

Snelling, A. M., Ernst, J. Irvine Belson, S. (2013) Teachers as role models in solving childhood obesity. *Journal of Pediatric Biochemistry.* 3:55–60. https://doi.org/10.3233/JPB-120074

Snelling, A. M., Irvine Belson, S., Young, J. (2012) School Health Reform: Investigating the Role of Teachers *Journal of Child Nutrition & Management* 36(1). https://schoolnutrition.org/journal/spring-2012-school-health-reform-investigating-the-role-of-teachers/

SCHOOL NUTRITION ASSOCIATION

Journal OF CHILD NUTRITION & MANAGEMENT

VOLUME 48 | ISSUE 2 | FALL 2024

Published by the School Nutrition Association

Snelling, A. M., Irvine Belson, S., Beard, J., Young, K. (2015) Associations between grades and physical activity and food choices: Results from YRBS from a large urban school district. *Health Education 115*(2):141–151. https://doi.org/10.1108/HE-03-2014-0028

Snelling, A. M., Newman, C., Ellsworth, D., Kalicki, M., Guthrie, J., Mancino, L., Malloy, E., Van Dyke, H., George, S., Nash, K. (2017) Using a Taste-Test Intervention to Promote Vegetable Consumption. *Healthy Behavior Policy Review, 4*(1):67–75. https://doi.org/10.14485/HBPR.4.1.8

Snelling, A. M., Newman, C., Watts, E., van Dyke, H., Malloy, E., Ghamarian, Y., Guthrie, J., Mancino, L. (2017) Pairing Fruit and Vegetables to Promote Consumption in elementary School Cafeterias. *Journal of Child Nutrition Management. 41*(1). https://schoolnutrition.org/journal/spring-2017-pairing-fruit-and-vegetables-to-promote-consumption-in-elementary-school-cafeterias/

Stephens, L., & Byker Shanks, C. (2015). K–12 School Food Service Staff Training Interventions: A Review of the Literature. *The Journal of School Health*, *85*(12), 825–832. https://doi.org/10.1111/josh.12338

USDA, Food and Nutrition Service. (2022). *Feeding the Future with Healthy School Lunches*: *Program Fact Sheet.* U.S. Department of Agriculture. https://www.fns.usda.gov/nslp

Wardle J., Herrera M., Cooke, L. J., Gibson, E. L. (2003) Modifying Children's Food Preferences: The effect of exposure and reward on acceptance of an unfamiliar food. *European Journal of Clinical Nutrition,* 57:341–348. https://doi.org/10.1038/sj.ejcn.1601541

Young, K. D., Snelling, A. M., Maroto, M., Young, K. (2013) Consumption of Fruits and Vegetables in Middle School Students Following the Implementation of a School District Wellness Policy. *The Journal of Child Nutrition and Management. 37*(2). https://schoolnutrition.org/journal/fall-2013-consumption-of-fruits-and-vegetables-in-middle-school-students-following-the-implementation-of-a-school-district-wellness-policy/