Healthy Schools Healthy Students: Evaluation Results and Recommendations

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Background

In general, Americans of all ages do not adhere to dietary recommendations, including increasing fruit, vegetable, and whole grain consumption and limiting foods such as added sugar.[1-3] Nutrition interventions, particularly those targeting children, are needed to improve dietary intake and increase overall health.[4] While the nutrition requirements included in the Healthy, Hunger-Free Kids Act of 2010 have improved the content of school meals, plate waste studies indicate that further interventions are needed to ensure students not only have access to healthy foods, but that students are consuming nutritious meals to reach dietary recommendations.[5-7] Nutrition interventions delivered in schools have the potential to have a large impact. This is due to schools' ability to reach many children, the schools' role in providing meals and supporting proper nutrition through education, and the ability to manipulate multiple factors in the school environment to promote healthy eating.[8, 9]

Nutrition interventions targeting children are needed to establish healthy eating habits early in life, prevent later health issues due to poor dietary intake, and improve population health. However, more research is needed to examine their effectiveness and determine which methods are most appropriate.[10-12]

The aim of this project was to implement a multi-component intervention in schools to improve 4th grade students' nutrition knowledge, attitudes towards fruits and vegetables, preferences for fruits and vegetables, and awareness of MyPlate. The process evaluation was designed to answer the following research questions:

RQ1) Was the intervention implemented as planned?

RQ2) What were the barriers to implementation?

RQ3) What were the successes, as identified by school nutrition professionals, nutrition educators, 4th grade teachers, Cafeteria Coaches, and administrators?

The outcome evaluation sought to answer the research question:

RQ4) Do fourth graders in intervention schools demonstrate greater increases in nutrition knowledge and more positive attitudes to fruits and vegetables when compared to students in control schools.

This report describes the evaluation of the first year of the intervention, which involved 606 children receiving the intervention in a cluster-randomized intervention study.

Methods and Results

School Recruitment

Schools applied to participate in the *Healthy Schools - Healthy Students* (HSHS) project during the spring of 2017. We selected twenty schools to participate that were matched on school size, public vs private, geographic region, and grades served. We randomly assigned one school from each matched pair to the intervention or control condition. School level variables are shown in Table 1 for schools that completed all outcome evaluation activities and were included in the analytic sample. All 4th grade classrooms and students at each school participated in the project.

Table 1. School level variables of schools included in the Healthy Schools Healthy Students project outcome evaluation

Variables	Mean (SD), Percent, or Count	
	Intervention (n=9)	Control (n=10)
School Enrollment	274.44 (109.0)	256.00 (135.81)
Free and Reduced Lunch Eligible	43.47%	39.49%
October 2017 Average Daily School Lunch Participation	75.67%	73.80%
% Hispanic	3.29%	5.53%
% White	93.45%	90.02%
% Male	51.76%	51.49%
NCES* Rural Classification		
21: Suburban-Large	0	1
23: Suburban-Small	0	1
32: Town-Distant	1	1
33: Town-Remote	2	2
42: Rural-Distant	3	1
43: Rural-Remote	4	4

*National Center for Education Statistics

Intervention Description

The *Healthy Schools - Healthy Students* project was implemented by Iowa Department of Education's Team Nutrition Program and evaluated by the University of Iowa. The intervention aimed to empower youth through school-based nutrition education, modeling and encouraging healthy behaviors, promoting healthy school environments, and providing food service staff with training opportunities.

The intervention design was a cluster-randomized trial with a delayed intervention arm that included 20 schools across the state of Iowa. In the 2017-2018 school year, 10 schools received the intervention and 10 schools served as the control. Control schools will receive the intervention in the following school year (2018-2019). In early fall 2017, a Kick-Off event was held to welcome the intervention schools to the *Healthy Schools-Healthy Students* project. At this event, key individuals from each school attended to learn the basics of the project, timeline of activities, expectations throughout the year, and an overview of the evaluation components. Key intervention activities as they were initially planned are shown in Table 2. School were provided with a stipend for participating and funding for a nutrition educator. Schools also participated in a number of supporting activities, such as webinars, participation in National School Lunch Week and School Breakfast Week, improving school wellness policies, and holding other school wide events.

Table 2. Planned Healthy Schools Healthy Students Intervention Activities

Intervention activity	Description
In-classroom nutrition education	Intervention schools will contract with an educator from the community to deliver Team Nutrition's Serving Up MyPlate curriculum in 4th grade classrooms. [13] Serving Up MyPlate is a collection of classroom materials that integrates nutrition education into Math, Science, English Language Arts, and Health and introduces the importance of eating from all five food groups through a variety of hands–on activities. Contracted nutrition educators may include: Registered Dietitian Nutritionists (RDN) from the Iowa Academy of Nutrition and Dietetics, Nutrition and Wellness Specialists from Iowa State Extension and Outreach, RDNs from local hospitals and grocery stores, parent volunteers with a background in wellness. Each lesson was designed to be delivered in thirty minutes. Interactive classroom activities, delivered by the educator and planned in partnership with the classroom teacher will include: • Six monthly nutrition education lessons utilizing Team Nutrition's Serving Up MyPlate. • Six tasting opportunities coordinated with nutrition education lessons. • Physical activity demonstrations during each lesson. • Visit by the Child Nutrition Manager/Director to provide student input on school meals. • Implementation of classroom BINGO challenge to promote a healthy classroom (drinking water, physical activity breaks, healthy birthday snacks, etc.). A list of non-food rewards for meeting challenges will be provided.
Cafeteria coaching	Cafeteria Coaching, a cafeteria-based program developed by Iowa State University Extension and Outreach, utilizes middle school and high school students along with school nutrition staff to encourage elementary students to try new foods and eat nutritious school meals. Cafeteria coaches will be expected engage with the younger 4th grade students who are receiving the in-classroom nutrition education, encourage them to try new foods, and model healthy behaviors through either conducting taste tests or eating lunch with the younger students. Intervention schools will recruit and implement Cafeteria Coaching in their schools. The Cafeteria Coaching feedback will be used to assist the school nutrition program in menu development and school meal preparation and presentation. Through the use of cafeteria coaches the goal is to: increase consumption of whole grains, fruits and vegetables, try recipes/foods that can be featured on the menu in the future, use foods that meet school requirements for nutrition, presentation and cost; and incorporate local foods.
Smarter lunchrooms	A member of the evaluation team or Team Nutrition will complete the Smarter Lunchroom scorecard in each intervention school. Each school will receive a summary of the fall results in order to identify changes that could improve their lunchroom.
Food service staff culinary training	School nutrition professionals will attend a 4-hour culinary workshop. The workshop, Practical Skills for Preparing Quality Meals, will be facilitated by the Institute of Child Nutrition (ICN) and will be offered at two regional locations. Attendees will learn the acronym PROUD to learn five key steps to preparing nutritious meals that look and taste good too: Plan food production; Review the quality scorecard and standardized recipe; Organize; Use the right culinary technique; and Deliver a quality product. ICN training evaluations will be administered to participants and reviewed for training effectiveness.

Data Collection Activities

The University of Iowa evaluation team was responsible for collecting and analyzing all data for the project. All control and intervention schools agreed to participate in the evaluation components. Data collection activities differed between control and intervention schools as shown in Table 3. The Smarter Lunchrooms Scorecard was only completed in the intervention schools because changes in scores was not a major evaluation outcome. Control and Intervention schools were compensated following the completion of the student surveys at both the pre and post intervention time points. All evaluation activities were determined to be non-human subjects research by the University of Iowa institutional review board.

Table 3. Data collections schools participated in

Data Collection Activity	Description	School Type	
		Control (n=10)	Intervention (n=10)
Pre and Post Student Surveys	The survey was designed to measure students' nutrition knowledge, attitudes towards fruits and vegetables, preferences for selected fruits and vegetables, and awareness of MyPlate. It was administered to each 4th grade section by their teacher pre and post intervention.	X	X
Pre and Post Production Records	Food service directors or kitchen managers completed a food production record form each day for one week pre and post intervention.	X	X
Smarter Lunchrooms Scorecards	The Smarter Lunchrooms Scorecard was completed by a member of the evaluation team pre and post intervention.		X
Post Focus Groups with Cafeteria Coaches	Focus groups were conducted with cafeteria coaches in the spring by a trained moderator. The focus groups were conducted to determine what was successful and what was challenging around the cafeteria coaching component of the intervention.		X
Post In-depth Interviews with Food Service Directors, Nutrition Educators, and Teachers	Telephone interviews were conducted with a number of program stakeholders. The interviews were conducted to determine what was successful and what was challenging about the project over all as well as the nutrition education component of the intervention. The nutrition educator interviews used a more extensive interview guide than the general project stakeholder interviews.		X
Site Visits for Fidelity checks	Members of the evaluation team visited intervention schools to observe either a nutrition education lesson or a lunch period where cafeteria coaching was occurring.		X

Student Surveys

Methods

The Student Knowledge, Attitudes, and Awareness Survey was designed by the University of Iowa Evaluation Team to understand fourth grade students' nutrition knowledge, attitudes towards fruits and vegetables, preferences for selected fruits and vegetables, and awareness of MyPlate. The survey contains questions based on *Serving Up MyPlate* curriculum content as well as questions adapted from previously used measures.[14-16] Table 4 describes each construct that the survey was designed to measure. We tested the survey for readability and comprehension prior to its implementation. Evaluation team members conducted ten think alouds with fourth grade students in three rounds. Think alouds are a method of cognitive interviewing where the participant speaks everything they are thinking aloud while completing a task.[17] After each round of interviews, the team met to discuss and make changes to the survey. The survey is shown in Appendix A. Fourth grade teachers received packets that contained a cover letter, an implementation protocol, a class roster form, and numbered surveys, along with pre-paid envelope to mail completed surveys and class roster form back to the team. Prior to implementing the survey, each fourth grade teacher was provided with a link to a pre-rerecorded webcast describing the survey implementation protocol. Each student received a specific code in order to track individual-level data. The assessment took about 15-20 minutes and teachers read each question of the survey aloud to minimize issues with students' reading comprehension. The pre- and post-intervention surveys were administered in fall 2017 and spring 2018, respectively.

Table 4. Description of survey constructs developed for the Healthy Schools Healthy Students Student Knowledge, Attitudes, and Awareness Survey

Construct	Description
Knowledge	We developed fourteen items to measure nutrition knowledge based on the Serving Up MyPlate curriculum content.[13]
Fruit attitudes	We used five items to measure fruit attitudes. One item on the original scale was not included.[16] Cronbach's alpha was calculated as 0.73 pre-intervention and 0.74 post-intervention.
Vegetable attitudes	We used five items to measure vegetable attitudes. One item on the original scale was not included.[16] Cronbach's alpha was calculated as 0.83 pre-intervention and 0.84 post-intervention.
Fruit preferences	We adapted six items to measure fruit preferences.[14]
Vegetable preferences	We adapted six items to measure vegetable preferences.[14]
Consumption	We used two items to measure fruit and vegetable consumption.[15]
MyPlate Awareness	We developed two items to measure awareness of MyPlate.

After completing the surveys, the schools mailed the survey and class rosters to the University of Iowa. A team of trained graduate research assistants entered survey data for each school into Excel. One graduate research assistant combined the individual school survey data, cleaned the data, and performed any necessary recoding or transformations.

Scores were calculated for knowledge, fruit attitudes, vegetable attitudes, fruit preferences, vegetable preferences, consumption, and food group knowledge. For calculating the knowledge score, items were not included if all schools had over 80% of their students responding correctly in the pre survey. Correctly identifying the name of MyPlate (question 46) was used as the outcome for MyPlate Awareness, as over 97% of students in both intervention and control schools had seen MyPlate previously. Appendix B shows detailed information of how variables were coded, how each score was calculated, and the range of possible values for each score.

Analysis

First, frequencies and descriptive statistics were produced. Next, we conducted Mann-Whitney U test comparing the difference of median pre and post scores for each score between intervention or control schools. This test is appropriate for data without normal distributions. We estimated the effects of the intervention on all outcome measures (knowledge, food group knowledge, fruit and vegetable attitudes, fruit and vegetable preferences, consumption, and MyPlate awareness) using

difference-in-differences (DID) regression models with student fixed effects. The evaluation did not collect student level variables (such as student sociodemographic variables) beyond what was asked in the survey, and school level data was collected but is not used in these analyses because the modeling strategies used accounts for these factors.

Because the intervention assignment is randomized at the school level, potential bias may still exist at the classroom and student levels. The intervention period was short and factors that might contribute to potential bias should not have changed. We used fixed effects to control for time dependent observed and unobserved factors at the school or student level to minimize potential bias. Also because students did not change schools or classes during this intervention period, student fixed effects controls for bias from school and classroom factors. These models accounted for the nested structure of the data (observations within students within schools) and the variances were clustered at the school level. We report the results of student fixed effects models because the results using school or school-classroom fixed effects were similar.

For the DID regression models with student fixed effects the score*treatment interaction term (or DID estimator) measures the effect of the intervention by comparing the difference between the average outcome in the intervention and control schools, before and after intervention. We report this value for all outcome measures. When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

Results

A total of 490 students from intervention schools and 567 students from control schools completed both pre and post surveys and were included in this analysis. School level attrition and student level attrition are shown in Table 5 and Table 6. One intervention school failed to return their posttest surveys. The overall attrition rate was 5% at the school level and approximately 5% at the student level. The differential attrition rate was 10% at the school level and 1.60% at the student level.

Table 5. School level attrition rates for completion of the student survey

Intervention or Control	Assigned	Analytic sample	Attrition rate
Intervention	10	9	10%
Control	10	10	0%

Table 6. Student level attrition rates for completion of the student survey

Intervention or Control	School ID	Assigned sample	Analytic sample	Attrition rate
Intervention	1	76	72	5.26%
Intervention	2	49	45	8.16%
Intervention	3	92	87	5.43%
Intervention	4	70	68	2.86%
Intervention	5	41	40	2.44%
Intervention	6	30	27	10.00%
Intervention	8	102	95	6.86%
Intervention	9	25	21	16.00%
Intervention	10	38	35	7.89%
Total		**523**	**490**	**6.31%**
Control	11	13	13	0.00%
Control	12	114	109	4.39%
Control	13	99	92	7.07%
Control	14	116	111	4.31%
Control	15	37	36	2.70%
Control	16	32	30	6.25%
Control	17	10	10	0.00%
Control	18	112	108	3.57%
Control	19	14	13	7.14%
Control	20	48	45	6.25%
Total		**595**	**567**	**4.71%**

Frequency distributions and descriptive statistics for survey results are shown in Appendix C. Figure 1 shows the percent of students responding correctly to knowledge questions that were included in the overall knowledge score pre and post intervention. Figure 2 shows the average values of the knowledge score and Figure 3 shows the average values of the food group knowledge score. Figures 4 through 7 show the average values of the scores for fruit attitudes, vegetable attitudes, fruit preferences, and vegetable preferences. Figure 8 and 9 show the proportion of each response for fruit and vegetable consumption respectively. Figure 10 shows the score for fruit and vegetable consumption. When asked if they had seen MyPlate, 97% or more of students in both control and intervention schools responded to having seen MyPlate before pre and post intervention. The number who correctly named MyPlate is shown in Figure 11.

Figure 1. Percent of Students Responding Correctly to Knowledge Questions Included in the Overall Knowledge Score Pre and Post Intervention for intervention (n=490) and control schools (n=567)

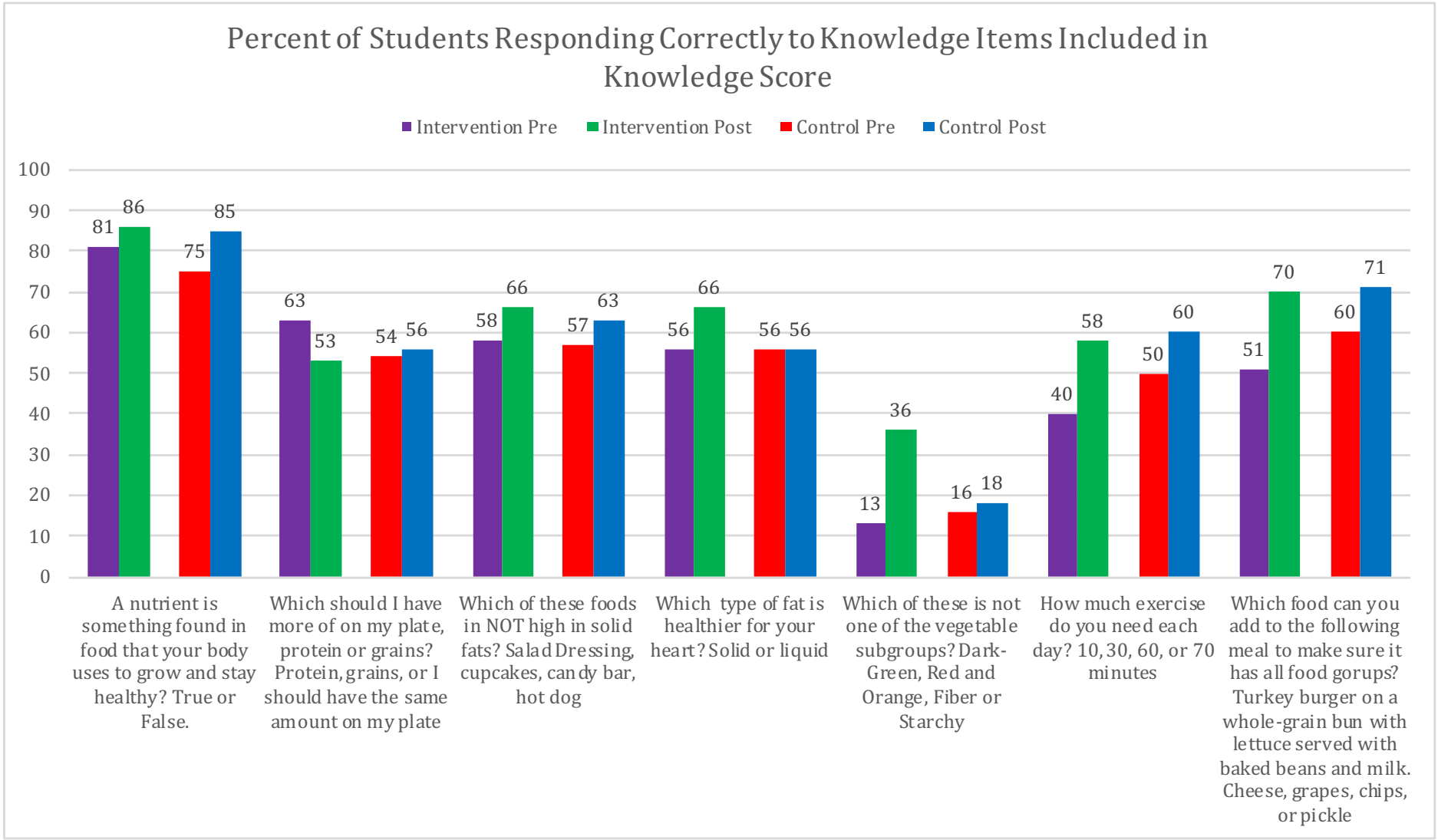


Figure 2. Average Value for Students' Knowledge Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

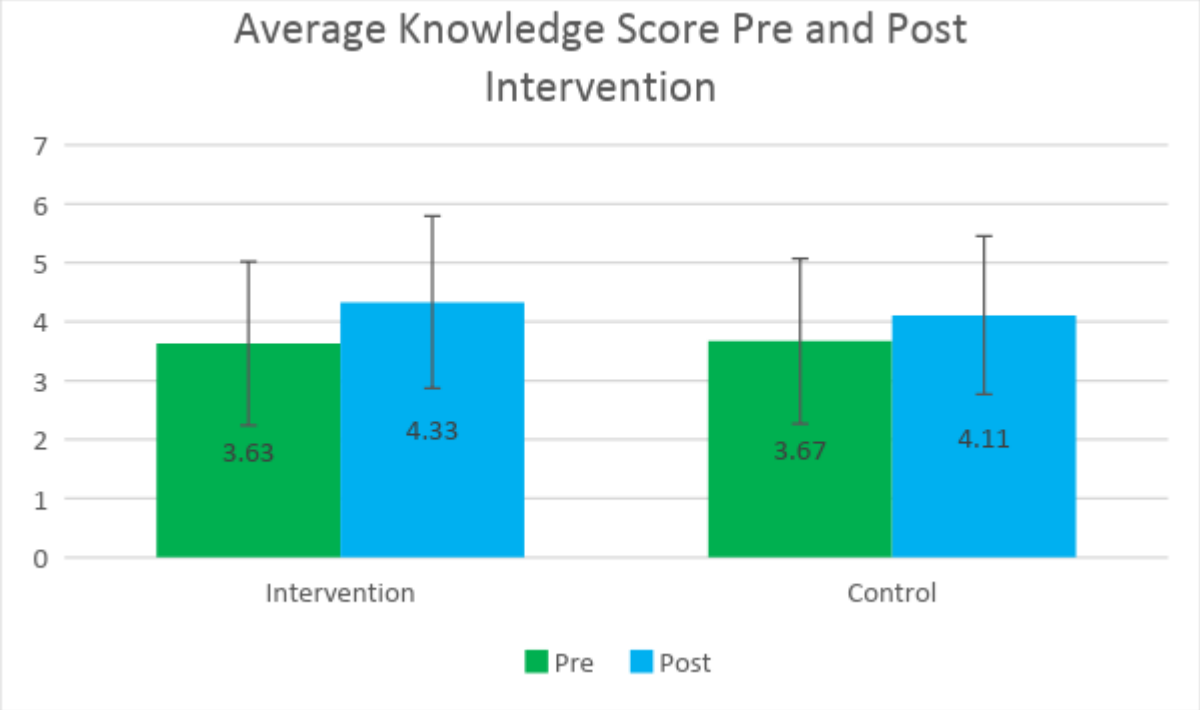


Figure 3. Average Value for Students' Food Group Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

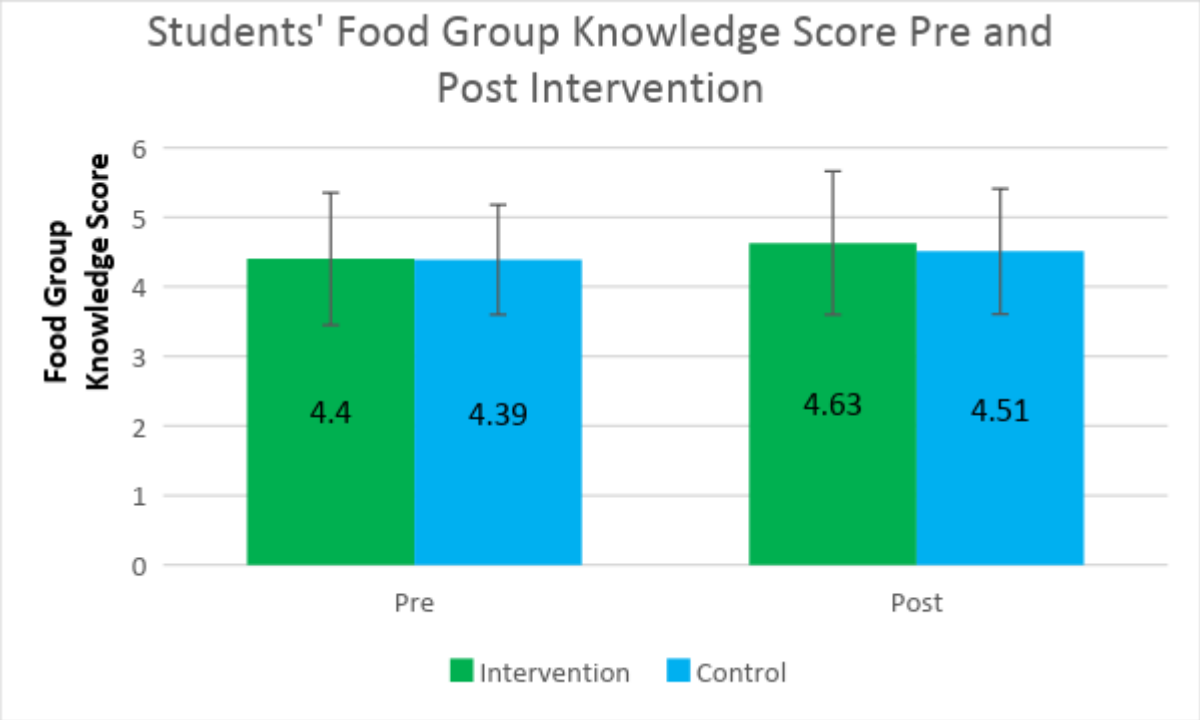


Figure 4. Average Value for Students' Fruit Attitude Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

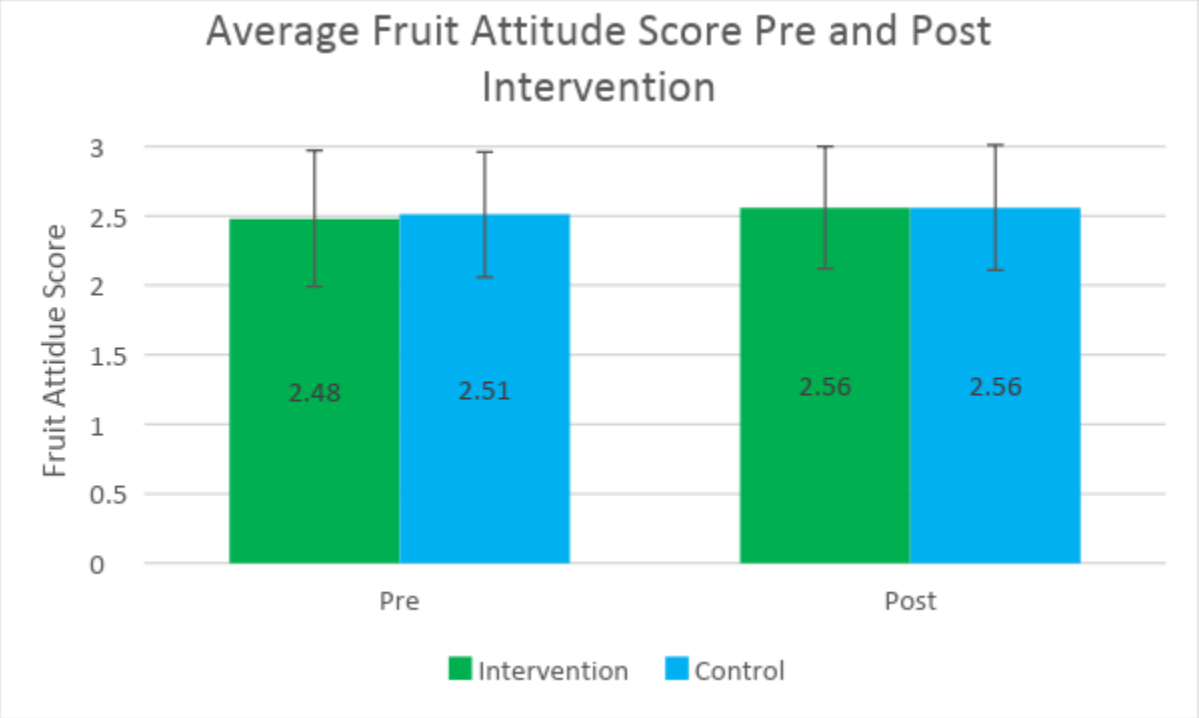


Figure 5. Average Value for Students' Vegetable Attitude Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

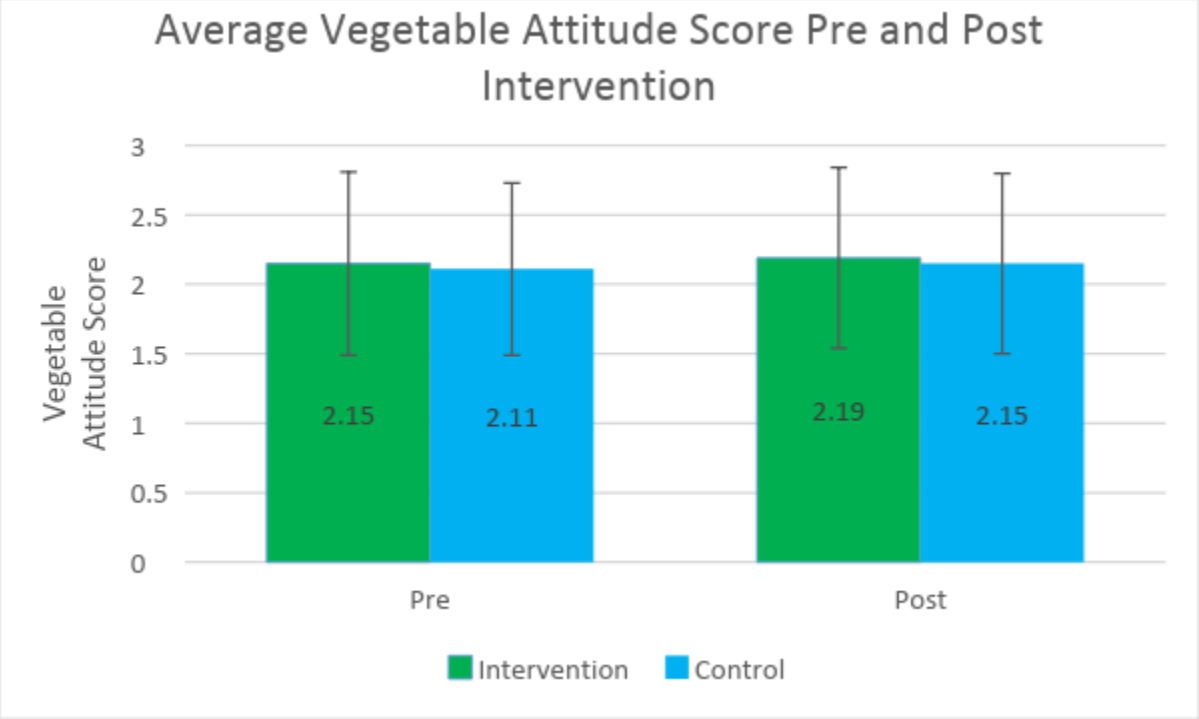


Figure 6. Average Value for Students' Fruit Preference Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

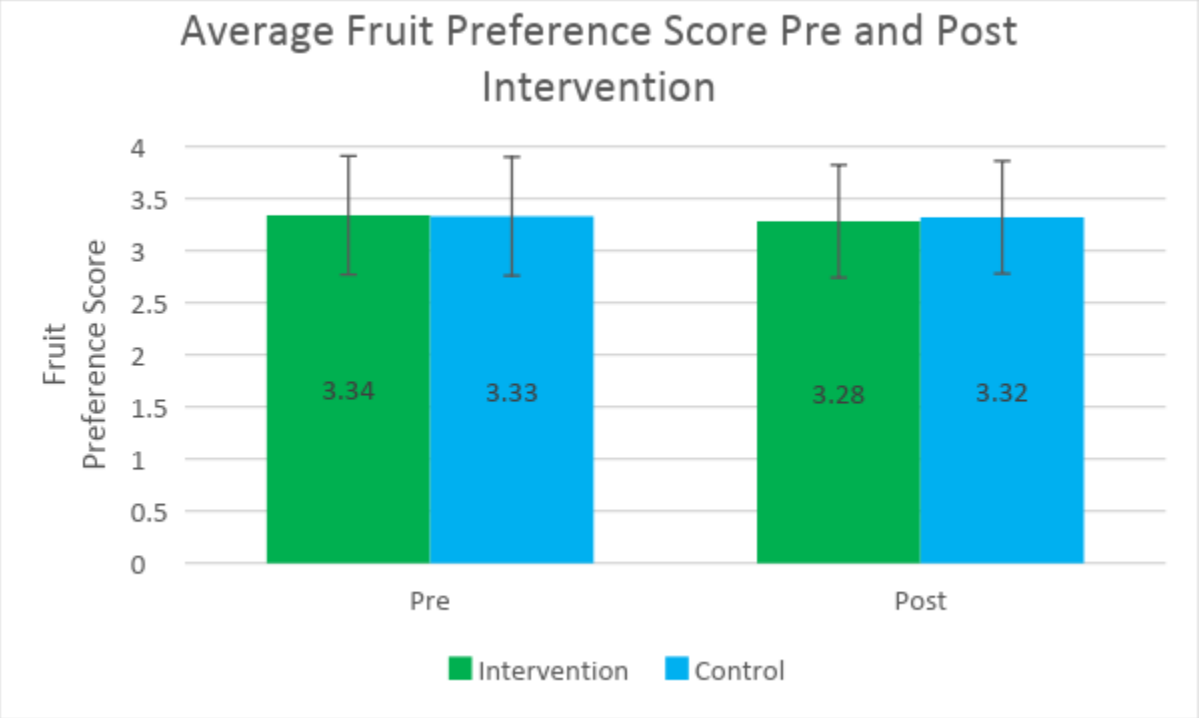


Figure 7. Average Value for Students' Vegetable Preference Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) with error bars representing standard deviation

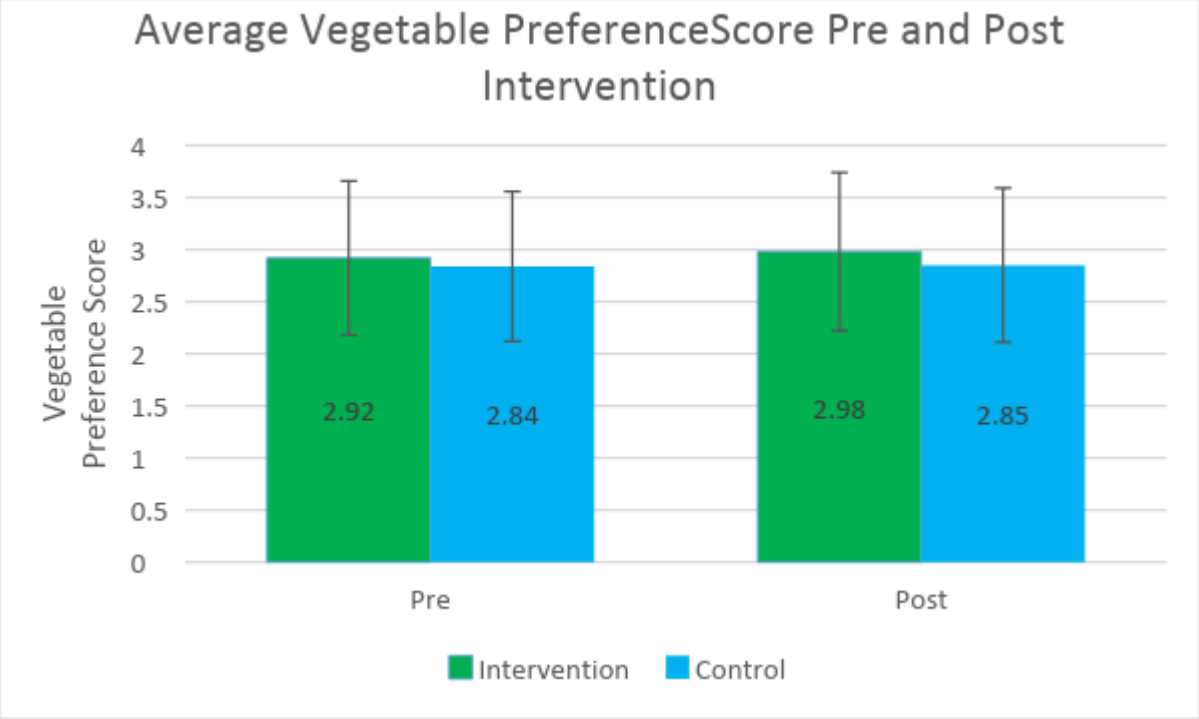


Figure 8. Proportion of Students' Responses to Fruit Consumption Question Pre and Post Intervention for intervention (n=490) and control schools (n=567)

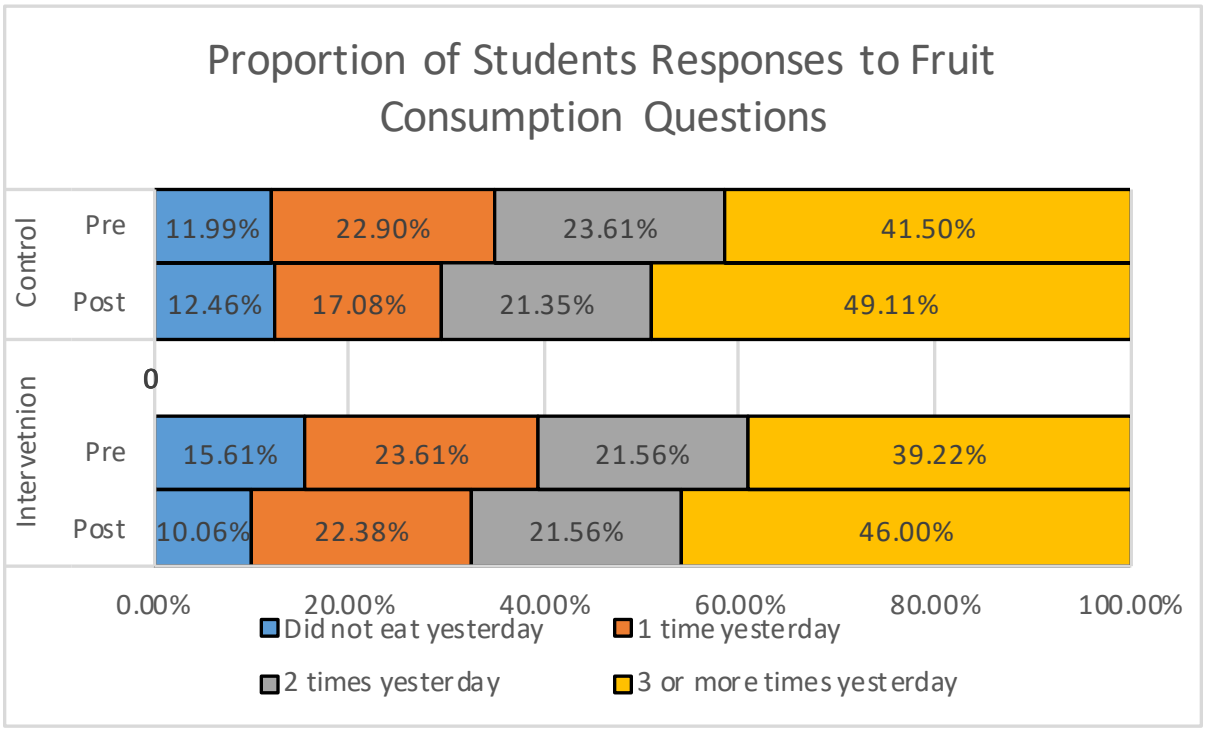


Figure 9. Proportion of Students' Responses to Vegetable Consumption Question Pre and Post Intervention for intervention (n=490) and control schools (n=567)

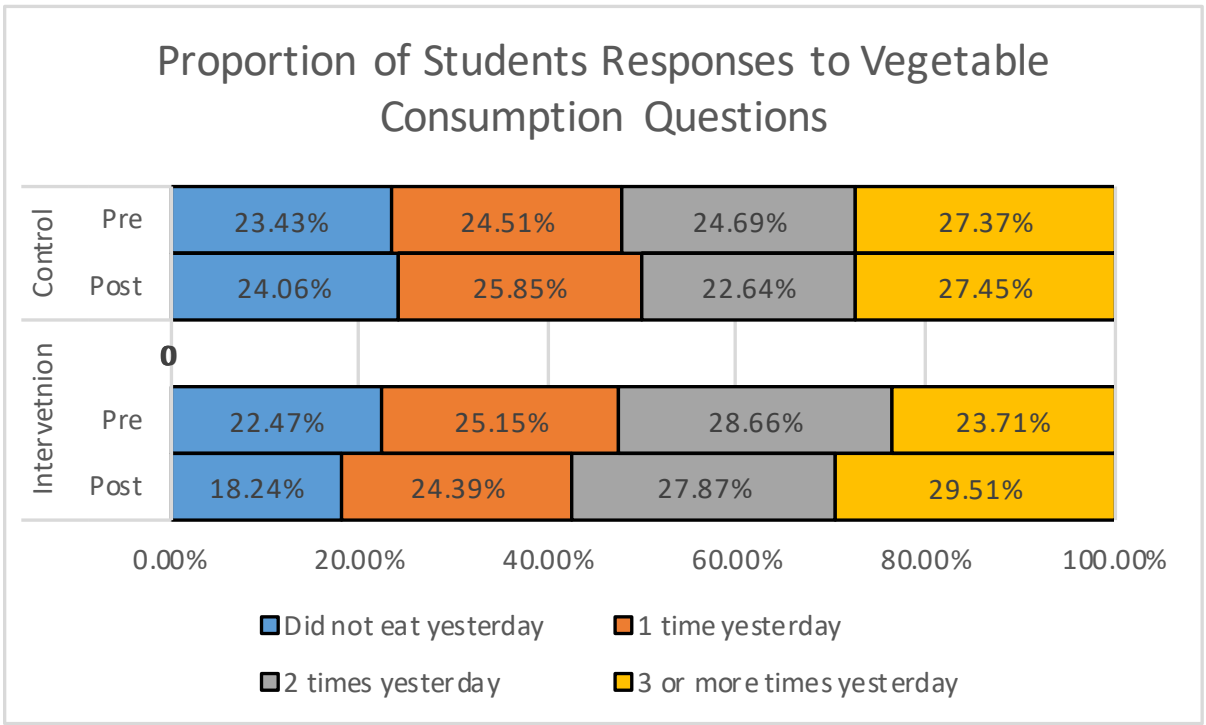


Figure 10. Average Value for Students' Fruit and Vegetable Consumption Scores Pre and Post Intervention for intervention (n=489) and control schools (n=563) with error bars representing standard deviation

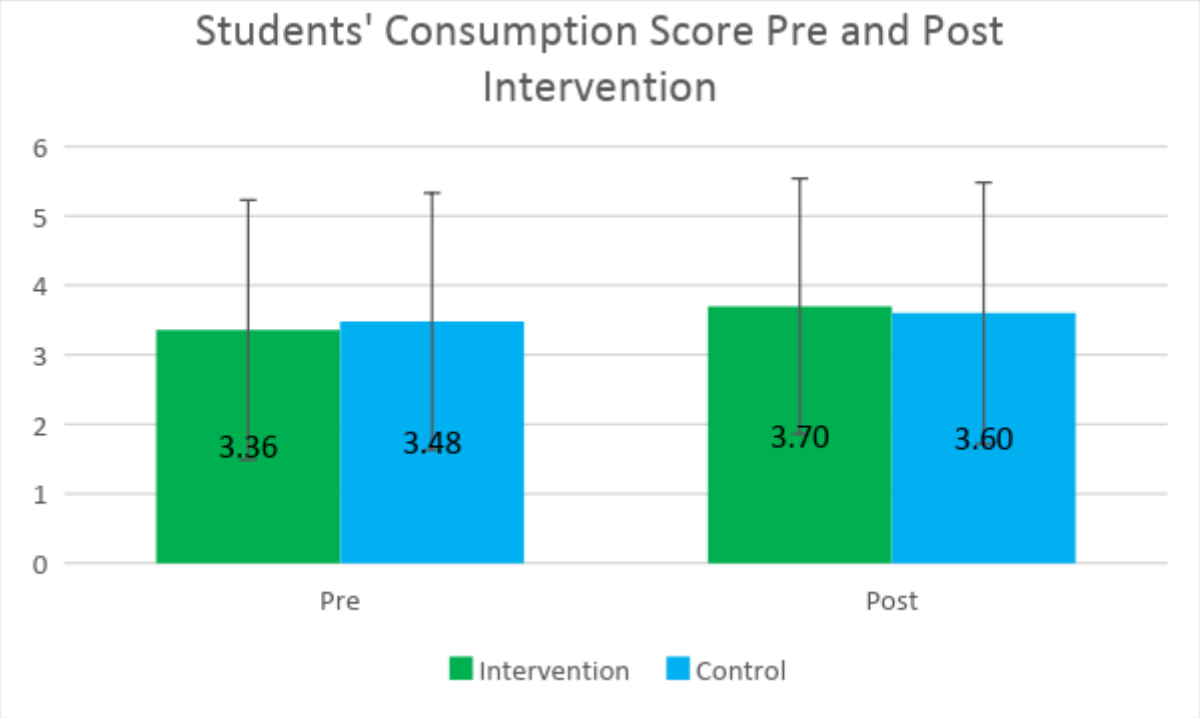
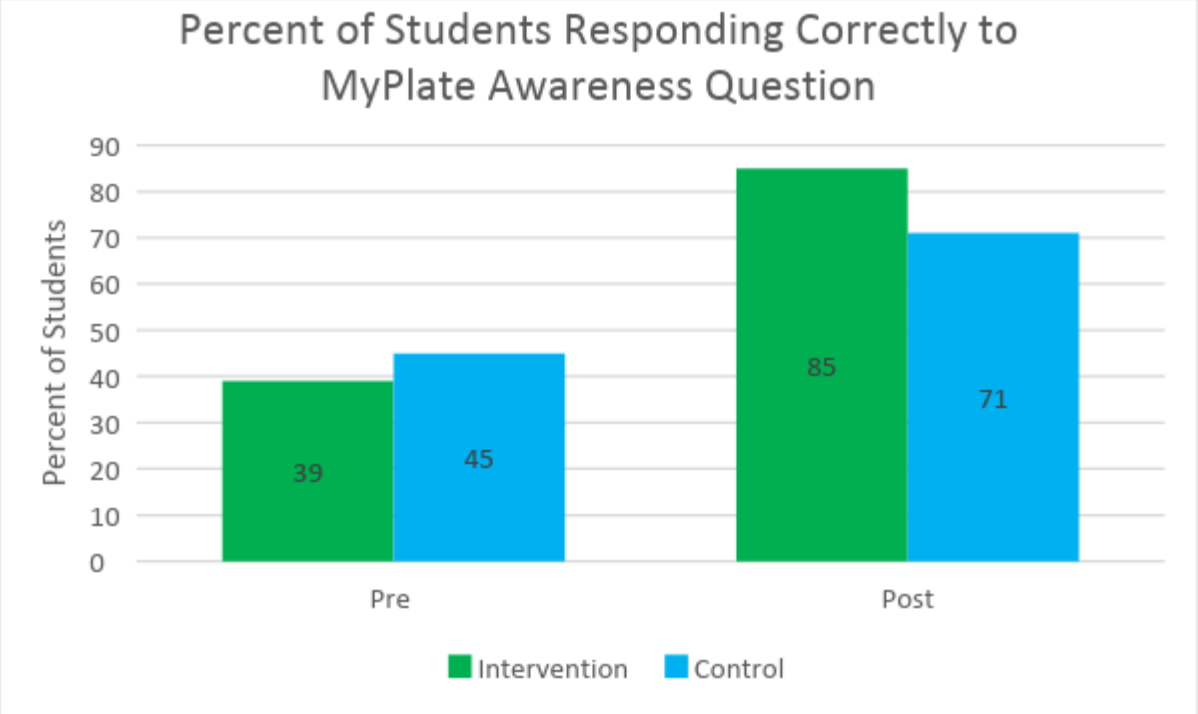


Figure 11. Percent of Students Responding Correctly to MyPlate Awareness Questions Pre and Post Intervention for intervention (n=490) and control schools (n=567)



Results of the Mann-Whitney U-Test are shown in Appendix D. Because children are nested in schools and classrooms, we need to control for the possibility that their answers might be similar to their classmates or schoolmates. The regression models used to do this indicate that the children in the intervention schools had an increase in knowledge and an increase in MyPlate awareness over the children in the control schools. This was true whether we were controlling for schools alone or for school and classroom. Table 7 shows the results of the regression models where student was treated as a fixed effect. Based on the regression models in Table 7, the intervention is associated with

a 0.273 point increase in knowledge scores (Figure 12) and a 0.205 point increase in awareness of MyPlate scores (Figure 13). Further analysis are presented in Appendices E, F, and G.

Table 7. Difference in Difference (DiD) Estimators from Regression Models Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Knowledge Score	**0.273***	**0.134**	**2.03**	**0.042**
Food Group Knowledge Score	0.104	0.103	1.01	0.314
Fruit Attitude Score	0.033	0.036	0.92	0.360
Vegetable Attitude Score	0.002	0.053	0.04	0.967
Fruit Preference Score	-0.036	0.044	-0.80	0.424
Vegetable Preference Score	0.062	0.057	1.10	0.273
Consumption Score	0.254	0.162	1.57	0.116
MyPlate Awareness Score	**0.205****	**0.050**	**4.14**	**<0.001**

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level

Figure 12. Mean Value for Students' Knowledge Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) Predicted by Regression Models

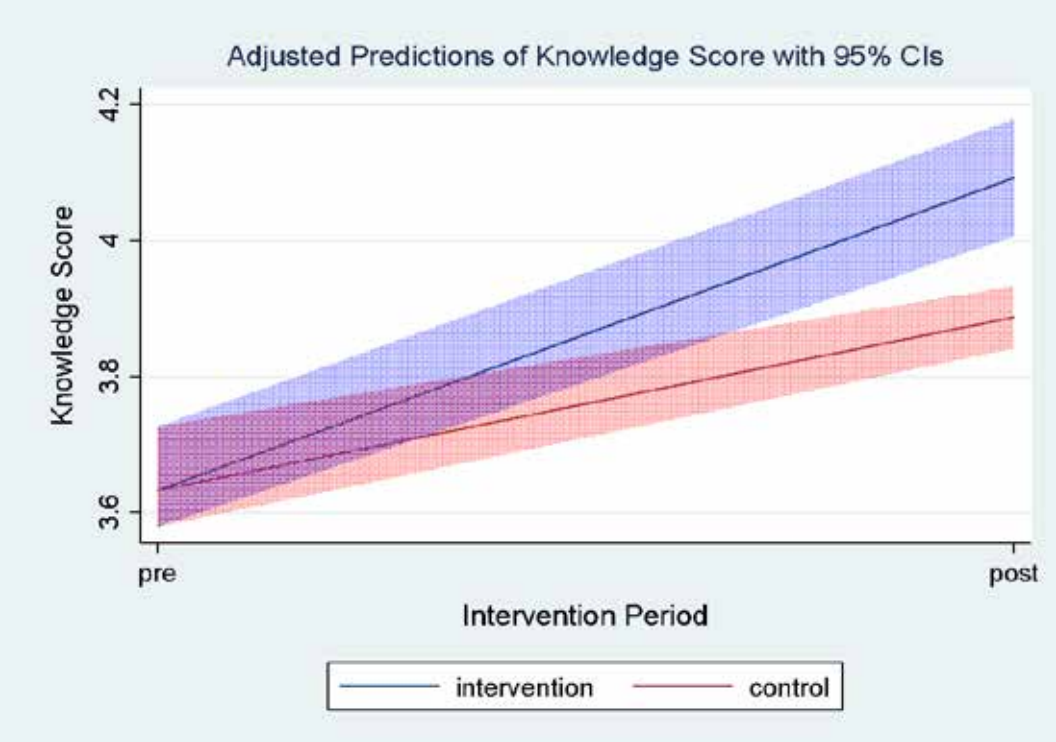
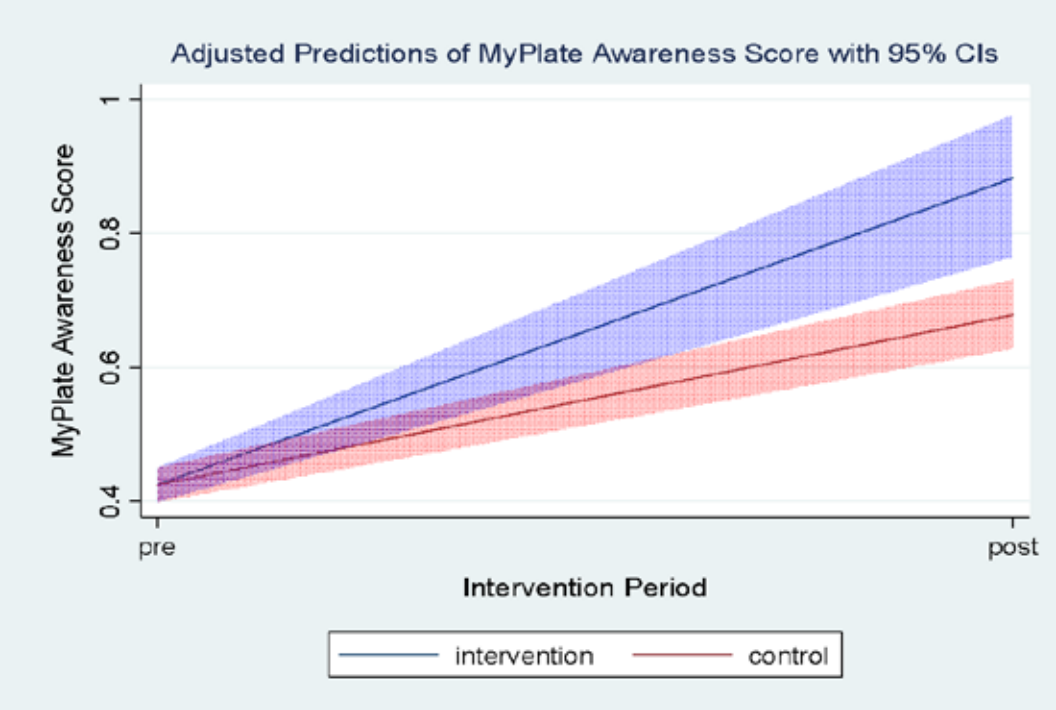


Figure 13. Mean Value for Students' MyPlate Scores Pre and Post Intervention for intervention (n=490) and control schools (n=567) Predicted by Regression Models



Limitations

When implemented pre-intervention, there were a number of questions where a high proportion of the students answered correctly (i.e. Table C1, C3, and C12). When calculating overall scores for knowledge and MyPlate awareness, questions were dropped when over 80% of students answered the question correctly. Finally, no previously validated tools were available to assess nutrition knowledge, food group knowledge, consumption, and MyPlate awareness in 4th grade students and preference and attitude questions were adapted from a previously validated tool.

Production Records

Methods

Food service directors were asked to complete food production record templates to report vegetable, fruit, and milk production for one week in the fall and one week in the spring. The template forms were based on existing food production record forms and developed based on previous work implementing nutrition interventions in schools.[18, 19] The form is shown in Appendix H. These templates were used to collect data for the number of prepared servings of fruit, vegetable, and milk. The number of servings for each vegetable component, fruit, and milk initially prepared and the number of servings leftover were calculated. To determine the number of servings produced, the number of servings leftover was subtracted from the number of servings prepared.

Analysis

The number of servings of each meal component produced were entered into a spreadsheet for each day of the week the school collected data. The number of servings were then compared from the fall to spring to assess potential changes in vegetable, fruit, and milk production during school lunch. Because some schools completed production records during a shortened week, the results for those schools were transformed to be representative of a five-day week to allow for a comparison between fall and spring.

Results

The number of schools increasing each meal component are shown in Table 8.

Table 8. Number of schools increasing production by meal component

Meal Component	Intervention schools (n=10)	Control schools (n=10)
Dark Green Vegetables	4	6
Red and Orange Vegetables	5	7
Beans, Peas, & Legumes	6	4
Starchy Vegetables	6	5
Other Vegetables	4	6
Total Vegetables	2	6
Total Fruit	2	4
1% White Milk	4	4
Skim White Milk	6	8
Skim Chocolate Milk	7	5
Other Milk	0	1
Total Milk	5	5

Scorecards

Methods

To measure food environment and wellness policies, the Smarter Lunchrooms (SLR) Scorecard was used.[20] The scorecard examines eight categories including fruits, vegetables, salad, milk, reimbursable meals, atmosphere, student involvement, and school community which are rated present or not present in the lunchroom on the day of the assessment. The scorecards were administered in the fall and spring by Team Nutrition staff or a member of the evaluation team.

Analysis

Scores were entered into a spreadsheet for each scorecard and an average score was calculated. Scores in the fall were compared to scores in the spring to assess the areas in which schools improved their scores.

Results

All interventions schools improved their score on the SLR scorecard. The average score for all intervention schools increased from M=22.40 (SD=5.19) to M=31.50 (SD=5.50). A summary of the SLR scorecard results are shown in Tables 9 and 10.

Table 9. SLR Scorecard Scores

School	Fall Score	Spring Score	Difference
1	26	30	+4
2	26	31	+5
3	26	42	+16
4	24	34	+10
5	21	23	+2
6	27	34	+7
7	27	37	+10
8	17	26	+9
9	18	30	+12
10	12	28	+16

Table 10. Number of intervention schools improving SLR Scorecard Score by category

Category	Number of schools improving score
Fruit	5
Vegetables	8
Salad	2
Milk	7
Reimbursable meals	2
Atmosphere	7
Student involvement	8
School community	10

Focus Groups

Methods

Focus groups with Cafeteria Coaches were conducted to assess what students learned, what was successful, what was challenging, and what could be improved about the Cafeteria Coaching component of the intervention. Focus groups were completed at six intervention schools by members of the evaluation team. Between three and six cafeteria coaches took part in each focus group. The focus group guide is shown in Appendix I.

Analysis

Focus groups recordings were transcribed. A codebook was generated based on the focus group guide and an initial reading of the transcripts. Two members of the evaluation team independently coded two transcripts to establish intercoder reliability. The two members then met and discussed any discrepancies, resolved any issues, and updated the codebook if needed. The remaining transcripts were coded to identify relevant themes.

Results

We conducted six focus groups with students who participated in the cafeteria coaching component of this intervention. The number of students who participated varied, but there were between three and six students actively participating in each focus groups.

Student Recruitment

Students were recruited to participate as cafeteria coaches in a number of ways. Three schools went to classes or emailed the entire student body asking students to volunteer, one school asked students who they thought would be good as cafeteria coaches to participate, and two schools selected students to participate because they were part of an existing club, the Future Farmers of America and another school used a Family and Consumer Science class.

> *"We came into class one day and we were asked if we wanted to volunteer for it, and all of us kinda said, 'Yeah, sure, that sounds like fun. We'll go and sit with the little kids and eat.'" CC_517*

> *"Our FFA advisor brought it up to us. She just came up to me in class and was like, "Hey, this is what we're doing. It's through the lunch program and you just go once a month on an early out and you eat with them and get to miss school and just sit and talk with them." CC_57*

> *"So, [Name 1] sent out an email to the whole high school and said, "I'm looking for volunteers for cafeteria coaches to eat at the elementary a couple times a month. Is there any volunteers?" Later there was six of us, I think, that volunteered to go. Two of us went at a time, and we all rotated, so we went a couple times a month to come here." CC_515*

Training and Preparation

The cafeteria coaches said that they had received little or no training. All groups recalled a school staff person describing the project goals, either while being recruited to participate or after, as well as the basic ideas behind cafeteria coaching. Some groups stated they also received training packets or discussed how to talk to the younger students about trying new foods and eating healthy as a group.

> *"We didn't really have as much training, but we talked through if kids would say this, what would you say back to them?" CC_54*
>
> *"We came in early one morning and she came and talked to us and she gave us this big packet that just said what we could tell students if they don't like it so we sound like, I don't know. It was how we could talk to them…She went over it as a group, each page and stuff. And we just kept it." CC_57*
>
> *"There was absolutely nothing for us. They just kinda threw it at us. They were like "Hey! Go down there; talk to the kids; try to get them to laugh; try to get them to eat healthier foods, try different things, and there you go!" Got about 30 seconds of training and called it good." CC_58_O*

Cafeteria Coaching Experience

Cafeteria coaches from four of the groups stated they were in the lunchroom once a month, one group had coaches in weekly, but rotated who attended, and another group said they started weekly, but after a month and a half, they were no longer conducting cafeteria coaching.

Each group described the cafeteria coaching similarly. The coaches would attend lunch, disperse amongst the younger students, have conversations with them, and encourage them to try to new foods, particularly healthy options. Cafeteria coaches described a number of ways they used to talk to the younger students, to encourage them to try new foods, and to model behaviors, such as eating all the food they were served and trying new things. The cafeteria coaches stated that they tried to change whom they sat with and to interact with new students each time. Some cafeteria coaches discussed being involved in the taste-testing component of the intervention specifically. One group described having a presentation board with facts and information about healthy foods.

> *"They said just kind of ease them into ... Like I had a kid that didn't like broccoli, and I told him, "Okay. Try to eat it." And he said that, "It wasn't bad." CC_58*
>
> *"We'd start the conversation with, "Hey, what are you eating today? Is it good?" Then we'd just get off topic from lunch and start talking about what they like to do in their free time."*
>
> *"Sports and activities and stuff like that." CC_517*
>
> *"You're kind of more there as encouragement…it helps having someone there that they cannot quite *exactly* look up to but they see an older person doing it so they're like, "Oh maybe I'll try to do it so I can act like a big kid. I think that helped them too." CC_57*
>
> *"We kind of like set up our board. And then we kind of came in when we got lunch, our lunch, with the middle schoolers, we went early. During our class we could go to the middle school lunch, got our lunch, brought it down there to the elementary, and then sat down with them and ate and then we'd them did you like it, did you try it, and then we had some of them try it in front of us. It was kind of funny to watch them eat something for the first time…And then they would say if they liked it or not, they'd be pretty honest, and then asked them, what other vegetables do you like? And those kind of questions." CC_54*

Likes

Cafeteria coaches reported that they enjoyed interacting with the younger students and the relationships they developed with them through the cafeteria coaching experience. Students also stated they liked helping plan, organize, or implement activities, such as taste testing or a health fair one school was putting on with the help of the cafeteria coaches.

"Yeah, you got to know each time, there's little girls that come up and hug me and are like, "Can you sit with me?" And I'm like, "No, not today, next time." So it's really cute" CC_57

"They have a lot to say….It's fun to hear the stories they have"

"And they're attached too, 'cause they know we come there, "Oh, they're here today!" So it's something they look forward to, which I don't know, gives us something to look forward to as well" CC_515

"I like getting out there with the little kids and teaching them this stuff. And saying, "I was that picky when I was your age, but now I like this, so maybe you should try it."

"I liked being able to help organize things. So I just got out of the classroom."

Yeah, get out of the class. Talking to the little kids."

"A lot of them I didn't even really know, so you get a chance to know what some of the kids coming out are gonna be like, I guess."

"Yeah, I liked planning stuff, like planning the health fair I thought was pretty fun, and then having like ... Put the lemons and limes on their food and see how they liked it." CC_58

"I really enjoy seeing them smile. They smile more and they look up to us 'cause they're so small and we're triple their size." CC_58_O

Dislikes

Two focus groups reported having no dislikes with the cafeteria coaching experience, while the other groups noted minimal problems. These problems were primarily logistical and included having to eat school lunch even if they did not like what was being served, problems with transportation, competing priorities, and not having enough cafeteria coaches to adequately cover the lunchroom.

"I don't think we had any troubles with the kids, but if we had homework that was due the next hour, we needed to go to study hall or whatever and do that."

"Yeah, that was probably the only thing, is that sometimes it was ... You have to have your homework done before, and you gotta remember that this is coming." CC_58

Some of the cafeteria coaches described not feeling comfortable working with younger students and that they *"got crazy at lunch" CC_517.* As discussed below, providing cafeteria coaches with further training on communicating and working with younger students could improve their experience.

"The first day I felt like there's a thousand eyes on me."

"There's some pressure."

"It's not that kids are very intimidating, but some of them, they kind of have like an attitude with you about things. And then, I'm like, okay. You just kind of know how to talk to them, so that they take things kind of seriously…Or, I'm not going to try it, you can't make me try it or something." CC_54

"I think it was when they got crazy at lunch…You'd sit down and you'd be eating a little bit and all of a sudden they'd bounce off the walls and start screaming. Oh I wanna go over there. Hey, eat this orange. But for the most part it was pretty fun."

"There was just some kids that were crazy with their food. They'd put ketchup on their pineapple and yeah." CC_517

Cafeteria Coaching as a Learning Opportunity

The cafeteria coaches reported that they had learned about working with younger students, leadership, and being a role model from participating in cafeteria coaching. Some students also reported learning about issues around school nutrition and food waste.

"How to not like just jump on a kid, and be like, "Hey! Let's talk about this." Just kind

of working your way in. Trying to make them feel like their your friends and stuff like that , instead of just, "Oh, hey, how's it going?" CC_517

"You kind of learn how to talk and behave around younger kids 'cause they'll act how they see older people doing, you have to be careful about it all."

"You have to be a good role model." CC_57

"I learned more of a responsibility thing. We're getting a lot of trust to go down there and eat with the kids and try to teach them lessons about health and food and stuff, and I feel like it was a big responsibility to take to be able to go down there and do that." CC_58_O

"Like learn how to be a role model in that position or not acting like you might with your friends, or being respectful and knowing that they're looking up to you, and they're going to want to do what you're doing." CC_54

Perceived outcomes

The cafeteria coaches attributed a number of changes they saw in younger students to cafeteria coaching. They stated that younger students were more willing to try new foods, were eating more of their lunches or of certain healthy items, were talking to their parents about wanting healthy snacks, and were more open and comfortable talking to the cafeteria coaches themselves. They noted that the connections formed between the older and younger students was a benefit in itself. Some cafeteria coaches also noted changes in themselves, such as being more social.

"Well, sometimes, I feel like if they just saw older kids trying it, they'd be like, "Oh, they're doing it, so I should do it." CC_57

"Well maybe the ones that complain about the food a little bit. You explain all the different rules that the lunch ladies have to go through, and to just get what they have, and how much it takes to even add more. And they realize that it's probable the best ... That they're doing their best to make it the best they can, I guess. Like the food the best they can." CC_58

"There was one kid, I sat by him 'cause he didn't have anybody else sitting by him and he finished all of his food. And when I went to go leave, one of the teachers was like, "Hey, he never really eats, so thank you for sitting with him." And I'm like, okay, yeah, then I really enjoy it and I feel like I'm making a difference." CC_58_O

"Yeah, cause I talked to some that are like, oh, this is good, like I'm going to tell my mom and dad that I want this. So that's making them eat healthier at home."

" Plant in their garden. A lot kids are talking about gardens and stuff too. I had this in my garden, where some of them would bring up that they want to plant it and stuff." CC_54

Recommendations

Cafeteria coaches provided a number of recommendations in order to provide a better experience. The main recommendation was to increase the number of coaches participating. Having more coaches present would allow the cafeteria coaches to ensure that all students in the lunchroom were able to be reached. In one of the groups, a student noted that fewer cafeteria coaches attended as the project went on, causing difficulties and eventually the cafeteria coaching stop occuring. Issues such as student buy-in to the project should be taken into consideration when recruiting students to participate in future projects.

"Some days we'd have like five or six of us and then other days we'd only have about four so I think just a set like amount of kids who are wanting to do it."

"Four of us spanning out to like 50-something kids all eating lunch, it was kinda tough." CC_517

The cafeteria coaches also stated that more training, preparation, and strategies and topics for talking

to younger students as well as clearer directions and expectations would have improved their experience. The cafeteria coaches often described feeling unprepared and "thrown into" the project.

> *"I wish someone just would've given me their names and a photo so I knew who was who. 'Cause I got kids mixed up."*
>
> *"A lot of the conversations that you'd start would usually be about sports or something. Maybe find some different topics too, that would relate to pretty much everybody." CC_58*

Some groups also recommended changing the structure of cafeteria coaching, either to have them in the lunchroom more often or to have them interacting with the younger students during other times, such as at recess. Having additional activities to do with the younger students beyond those in the lunchroom was also mentioned as a way to increase interest from the younger students and keep them excited about meeting with the cafeteria coaches. The cafeteria coaches believed that increasing the amount of interactions they had with the younger students would improve the outcomes associated with the project.

> *"Spend more time with them… Go to recess with them or something"*
>
> *"Yeah, spend more time with them. Have times that's not just in the cafeteria.*
>
> *"Or maybe even a time to-- if you did want to do mostly nutrition and learning about that stuff and not just trying new foods-- a time to just sit and talk about that food or something with them."*
>
> *"I think, do they have a classroom time hall so that when they had someone coming to talk about it? That's what most of them said; but maybe we come in with them too so we're there also." CC_57*

In-depth Interviews

Methods

In-depth telephone interviews were conducted to help understand the successes and challenges that were experienced during the implementation of the *Healthy Schools - Healthy Students* project. The interviews were done with general staff and school administrators, such as fourth grade teachers, food service directors, principals and other key contact from the 10 intervention schools. The general stakeholder interview guide is shown in Appendix J. Five trained graduate research assistants completed a total of 13 interviews. The interviews lasted between 5 & 18 minutes, with an average interview lasting around 10 minutes.

In-depth telephone interviews were also conducted with nutrition educators to explore perceptions of and suggestions on how to improve the *Healthy Schools - Healthy Students* project. The nutrition educator interview guide is shown in Appendix K. Two trained graduate research assistants completed a total of 8 interviews. The interviews lasted between 19 & 35 minutes, with an average interview lasting around 25 minutes.

Analysis

Interview recordings for the general stakeholder and nutrition educator interviews were transcribed. A codebook was generated for each set of interviews based on the interview guide and an initial reading of the transcripts. For each set of interviews, two members of the evaluation team independently coded two transcripts to establish intercoder reliability. The two members then met and discussed any discrepancies, resolved any issues, and updated the codebook if needed. The remaining transcripts were coded to identify relevant themes.

Results: In-depth interviews with General Stakeholders

Thirteen interviews were conducted. Interviewees held a number of roles in their schools including food service director (n=5), fourth grade teacher (n=5), school nurse (n=1), and principal (n=2). One food service director also served as wellness coordinator in their school. Interviewees either had applied to be a part of the project themselves or became involved due to their role in the school. Their

role in the project ranged from organizing and coordinating all aspects of the project to being very minimally involved (i.e. only observing nutrition education and administering the student surveys).

Challenges

Interviewees stated minimal problems with the project overall, but identified some areas where improvements could be made. While some interviewees stated having no challenges, they were less involved in the project and more involved interviewees, such as those who coordinated the project in each school, stated challenges that should be addressed in the future.

Interviewees indicated that they had underestimated the scope of the project and the time and effort needed to properly coordinate and implement a project involving multiple components. Clearly describing the project requirements and roles of individuals in the project could have prevented some challenges. For example, describing the amount of reporting could allow schools to better delegate duties and manage time or ensuring that the individual coordinating the project attends all trainings could ensure that all project requirements and duties are clear.

> *"You know, honestly, I think it was a bigger project than what I anticipated just in terms of the amount of time it took and the paperwork that it was. I just didn't anticipate that quite ... and perhaps I should have. But that was probably the biggest challenge with me watching this was just how much time it took for them" G_ WW_5.10.18*

Interviewees also stated that there was confusion among school staff involved in the project on the overall project as well as how to incorporate nutrition topics into the school day. For example, four interviewees stated that materials or activities delivered by the teachers in the classroom, i.e. the bingo activity and sending newsletters home, were difficult to implement with other classroom requirements and competing priorities of the teachers. One interviewee stated that they had not even attempted to implement the classroom bingo in their school. Interviewees stated that increased communication and direction from Team Nutrition and the evaluation team would have been helpful and allowed them to better implement the project.

> *"The biggest challenges, I would say, would be for me to implement the supplementary activities with fidelity. I have a class with some students with different learning styles that are pulled out at various times of the day, and so more of the core subjects, reading and math, were focused on than some of the extra dietary activities that we could have participated in" G_PJB_Delhi_510*

The cafeteria coaching component was also an issue at some schools. Three interviewees stated that it was challenging to arrange cafeteria coaching due to logistical, recruitment, and transportation issues. Examples of included: the high school having an open campus led to recruitment problems and the school being in a rural area making scheduling the cafeteria coaching difficult. Interviewees described solutions, for example recruiting students who had a study hall prior to the lunch period to address these issues.

> *"The biggest challenge for me was getting the high school students here to do the cafeteria coaching. Yeah. The rest of it was pretty simple, but that was a challenge" G_WW_5.14.18*

Finally, two interviewees stated that while it was not necessarily a challenge currently, funding any changes that were made, i.e. offering fresh instead of canned vegetables for lunch, may be difficult in the future. Since one of the goals of any intervention should be sustainability, addressing this challenge should be considered in future interventions.

Successes

All interviewees believed that the overall project was a success. When asked about particular activities that contributed to this, nutrition education lessons, cafeteria coaching, and taste testing were stated as being the most impactful. The major benefits include introducing students to new foods, providing them with needed nutritional information, and encouraging them to make healthier choices. Interviewees also stated that the students enjoyed these three components and were excited when they occurred. Interviewees believed that students had increased their knowledge and were

more aware of healthy food choices. Interviewees also related that some students were engaging with their parents around the foods sampled in the taste tests and were more willing to try new foods. Some of the interviewees also stated that they would participate in the project again if it were offered in the future or that students had asked about continuing the project moving forward.

> *"You know, it's just good for them to be exposed and I think that was-if you had to change things, please never change that. They need the taste-testing and the exposure" G_5_10_CM*
>
> *"I think that the taste testing in the cafeteria, exposing the kids to different foods and different ways to make them, that was probably the most successful because it reached the most kids" G_PJB_WBM_510*
>
> *"The kids are making better choices as far as what would be nutritious snacks. When they might share something about their weekend, and they would say, "Oh, well, we ate this," we often, in my class, I would have one student pipe up, "Oh, but that's not on my plate." That's a sometimes food type of thing. They were more aware of how to balance their diet and make better choices" G_PJB_Delhi_510*
>
> *"I would certainly do it again. If we had to do it all over again, I would definitely do it again" G_WW_5.10.18*

Recommendations

Interviewees provided a number of recommendations to improve the project and its outcomes. Recommendations included whom the intervention should be reaching, improvements to intervention components, better incorporating stakeholders, and keys to project success.

When asked about what age group this intervention would be effective for, all of the interviewees stated that fourth grade was an appropriate and important age for this type of program, and should be continued to be delivered to this age group. While some stated that the intervention could be delivered to younger children, they mentioned the curriculum would need to be adapted to be age appropriate. Interviewees did state that delivering nutrition education to more students (i.e. not those in 4th grade) would be beneficial.

Interviewees stated that changing the time or frequency of the nutrition education lessons could improve the overall project, but differed with some wanting more time devoted to the project while others recommended condensing the lessons to make them more manageable. In one school where extended time was given for the nutrition education lessons (40 minutes instead of the planned 30), they were not able to get through the entire lesson. Interviewees also indicated that certain components, such as emphasizing physical activity, could be better incorporated into the nutrition education component of the intervention. Interviewees also stated that incorporating parental involvement in nutrition education or other aspects of the project could provide additional opportunities for intervention.

Additionally, three interviewees discussed improving the cafeteria coaching component of the intervention by increasing the frequency of visits, providing more training to the cafeteria coaches, and selecting appropriate students to act as the cafeteria coaches.

Interviewees also mentioned increasing the involvement of the 4th grade teachers by providing them with a larger role and providing more training as a way to improve project. As mentioned in the challenge, intervention activities the 4th grade teachers were asked to deliver were poorly implemented, and further involvement in the project could improve this. Additionally, one interviewee described setting up a clear communication chain and an events calendar for the project to ensure all individuals involved in the project were kept up to date and aware of what was going on and which activities should be being implemented.

Interviewees also stated that involving other school staff, such as health or gym teachers as well as food service staff, could improve the project. One interviewee specifically called for increasing interactions between students and food service staff as a way to improve the intervention. Interviewees stated that buy-in among school staff was a key factor of why the project was successful in their schools, and further involving additional stakeholders could increase buy-in amongst school staff.

Finally, trainings for those involved in the project, particularly the Kick-Off event offered by Team Nutrition, were important for school staff to fully understand the project components and expectations. One interviewee recommended that in the future, the key contact person in the school should be required to attend the Kick-off, as that is where the project details were presented.

> *"I think it's important to have people have buy in before you get started. Everybody on our team was really excited to do this. And I think that's what made it successful" G_WW_5.10.18*

Results: In-depth interviews with Nutrition Educators

Nutrition Educator Characteristics

Of the eight nutrition educators that were interviewed, four were dietitians and the remaining four were a combination of workers from within the schools themselves (Food Corp Service Worker and Food Service Director) and outside the school (Iowa State University Extension and Outreach and a Wellness Coach). Most had experience delivering nutrition education, however only a few had delivered nutrition education in schools with younger students.

Project Involvement

Nutrition educators, who were not school based, were recruited to provide the nutrition education by a staff or teacher at the schools. Each said that they were contacted due to their position or a previous relationship with the school. For the two school based nutrition educators, one self-selected to provide the nutrition education because it fit well with their current position, while the other said they were told that they would be delivering the nutrition education. The two school based nutrition educators were involved with other aspects of the project, including the cafeteria coaching.

Implementation

To prepare for the lessons, all nutrition educators said that they would review the lesson material provided in the binder. Everyone said that the lesson materials were very clear and everything was laid out, making it easy to prepare to deliver the lessons.

> *"I use[d] the resources that were given to me. They were wonderful…" NE-1*

> *"Lessons, I felt, were pretty laid out so I had the educational kit, so the food models and the lessons and the binder and all that. It was pretty laid out" NE-6*

Each commented how they would also try to make the lesson their own, while following the lesson plan and topic to be covered they added unique touches to their delivery of the lesson.

> *"Well, they gave me the binder and I looked through it, and then I did my own research online to get some additional information, just some fun facts. More fun facts, they really seemed to grasp on those. And then I did an outline of what I wanted to do, what I wanted to accomplish in that session." NE-5*

> *"Sometimes I would look at it and maybe do a different twist because I had something more hands [on] and maybe that I've accumulated over the years that I would maybe bring in instead of maybe what was recommended on the program, but it was still the same content." NE-2*

The nutrition educators all said that there was minimal prep work to be done, such as preparing the worksheets for the lesson or other supplies. Nutrition educators each described that the coordination with the schools was an easy process, with most setting the dates from the beginning of the project. All said that the school contacts were easy to work with and accommodating.

All of the nutrition educators said that the day of process was very easy for them, where they reviewed the lesson, gathered materials, and delivered the lesson. All but one of the nutrition educators said they had 30 minutes of class time to deliver lessons, with one nutrition educator saying they had an hour of lesson delivery time. Three nutrition educators said that they delivered the lessons to all fourth grade classrooms at once in a combined session. All nutrition educators said

they held all six sessions with one saying *"Yes, but did we deliver all six sessions to the full entirety? No" NE-8.* Overall, the nutrition educators reported that the activities were easy to deliver to students.

Appropriateness of Lesson Content

When nutrition educators were asked about the appropriateness of the amount of content, they all said that the lessons had plenty of content to fill the 30 minute delivery time. However, most said that because there was so much content they would alter the lesson content to stay within the 30 minute time frame.

> *"I would say I covered the basic information but if there was anything to do activity, we didn't do it because there just wasn't time to do the activity part. So I basically covered the information. I guess there was times they said you could do additional this, additional that" NE-2*

> *"Yeah. I think the lesson plans had just an abundance, like almost too much materials, too much ... so I would have needed more time to cover everything in the way that I believe that it wanted to be covered, if that makes sense" NE-4*

> *"I did feel that there was a lot of material to cover in just 30 minutes, so if I knew I was gonna be short on time or I was gonna run out of time, I probably didn't hit everything, but I kinda just had to make a judgment call based on how much time I was going to have, and what the most important parts of the lesson were" NE-7*

The nutrition educators said that all of the material built well on each other. All nutrition educators said that they thought that overall the lessons seemed age appropriate, except for a few specific activities.

> *"I think one of the first lessons I did, they were all supposed to have ... food, like attached to their back or something, and they were supposed to walk around and ask each other questions about and try and figure out what food they were. Okay, so kids at this age do not know how to ask the right questions. So that did not work" NE-3*

> *"However… there were a couple songs in there and my students ... I did it once. I don't know if there was more than just one time in there but I did it with one class and they all looked at me like, this is really not fun, so I didn't do it with any other classes" NE-4*

Changes to Lesson Delivery

At times, nutrition educators said that they had to make changes to the lessons by altering the activities. This was usually because of time constraints. They described cutting out, most frequently, the physical activity and music activities.

> *"…Sometimes I just shortened some if it so that we could get on to the activity that needed to be done. But the basic concept I got across, maybe just because it's short and sweet." NE-2*

However, in a few instances, changes were made to the lesson delivery because of logistical issues.

> *"Yes, I did have to switch one session only because our distribution center here in town where I was getting our taste-testing items… Had a problem getting the tangelos in. So I had to switch those and wait one month until the tangelos were a better quality, and enough of them to spare" NE-4*

Changes to lessons were also made sometimes to make lesson delivery more feasible for the classroom. For example, most educators described making changes to the sugar lesson.

> *"So, for the added sugars in April, on their worksheets, I didn't have them individually do the sugar cubes by themselves because it was a cluster for one class. Like they all just wanted to eat it and they were being incredibly disrespectful so instead we did it as an entire classroom so everybody got to see how much sugar it was instead of*

everybody doing it for themselves. I mean, they did the math and whatever but I just did it up front" NE-4

"This week we did sugar intake, I put actual sugar. I know it said to take the cubes, but we put them in a cup. I was like, "If you drank a can of pop you might as well drink this sugar right here" NE-5

Perception of Lesson Activities

Nutrition educators described what they perceived to be the most effective activities at impacting students' knowledge and attitudes regarding fruits and vegetables. They overwhelmingly reported that taste tests were the most powerful influencer on the students with some saying additional activities like worksheets and the oral nutrition education also making an impact.

"The taste-testing… Yeah, we stood at the end of the line, the food line. And just automatically handed everyone whatever we were taste-testing. Then once everyone was sitting down, then we all took a bite together, so there was no "Yuck" factor of someone saying, "Oh, I tried it and it was gross" before someone else had a chance… And we talked about, we don't "Yuck" other people's "Yum's." That we all have different tastes. A lot of them I know would've never tried these foods if they hadn't been given this opportunity. And then the voting, there's a lot of cheering… Yep, that was a fun thing. I think that attitudes changed on trying new foods, and being brave enough to actually do it" NE-1

"I'm 100% sure that they liked the taste testing the most and going back to your last question, a lot of my students attitudes changed about spinach when I served it with some balsamic vinegarette, because first of all, they were like, Ew, spinach is gross, which is hilarious because everybody asked for seconds and then, they were like, why aren't you giving us ranch, so we talked about, this is a healthier alternative and yadda, yadda, yadda, and they really liked the dressing too, so I think that really changed their attitude. Again, tasting usually does" NE-4

"I would say that the actual taste tests were by far the most popular and probably the most hands on and memorable for them to think about in learning about that food and thinking about ways they could eat it and try it" NE-6

"I would say I think teaching the taste sampling is one of the most effective ones. I think research shows that children respond more to taste than they do like talking about health. So, I think the more you can incorporate taste in any of it would be beneficial" NE-8

The nutrition educators each had examples of the activities that their students enjoyed the most and least. While taste tests were described as the activity most often enjoyed, some additional activities were also described as enjoyable to their students. Activities students liked the least were often tied to difficulty of the activity or those that were less interactive.

"Oh, no, they were very excited. Very excited. And like I said, the beginning of the week that they knew I was coming they were like, "What are we taste testing? Have you tried it?" That was always what they asked me. "Have you tried it yourself?" And my staff was just almost excited as the kids, because when it would come in on the truck they would get out and, "Can we try it today?"" NE-5

"The most was the taste testing…And ... I don't know if I should say the least, but I'm just gonna put it out there is the group activities where they came up with nutrition planning or they had to make a super snack or they had to make a meal for a nine-year-old girl, sort of thing. So that actually took quite a bit of time and I don't know if they got a whole lot out of it. Good in concept, but the application, I think, was tough" NE-7

"Anything that was hands on I think they liked more. So, anytime they took could like sort things out with the food models that were there. Yeah, I think anytime they

could make it more interactive, they did better with it. It didn't really matter what the subject was as long as it was interactive, I think they did better with it" NE-8

"I think they really liked the sometimes foods or the added sugars because we got to talk about foods that aren't healthy for you. And they liked to talk about that" NE-4

"Anything that was hands on I think they liked more. So, anytime they took could like sort things out with the food models that were there. Yeah, I think anytime they could make it more interactive, they did better with it. It didn't really matter what the subject was as long as it was interactive, I think they did better with it" NE-8

Project Success

Nutrition educators said that their students demonstrated their retention of the lesson information in several ways. This included being able to recall the previous lessons materials and also by self-reported and observed behaviors.

"Well, they use it during their lunch, for sure. They asked if they could have jicama and tangelos on their salad bar. I know a lot of them went home and told their parents the topics that we talked about, [be]cause we live in a very small town. So I'd see parents in the store and they'd say "Quit telling them all this stuff, when I open a soda they are always yelling at me about how much sugar's in it." Things like that. So I know they're taking it home" NE-1

"So I have them use it at lunch, quite a bit, so we talk a lot, like a lot, a lot, a lot, about how much sugar is in their chocolate milk and I can already see a ton of students using that because a lot of students have switched to white milk, which makes my heart so happy" NE-4

"So this one kid said, "Oh, I go home and eat chips every day. Do you think that has fats and oils?" And I said, "Yeah, it does." So he came back the next week and said, "When we went and got groceries I talked mom into buying baby carrots and I've been eating baby carrots every day after school."" NE-5

"Yeah. So, I would deliver the lesson, for example, in January. In February, when I would come back, I would do just a short little reminder or recap of what we had learned the last month, the previous time. And they were pretty good about remembering and recalling what the lesson was, and could give me some facts and figures about things they'd learned about it" NE-7

Nutrition educators reported that overall, the project was a success. They said that they believed students were able to try new foods, learn nutrition information, and that it was fun at the same time

Challenges

Nutrition educators also experienced some barriers to lesson delivery. These ranged from classroom issues (e.g., chatty students) to the taste test items not being available for purchase in the community. These barriers made delivery difficult for nutrition educators at times, but they had ideas for addressing such barriers.

"Overall, actually, the hardest for me was hauling the foods there and getting them… Through the facility, making sure that the template's good, things like that. And then, like, the pomegranates, those took some time to prep and cook, and the avocados. I mean, those were great fruits for them, but I just took it on myself and I'm sure other people would have the school order it or do it or however" NE-1

"They all said this fourth grade class is just a chatty class. So that was maybe a little bit of a challenge sometimes to get them back on track or keep them on track because they were very chatty" NE-2

"But I just thought that was really challenging for me, as an educator, to have to go out of my way to buy a food that kids won't even have access to. Like, I understand the

point of them trying a new thing but it should be trying a new thing that they're going to have access to. So that was a really big challenge for me" NE-4

"Yes, I think they understood the objective of it, but it's hard anytime you put three to five students there's a lot of distractions and the time that it took was pretty significant to actually get a completed project from you" NE-7

Sustainability

When asked if they would be interested in continuing to provide nutrition education to students, all nutrition educators who were interviewed replied yes. Reasons given for wanting to continue include enjoying the experience, believing that the nutrition education component of the intervention was worthwhile, and thinking that working with young children is important for establishing good dietary practices that will carry over into adulthood.

Recommendations

The nutrition educators had several recommendations for changes to improve the lessons and delivery. One recommendation, from multiple nutrition educators, was to add additional lessons.

"Maybe adding a little bit more on a dairy food group, you know, and talking about their grains and whole grains, and talking about what foods have carbohydrates in them, things like that. A lot of them say that bread is bad because it has carbohydrates, cause their parents are on a carb-free diet… Things like that. Expanding more on that. It would definitely take more sessions, though, to add those in" NE-1

"I don't know if anything was about dairy in it. I don't know if that one can be touched on even if they don't do a sampling or something like that. It's mainly in promoting fruits and vegetables I understand, but there was a little tiny little thing at the end, kinda just slid in, about whole grains when they did the crackers and the water. That was sort of just kinda slid in there, but maybe didn't necessarily fit as it was all fruits and vegetables. But, if it's going to be more holistic, maybe there is something more about trying something about a non meat protein" NE-6

Some of the nutrition educators said that adding a hands on component would be beneficial to the students. By adding a hands on portion students would learn about meal preparation and gain skills to prepare snacks at home.

"I think it would be really cool if they could make their own snacks, so there's a lesson called be the chef, I think and if we actually made something in that class, which is totally doable. Just a simple, like, even a yogurt parfait or something, then they could see that, oh this yogurt parfait has dairy, fruits, grain, and you could even put protein in there if you put some nuts in it. Obviously you have to watch for allergies though. But I just think that making snacks does wonders for them, instead of just writing down what they would make" NE-4

"I wish one of them could have been a little bit of food prep. Like make your own yogurt parfait, something like that. We get ready to run the summer program and we have kids that come in and volunteer and help us prep those kinds of things… Even to go in and make a fruit salad. Something that they can go home and say to their mom, "Hey, I did this at home" NE-5

The time element of the lessons was talked about by most nutrition educators, with most saying that it was difficult to fit everything within the 30 minute time allotment. It was recommended that the amount of material to be covered be shortened instead of increasing the length of sessions. Nutrition educators also had additional recommendations to improve delivery and for future implementers to consider.

"I think, to, like I said, just take it easy. Get down to a child's level. Everything isn't gonna go smoothly. They're gonna raise their hands, and tell you that they're grandpa is visiting this week when it has nothing to do with what you're talking about. Just

trying to keep on task and knowing that you're doing it just to better, for the future generations and that, we didn't know these things when we were that age either and it's important that they learn it now and can take it into their adult lives" NE-1

"I would just, you know just reading through the lesson ahead of time and then working through it. My parents are elementary education teachers and so are my sisters, so I grew up thinking about classroom behavior and what would work and what would not work. And I actually bounced a couple ideas off my sisters and, "What do you think about this?" And you know how could I make this activity work better? So just kind of reading through them ahead of time, looking for where a glitch might be" NE-3

"Just because of who I am, I think you should promote local foods in your lessons, so with the foods that are tasted, you could have it connect to things that are actually growing or things that could grow in a greenhouse if it's wintertime.so then they could have an actual connection to their food and I know that my students would have a connection with things like spinach, because we grow that in our garden. But I just think that would be really cool. And then you're supporting your local farmers and yadda, yeah. It's a good opportunity" NE-4

"I don't know from my angle if it's just fourth grade in all the buildings or in all the schools or if it's more of a school wide program. So, I don't know if once they're in fourth grade if the school continued to do it, would they get anything in fifth grade, or it is a one time, one and done thing. Cause if it's more of a behavioral change thing, it should, obviously, be through the whole school, kind of school wide wellness policy and build on each year" NE-6

"If they could probably shadow somebody who is actually done the thing, before they just go live, sorta thing, that would be maybe helpful. I felt a little bit like a floundering fish that first nutrition lesson, just 'cause I had no idea how it really was supposed to go. But you do it once or twice and you kinda get it figured out, but maybe some coaching along the way just to get 'em started" NE-7

Fidelity Checks

Methods

Members of the University of Iowa evaluation team visited schools in spring 2018 to observe and review Cafeteria Coaching as well Nutrition Education Lessons. Two separate tools were developed to measure how well Cafeteria Coaches and Nutrition Educators adherence to the provided trainings and planned interventions activities.

The Cafeteria Coaching fidelity tool asked evaluation team members to observe cafeteria coaches interactions with fourth graders and then describe what they were doing and how they were interacting. Other questions on the tool rated the Cafeteria Coaches behavior, communication, and social skills using a 5-point Likert scale. The Cafeteria Coaching fidelity tool is shown in Appendix L.

The Nutrition Education fidelity tool asked evaluation team members to rate classroom management and organization, classroom environment, instruction, student participation, and classroom teacher participation using a 5-point Likert scale. Classroom management included questions about managing time, monitoring student behavior, and interacting with students. The classroom environment included questions about how the educator involves students, manages inappropriate behavior, shows enthusiasm for and conveys the content, provides direction, and makes the classroom an inviting space. The instruction section asked whether the educator was prepared for the lesson and if the educator monitors students understanding and adjusts lessons appropriately. The student questions asked about the students' participation, engagement and enjoyment of the lessons and activities. Finally, the classroom teacher section asks if the classroom teacher was present for the lesson and if the classroom teacher participated throughout the lesson. Other questions on the tool rated the implementation of topics, activities, and taste tests used yes/no response option. The Nutrition Education fidelity tool is shown in Appendix M.

Trained members of the evaluation team observed nutrition education at five schools. All nutrition educators were delivering the same lesson on the day they were observed. Fidelity to the lessons plans was mixed. Nutrition educators covered an average of three out of four topics included in the lesson plan, with a range of one to four topics. Nutrition educators stated they had challenges completing all the activities included with the lesson plan, completing an average of 6.8 out of nine activities, with a range of five to nine. Even if activities were completed, minor adaptations were noted, such as using sugar packets instead of sugar cubes in a demonstration. Taste testing was performed during the nutrition education lesson for four schools, with the remaining school conducting it during lunch. Scores on a scale of one to five for classroom management and organization, classroom environment, instruction, and student participation were mostly high, indicating good levels of adherence to the lesson and skill of the nutrition educator delivering the lessons (Table 11).

Table 11. Ratings for observed nutrition education lessons. All items were scored on a scale of 1 (strongly disagree) to 5 (strongly agree) and an average score was calculated for each category.

Area	School				
	1	2	3	4	5
Classroom management and organization	4.00	5.00	4.75	4.75	4.75
Classroom environment	3.86	5.00	4.71	4.86	4.86
Instruction	2.50	5.00	5.00	3.50	5.00
Student participation	4.40	5.00	5.00	5.00	5.00

Results: Cafeteria Coaching

We observed cafeteria coaching at four sites. We were not able to observe one site due to inclement weather. There were between three and six cafeteria coaches during the observed sessions. One group was not in the lunchroom with the fourth grade students, which was how the intervention was designed, but instead were in the lunchroom with K-3rd grade students. The cafeteria coaches at all observed sites engaged with students and encouraged healthy food consumption. While modeling behaviors was intended to be part of cafeteria coaching, not all groups ate lunch with the younger students. Cafeteria coaches scored high on all rated scales (Table 12).

Table 12. Observed rating of cafeteria coaches. All items were scored on a scale of 1 (strongly disagree) to 5 (strongly agree).

Question	School			
	1	2	3	4
Cafeteria coaches behaved appropriately	5	5	4	5
Cafeteria coaches interacted positively with students	5	5	5	5
Cafeteria Coaches used appropriate communication	5	5	5	5
Cafeteria Coaches tried to interact with many students	3	5	5	5
Cafeteria Coaches encouraged students to eat healthy	3	3	5	5
Cafeteria Coaches were enthusiastic about healthy eating	3	3	4	4
Cafeteria Coaches helped student feel safe, welcomed and valued.	3	5	3	5
Cafeteria Coaches modeled and taught respectful manners.	3	5	4	3
Cafeteria Coaches let the students decide how much to eat and how to make choices respectfully.	3	3	5	5
Cafeteria Coaches taught/modeled social skills for meals: inside voices, eating etiquette, use of utensils, and gauging time to eat before dismissal.	3	5	5	2
Students were interacting with the cafeteria coaches	5	5	5	5
Students seemed to enjoy the cafeteria coaches	5	5	5	5

Summary of Intervention Implementation

A summary of how key intervention activities were implemented based on interviews, fidelity checks, and the experience of the evaluation team is shown in Table 13.

Table 13. How activities in the Healthy Schools Healthy Students Intervention were implemented

Intervention activity	Description
In-classroom nutrition education	Schools mostly contracted with educators from the list described in Table 2. Two schools used their food service director as the nutrition educator. All schools implemented the *Serving up MyPlate* lessons, often with minimal adaptations. Some examples of adaptations include using different physical activities or not including the physical activity demonstrations in the nutrition education sessions due to lack of time or not implementing the classroom bingo challenge due to competing priorities by the classroom teacher. Adaptations are described further in the in-depth interview section. Additionally, some schools conducted the taste test component separate from the nutrition education sessions due to time constraints.
Cafeteria coaching	Students from the district's middle and high schools were recruited and trained to be Cafeteria Coaches. Training and preparation for the cafeteria coaching was not consistent between schools, even with the development of 10 minute webcast. The frequency of cafeteria coaching varied between schools. Additionally, cafeteria coaches interacted with young students differently, for example cafeteria coaches at one school engaged with 4th grade students at lunch and encouraged them to try new food, but did not eat lunch with them, while other cafeteria coaches at their lunch with the younger students. At some schools, the cafeteria coaches conducted the food taste test component of the intervention rather than the nutrition educators. The cafeteria coaching experience is further described from the perspective of the cafeteria coaches in the focus group section.
Smarter lunchrooms	The assessment was conducted as planned. Schools varied on the intensity and type of changes implemented in their lunchroom. During the Spring assessment, some schools stated that they did not implement any Smarter Lunchroom techniques, even though their score increased.
Food service staff culinary training	The culinary training was implemented as planned.

Conclusions and Recommendations

Conclusions

Overall, the *Healthy Schools-Healthy students* was deemed successful by school staff, nutrition educators, and cafeteria coaches. Based on the process evaluation data we can answer the following research questions. RQ1) Was the intervention implemented as planned? The intervention was mostly implemented as planned, with minor adaptations or changes. RQ2) What were the barriers to implementation? Logistical issues were the most commonly cited barrier. Other barriers included the amount of work required to implement all the intervention component, difficulties engaging students for cafeteria coaching, and issues acquiring taste test items RQ3) What were the successes, as identified by school nutrition professionals, nutrition educators, 4th grade teachers, Cafeteria Coaches, and administrators? Results for the qualitative evaluation indicated that the taste tests were well received and allowed students to try new, healthy foods and were seen as particularly successful. The nutrition education and cafeteria coaching were also seen as being successful. Based on the outcome evaluation data we can answer the following research questions. RQ4) Fourth graders in intervention schools demonstrate greater increases in nutrition knowledge and more positive attitudes to fruits and vegetables when compared to students in control schools. Survey results indicated that students' nutrition knowledge and ability to identify MyPlate was improved through participation. Attitudes to fruit and vegetables were not impacted by this intervention.

All intervention schools increased their scores on the SLR scorecard. While there were no differences in production record data between intervention and control schools that indicate an intervention effect on production, this is likely due to this intervention's main focus of the intervention activities being on changing 4th grade students' nutrition knowledge and attitudes.

Recommendations

There are a number of ways that the project could be improved. Interviews indicated that more communication from Team Nutrition and the evaluation team to ensure that school staff understand the full scope of the project would have improved their experience. Stakeholders also stated that increasing the time allotted for nutrition education and/or increasing the frequency of nutrition education sessions would improve the intervention. Furthermore, nutrition educators suggested that the lessons were difficult to deliver in thirty minutes, and in the future they should either expand the time for each lesson or retool the lessons to fit in the time allotted. Nutrition educators also suggested addressing additional content, such as meal planning, and adding more components, such as a hands on food preparation component. Additional funding would be required to expand or enhance the intervention activities or to provide further technical assistance. Funding would also be needed for the project to be implemented in the following school year. Cafeteria coaches stated that while the experience was enjoyable and beneficial to the younger students, more training, preparation, and direction for engaging with younger students to encourage healthy eating would have improved their capabilities. While the project was stated to be successful, simple changes to the nutrition education curriculum, increased training and preparation for cafeteria coaches, and further communication from Team Nutrition and the evaluation team prior to the interventions implementation would have enhanced the intervention.

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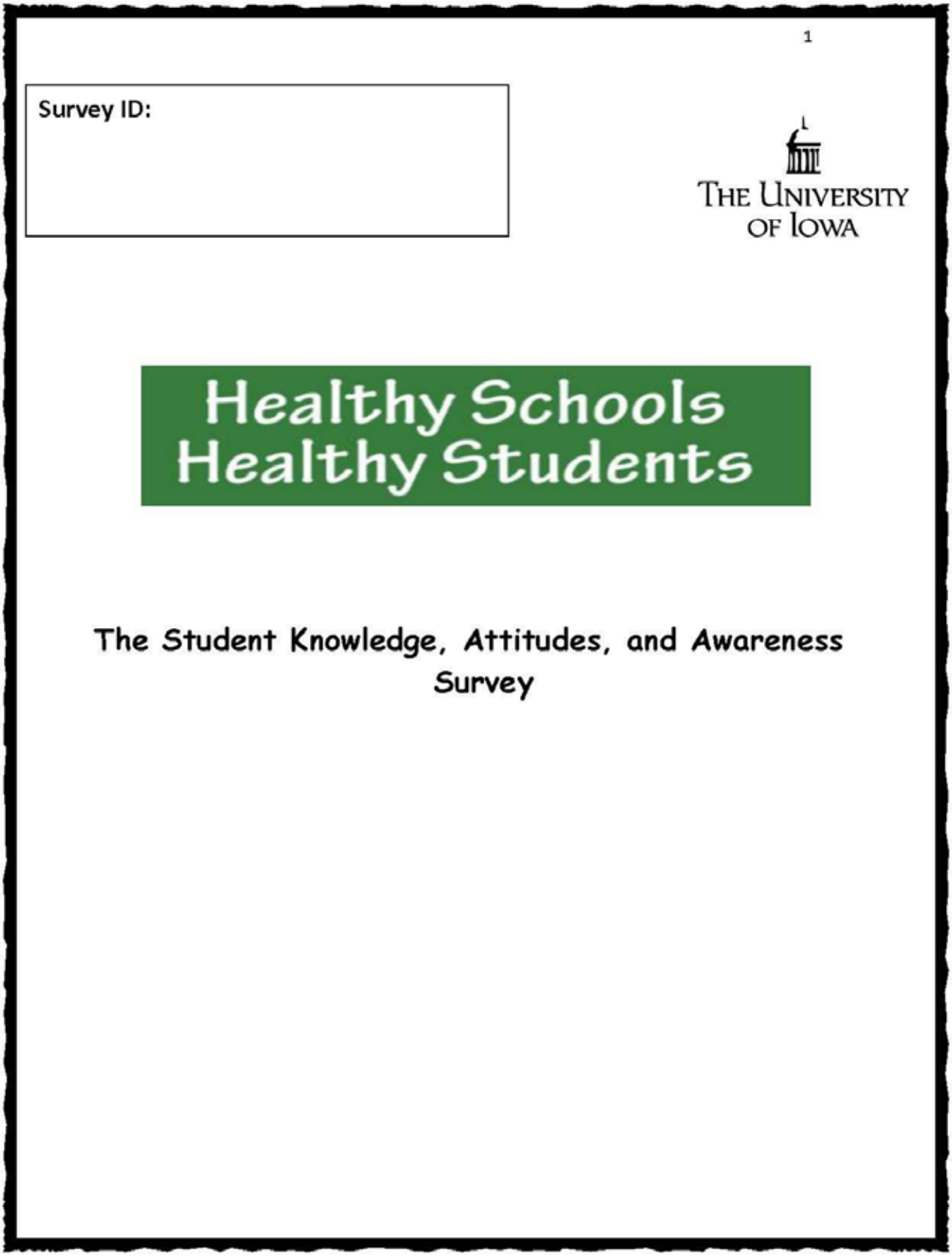
Appendix A: Student Knowledge, Attitudes, and Awareness Tool



1

Survey ID:

THE UNIVERSITY OF IOWA

Healthy Schools
Healthy Students

The Student Knowledge, Attitudes, and Awareness Survey

Questions 1-14

Fill in the triangle below the choice that best answers the questions.

1. Which food can you add to the following meal to make sure it has all food groups? Turkey burger on a whole-grain bun with lettuce served with baked beans and milk.

Cheese  Δ

Grapes  Δ

Chips 

Δ

Pickle  Δ

I Don't Know ? Δ

2. How much exercise do you need each day?

10 minutes Δ

30 minutes Δ

60 minutes Δ

70 minutes Δ

I Don't Know Δ

3. Which of these is <u>not</u> one of the vegetable subgroups?

Dark-Green Δ

Red and Orange Δ

Fiber Δ

Starchy Δ

I Don't Know Δ

4. Which drink contains the <u>most</u> added sugar?

Can of Soda 

Δ

Skim Milk 

Δ

Chocolate Milk  Δ

Water  Δ

I Don't Know ? Δ

5. I know it is healthy to eat vegetables with every meal. Is it healthier to eat the same vegetable at every meal or to eat a lot of different vegetables?

The Same Vegetable  Δ

Lots of Different Vegetables  Δ

I Don't Know ? Δ

6. Which of these is not a healthy snack?

Apple and string cheese  Δ

Peanut butter and celery  Δ

Raisins and pretzels  Δ

Potato chips and candy bar 

Δ

I Don't Know ? Δ

7. A "sometimes" food means that I can have that food how often?

Everyday Occasionally Never I Don't Know

8. Which of these is a "sometimes" food?

Low fat white milk Bananas Chocolate Covered Strawberries Apples I Don't Know




9. Which type of fat is healthier for your heart?

Solid Liquid I Don't Know

10. Which of these foods is NOT high in solid fats?

Salad Dressing Cupcakes Candy Bar Hot dogs I Don't Know




11. Which should I have more of on my plate, protein or grains?

Protein Grains I Should Have the Same Amount on My Plate I Don't Know

12. A nutrient is something found in food that your body uses to grow and stay healthy.

True False I Don't Know

13. To be a healthy person, it is important to exercise.

True False I Don't Know

14. I will try to make half of the food I eat each day fruits and vegetables.

Yes No I Don't Know

Questions 15-25

Mark the answer that best describes how you feel about each statement:

	All of the time	Most of the time	A little of the time	None of the time
15. I think fruit tastes good:	Δ	Δ	Δ	Δ
16. I feel good when I eat fruit:	Δ	Δ	Δ	Δ
17. Fruit is healthy for me:	Δ	Δ	Δ	Δ
18. Fruit is important for me to eat:	Δ	Δ	Δ	Δ
19. I like to eat fruit:	Δ	Δ	Δ	Δ

Mark the answer that best describes how you feel about each statement:

	All of the time	Most of the time	A little of the time	None of the time
20. I think vegetables taste good:	Δ	Δ	Δ	Δ
21. I feel good when I eat vegetables:	Δ	Δ	Δ	Δ
22. Vegetables are healthy for me:	Δ	Δ	Δ	Δ
23. Vegetables are important for me to eat:	Δ	Δ	Δ	Δ
24. I like to eat vegetables:	Δ	Δ	Δ	Δ
25. I feel that I am helping my body when I eat fruits and vegetables:	Δ	Δ	Δ	Δ

Questions 26-34

How much do you like each of these foods?

	 I like this very much	 I like this	 I dislike this	 I dislike this very much	I have not tried it
26. Pomegranate 	Δ	Δ	Δ	Δ	Δ
27. Tangelos 	Δ	Δ	Δ	Δ	Δ
28. Avocado 	Δ	Δ	Δ	Δ	Δ
29. Grapes 	Δ	Δ	Δ	Δ	Δ
30. Kiwis 	Δ	Δ	Δ	Δ	Δ
31. Flavored water 	Δ	Δ	Δ	Δ	Δ
32. Cherry Tomatoes 	Δ	Δ	Δ	Δ	Δ
33. Cucumber slices 	Δ	Δ	Δ	Δ	Δ
34. Carrots 	Δ	Δ	Δ	Δ	Δ

Questions 35-37

How much do you like each of these foods?

	 I like this very much	 I like this	 I dislike this	 I dislike this very much	I have not tried it
35. Broccoli 	Δ	Δ	Δ	Δ	Δ
36. Jicama 	Δ	Δ	Δ	Δ	Δ
37. Spinach 	Δ	Δ	Δ	Δ	Δ

Questions 38-39

Mark the one best answer for each question.

38. Yesterday, did you eat any vegetables? Vegetables are all cooked and uncooked vegetables; salads; and boiled, baked and mashed potatoes. Do not count French fries or chips.

	Yes, I ate vegetables 3 or more times yesterday.	Yes, I ate vegetables 2 times yesterday.	Yes, I ate vegetables 1 time yesterday.	No, I didn't eat any vegetables yesterday.
	Δ	Δ	Δ	Δ

39. Yesterday, did you eat fruit? Do not count fruit juice.

	Yes, I ate fruit 3 or more times yesterday.	Yes, I ate fruit 2 times yesterday.	Yes, I ate fruit 1 time yesterday.	No, I didn't eat any fruit yesterday.
	Δ	Δ	Δ	Δ

Strike through or cross out the food item that does <u>not</u> belong in the food groups below:

40. Dairy Group


Cheese


Lime


Milk


Ice cream

41. Protein Group


Corn


Steak


Fish


Turkey

42. Fruit Group


Watermelon


Orange


Pumpkin


Banana

43. Grain Group


Waffles


Apple


Toast


Crackers

44. Vegetable Group

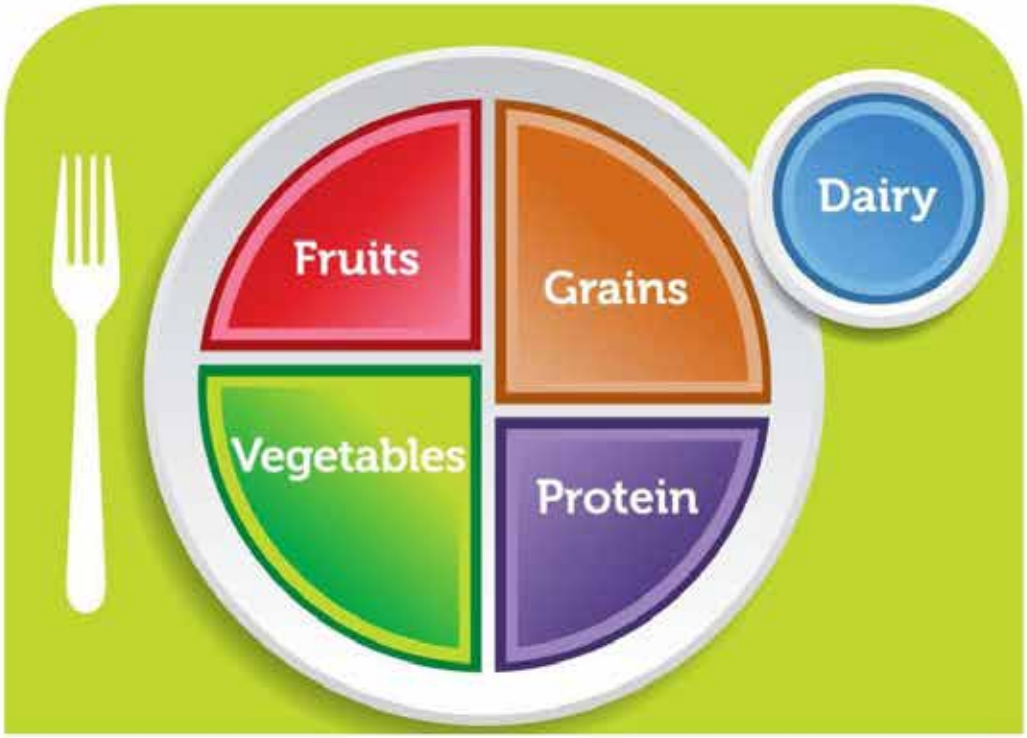

Carrots


Broccoli


Cucumbers


Eggs

Fill in the triangle below the choice that best answers the questions.



45. Have you seen this before?

Yes Δ

No Δ

46. What is it called?

YourPlate Δ

The Food Groups Δ

MyPlate Δ

Lunch Δ

Great job! You are all finished!

Appendix B: How each score was calculated and range of possible values

Knowledge, food group, and MyPlate awareness questions were coded as 1 (correct or yes) or 0 (incorrect or no). Attitude questions were recoded on a scale of 0 (None of the time) to 3 (All of the times). Preferences were recoded on a scale of 1 (I dislike this very much) to 4 (I like this very much), with the response option *I have not tried* being coded as a separate value that was treated as missing when calculating the overall scores. Consumption questions were recoded one a scale of 0 (Didn't eat any fruits or vegetables yesterday) to 3 (Ate fruits or vegetables 3 or more times yesterday).

Scores were calculated for knowledge, fruit attitudes, vegetable attitudes, fruit preferences, vegetable preferences, consumption, and food group knowledge. For calculating the knowledge score, items were not included if all schools had over 80% of their students responding correctly in the pre-survey. Correctly identifying the name of MyPlate (question 46) was used as the outcome for MyPlate Awareness, as over 97% of students in both intervention and control schools had seen MyPlate previously.

Table B1. Description of calculated variables

Score	Calculation	Range of possible values
Knowledge	Sum of correct responses for questions 1, 2 ,4 ,9, 10, 11, 12	0-7
Food Group Knowledge	Sum of correct responses for questions 40-44	0-5
Fruit Attitudes	Mean of item scores for questions 15-19	0-3
Vegetable Attitudes	Mean of item scores for questions 20-24	0-3
Fruit Preferences	Mean of item scores for questions 26-31, Items that were marked have not tried were not included	1-4
Vegetable Preferences	Mean of item scores for questions 32-37, Items that were marked have not tried were not included	1-4
Fruit and Vegetable Consumption	Sum of item scores for questions 38-39	0-6
MyPlate Awareness	Score from questions 46	0 or 1

Appendix C: Frequencies and descriptives for Student Survey

Table C1. Frequency and percent of correct answers for knowledge questions

Question	Response (Bold indicates the correct selection)	Pre				Post Control (n=567)			
		Intervention (n=490)		Control (n=567)		Intervention (n=490)		Control (n=567)	
Which food can you add to the following meal to make sure it has all food groups? Turkey burger on a whole-grain bun with lettuce served with baked beans and milk	Cheese, Grapes, Chips, Pickle, Don't know	251	51.2%	339	59.8%	341	69.6%	404	71.3%
How much exercise do you need each day?	10 minutes, 30 minutes, 60 minutes, 70 minutes, Don't know	194	39.6%	281	49.6%	286	58.4%	343	60.5%
Which drink contains the most added sugar?	Can of Soda, Skim Milk, Chocolate Milk, Water, Don't know	458	93.5%	528	93.1%	470	95.9%	546	96.3%
Which of these is not one of the vegetable subgroups?	Dark-Green, Red and Orange, Fiber, Starchy, Don't know	66	13.5%	90	15.9%	174	35.5%	102	18.0%
I know it is healthy to eat vegetables with every meal. Is it healthier to eat the same vegetable at every meal or to eat a lot of different vegetables?	The same vegetables, Lots of different vegetables, Don't know	475	96.9%	546	96.3%	478	97.6%	555	97.9%
Which of these is not a healthy snack?	Apple and string cheese, Peanut butter and celery, Raisins and pretzels, Potato chips and candy bar, Don't know	476	97.1%	551	97.2%	477	97.3%	555	97.9%
A "sometimes" food means that I can have that food how often?	Everyday, Occasionally, Never, Don't know	447	91.2%	486	85.7%	465	94.9%	524	92.4%
Which of these is a "sometimes" food	Low fat white milk, Bananas, Chocolate covered strawberries, Apple, Don't know	425	86.7%	496	87.5%	467	95.3%	518	91.4%
Which type of fat is healthier for your heart?	Solid, Liquid, Don't know	274	55.9%	317	55.9%	321	65.5%	319	56.3%
Which of these foods is NOT high in solid fats?	Salad dressing, Cupcakes, Candy Bar, Hot dog, Don't know	285	58.2%	320	56.4%	323	65.9%	360	63.5%
Which should I have more of on my plat, protein or grains?	Protein, Grains, Same amount, Don't know	309	63.1%	303	53.4%	258	52.7	315	55.6%
A nutrient is something found in food that your body uses to grow and stay healthy.	True, False, Don't know	395	80.6%	425	75.0%	423	86.3%	484	85.4%
To be healthy person, it is important to exercise.	True, False, Don't know	462	94.3%	535	94.4%	459	93.7%	539	95.1%
I will try to make half of the food I eat each day fruits and vegetables	Yes, No, Don't know	404	82.4%	466	82.2%	415	84.7%	454	80.1%

** Missing values were treated as incorrect

Table C2. Mean and standard deviations for knowledge scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
Knowledge Score	3.63±1.39	3.67±1.40	4.33±1.46	4.11±1.34

Table C3. Frequency and percent of correct answers for food group questions

Question	Pre				Post			
	Intervention (n=490)		Control (n=567)		Intervention (n=490)		Control (n=567)	
Dairy	421	85.9%	491	86.6%	450	91.8%	511	90.1%
Protein	386	78.8%	448	79.0%	431	88.0%	482	85.0%
Fruit	434	88.6%	511	90.1%	447	91.2%	510	89.9%
Grain	440	89.8%	498	87.8%	461	94.1%	541	90.7%
Vegetable	474	96.7%	540	95.2%	479	97.8%	543	95.8%

** Missing values were treated as incorrect

Table C4. Mean and standard deviations for food group scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
Food Group Score	4.40±0.95	4.39±1.03	4.63±0.79	4.51±0.90

Table C5. Frequency and percent of responses for attitude questions

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
I think fruit tastes good	None of the time	5	1.0%	5	0.9%	5	1.0%	2	0.4%
	A little of the time	45	9.2%	35	5.6%	35	7.1%	35	6.2%
	Most of the time	207	42.2%	266	46.9%	181	36.9%	246	43.4%
	All of the time	231	47.1%	260	45.9%	265	54.1%	282	49.7%
I feel good when I eat fruit	None of the time	15	3.1%	14	2.5%	9	1.8%	13	2.3%
	A little of the time	60	12.2%	54	9.5%	37	7.6%	43	7.6%
	Most of the time	149	30.4%	220	38.8%	163	33.3%	181	31.9%
	All of the time	2264	53.9%	274	48.3%	278	56.7%	353	57.0%
Fruit is healthy for me	None of the time	0	0.0%	2	0.4%	4	0.8%	4	0.7%
	A little of the time	12	2.4%	11	2.1%	12	2.4%	8	1.4%
	Most of the time	93	19.0%	80	14.1%	79	16.1%	96	16.9%
	All of the time	383	78.2%	464	81.8%	387	79.0%	455	80.2%
Fruit is important for me to eat	None of the time	6	1.2%	6	1.1%	6	1.2%	4	0.7%
	A little of the time	31	6.3%	18	3.2%	20	4.1%	16	2.8%
	Most of the time	123	25.1%	124	21.9%	116	23.7%	114	20.1%
	All of the time	328	66.9%	413	72.8%	344	70.2%	424	74.8%
I like to eat fruit	None of the time	11	2.2%	9	1.6%	7	1.4%	11	1.9%
	A little of the time	59	12.0%	45	7.9%	36	7.3%	46	8.1%
	Most of the time	173	35.3%	232	40.9%	161	32.9%	190	33.5%
	All of the time	246	50.2%	277	48.9%	280	57.1%	360	55.7%

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
I think vegetables taste good	None of the time	28	5.7%	31	5.5%	29	5.9%	36	6.3%
	A little of the time	141	28.8%	183	32.3%	121	24.7%	162	28.6%
	Most of the time	207	42.2%	237	41.8%	221	45.1%	269	47.4%
	All of the time	113	23.1%	113	19.9%	114	23.3%	97	17.1%
I feel good when I eat vegetables	None of the time	51	10.4%	58	10.2%	38	7.8%	52	9.2%
	A little of the time	103	21.0%	126	22.2%	93	19.0%	113	19.9%
	Most of the time	151	30.8%	212	37.4%	187	38.2%	207	36.5%
	All of the time	184	37.6%	166	29.3%	166	33.9%	188	33.2%
Vegetables are healthy for me	None of the time	9	1.6%	11	2.2%	3	0.6%	11	1.9%
	A little of the time	32	5.6%	26	5.3%	23	4.7%	24	4.2%
	Most of the time	89	15.7%	76	15.5%	86	17.6%	92	16.2%
	All of the time	429	75.7%	368	75.1%	369	75.3%	432	76.2%
Vegetables are important for me to eat	None of the time	11	2.2%	15	2.6%	11	2.2%	16	2.8%
	A little of the time	43	8.8%	37	6.5%	34	6.9%	24	4.2%
	Most of the time	105	21.4%	128	22.6%	100	20.4%	108	19.0%
	All of the time	329	67.1%	378	66.7%	340	69.4%	410	72.3%
I like to eat vegetables	None of the time	56	11.4%	63	11.3%	43	8.8%	57	10.1%
	A little of the time	116	23.7%	163	29.2%	124	25.3%	147	25.9%
	Most of the time	195	39.8%	214	38.4%	198	40.4%	246	43.4%
	All of the time	123	25.1%	118	21.1%	120	24.5%	109	19.2%
I feel that I am helping my body when I eat fruits and vegetables	None of the time	11	2.2%	13	2.3%	6	1.2%	16	2.8%
	A little of the time	27	5.5%	32	5.6%	30	6.1%	35	6.2%
	Most of the time	72	14.7%	100	17.6%	82	16.7%	99	17.5%
	All of the time	379	77.3%	418	73.7%	368	75.1%	410	72.3%

Table C6. Mean and standard deviations for attitude scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
Fruit Attitude Score	2.48±0.49	2.51±0.44	2.56±0.45	2.56±0.45
Vegetable Attitude Score	2.15±0.66	2.11±0.65	2.19±0.62	2.15±0.65

Table C7. Frequency and percent of responses for fruit preference questions

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
Pomegranate	Dislike very much	21	4.6%	29	5.1%	39	8.0%	32	5.6%
	Dislike	17	3.5%	24	4.2%	58	11.8%	30	5.3%
	Like	42	8.6%	60	10.6%	90	18.4%	89	15.7%
	Like very much	85	17.3%	120	21.2%	264	53.9%	127	22.4%
	Have not tried	332	65.7%	331	58.4%	37	7.6%	286	50.4%
Tangelos	Dislike very much	8	1.6%	13	2.3%	12	2.4%	24	4.2%
	Dislike	7	1.4%	14	2.5%	22	4.5%	16	2.8%
	Like	50	10.2%	61	10.8%	74	15.1%	101	17.8%
	Like very much	71	14.5%	121	21.3%	276	56.3%	133	23.5%
	Have not tried	351	71.6%	351	61.9%	104	21.2%	289	51.0%
Avocado	Dislike very much	95	19.4%	100	17.6%	134	27.3%	95	16.8%
	Dislike	69	14.1%	78	13.8%	103	21.0%	78	13.8%
	Like	55	11.2%	75	13.2%	75	15.3%	84	14.8%
	Like very much	75	15.3%	124	21.9%	99	20.2%	124	21.9%
	Have not tried	193	39.4%	186	32.8%	76	15.5%	183	32.3%
Grapes	Dislike very much	5	1.0%	7	1.2%	5	1.0%	7	1.2%
	Dislike	11	2.2%	11	1.9%	9	1.8%	7	1.2%
	Like	60	12.2%	91	16.0%	63	12.9%	98	17.3%
	Like very much	407	83.1%	451	79.5%	404	82.4%	447	78.8%
	Have not tried	6	1.0%	2	0.4%	5	1.0%	2	0.4%
Kiwis	Dislike very much	35	7.1%	44	7.8%	39	8.0%	50	8.8%
	Dislike	47	9.6%	61	10.8%	39	8.0%	53	9.3%
	Like	87	17.8%	114	20.1%	75	15.3%	120	21.2%
	Like very much	244	49.8%	273	48.1%	271	55.3%	274	48.3%
	Have not tried	75	15.7%	72	12.7%	63	12.9%	66	11.6%
Flavored water	Dislike very much	27	5.5%	19	3.4%	37	7.6%	22	3.9%
	Dislike	15	3.1%	25	4.4%	37	7.6%	18	3.2%
	Like	126	25.7%	133	23.5%	127	25.9%	144	25.4%
	Like very much	284	58.0%	358	63.1%	276	56.3%	350	61.7%
	Have not tried	34	6.9%	28	4.9%	10	2.0%	30	5.3%

Table C8. Frequency and percent of responses for vegetable preference questions

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
Cherry Tomatoes	Dislike very much	119	24.3%	140	24.7%	132	26.9%	140	24.7%
	Dislike	61	12.4%	69	12.2%	86	17.6%	93	16.4%
	Like	73	14.9%	82	14.5%	71	14.5%	98	17.3%
	Like very much	147	30.0%	156	27.5%	152	31.0%	144	25.4%
	Have not tried	85	17.3%	113	19.9%	42	8.6%	89	15.7%
Cucumber Slices	Dislike very much	62	12.7%	80	14.1%	62	12.7%	82	14.5%
	Dislike	56	11.4%	69	12.2%	57	11.6%	67	11.8%
	Like	103	21.0%	120	21.2%	98	20.0%	126	22.2%
	Like very much	219	44.7%	231	40.7%	235	48.8%	232	40.9%
	Have not tried	49	10.0%	61	10.8%	32	6.5%	53	9.3%
Carrots	Dislike very much	37	7.6%	51	9.0%	35	7.1%	43	7.6%
	Dislike	34	6.9%	43	7.6%	39	8.1%	41	7.2%
	Like	144	29.4%	165	29.1%	126	25.7%	188	33.2%
	Like very much	267	54.5%	304	53.6%	281	57.3%	288	50.8%
	Have not tried	7	1.4%	1	0.2%	6	1.2%	5	0.9%
Broccoli	Dislike very much	84	17.1%	115	20.3%	69	14.1%	97	17.1%
	Dislike	49	10.0%	87	15.3%	57	11.6%	71	12.5%
	Like	139	28.4%	169	29.8%	147	30.0%	181	31.9%
	Like very much	197	40.2%	177	31.2%	202	41.2%	190	33.5%
	Have not tried	16	3.3%	16	2.8%	13	2.7%	18	3.2%
Jicama	Dislike very much	25	5.1%	63	11.1%	71	14.5%	64	11.3%
	Dislike	14	2.9%	38	6.7%	57	11.6%	45	7.9%
	Like	25	5.1%	29	5.1%	96	19.6%	34	6.0%
	Like very much	55	11.2%	57	10.1%	162	33.1%	38	6.7%
	Have not tried	367	74.9%	376	66.3%	103	21.0%	379	66.8%
Spinach	Dislike very much	88	18.0%	100	17.6%	76	15.5%	100	17.6%
	Dislike	68	13.9%	75	13.2%	53	10.8%	79	13.9%
	Like	114	23.3%	146	25.7%	138	28.2%	142	25.0%
	Like very much	127	25.9%	169	29.8%	213	43.5%	165	29.1%
	Have not tried	90	18.4%	41	13.1%	9	1.8%	77	13.6%

Table C9. Mean and standard deviations for preference scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
Fruit Preferences score	3.34±0.57	3.34±0.54	3.28±0.57	3.32±0.54
Vegetable Preferences score	2.92±0.74	2.84±0.76	2.98±0.72	2.85±0.74

**Note have not tried was not included in the calculation of this score

Table C10. Frequency and percent of responses for consumption questions

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
Yesterday did you eat any vegetables?	Did not eat yesterday	109	22.2%	131	23.1%	89	18.2%	135	23.8%
	1 time yesterday	122	24.9%	137	24.2%	119	24.3%	145	25.6%
	2 times yesterday	139	28.4%	138	24.3%	136	27.8%	127	22.4%
	3 or more times yesterday	115	23.5%	153	27.0%	144	29.4%	154	27.2%
Yesterday, did you eat fruit? Do not count fruit juice	Did not eat yesterday	76	15.5%	67	11.8%	49	10.0%	70	12.3%
	1 time yesterday	115	23.5%	128	22.6%	109	22.2%	96	16.9%
	2 times yesterday	105	24.1%	132	23.3%	105	21.4%	120	21.2%
	3 or more times yesterday	191	39.0%	232	40.9%	224	45.7%	276	48.7%

Table C11. Mean and standard deviations for consumption scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
Consumption Score	3.36±1.87	3.48±1.84	3.71±1.85	3.60±1.87

Table C12. Frequency and percent of responses for MyPlate awareness questions

Question	Response	Pre				Post			
		Intervention		Control		Intervention		Control	
Have you seen this before? (Picture of My-Plate shown)	Yes	480	98.0%	559	98.6%	474	96.7%	560	99.1%
	No	9	1.8%	8	1.4%	10	2.0%	5	0.9%
What is it called?	YourPlate	32	6.5%	61	10.8%	14	2.9%	38	6.7%
	The Food Groups	245	50.0%	239	42.2%	49	10.0%	116	20.5%
	MyPlate	192	39.2%	257	45.3%	417	85.1%	401	70.7%
	Lunch	17	3.5%	7	1.2%	6	1.2%	9	1.6%

Table C13. Mean and standard deviations for MyPlate Awareness scores

Score	Pre		Post	
	Intervention	Control	Intervention	Control
MyPlate Awareness Score	0.39±0.49	0.45±0.50	0.85±0.36	0.71±0.46

Appendix D: Results of Mann-Whitney U-tests

Mann-Whitney U-Tests showed that the median rank of differences of scores pre and post intervention was greater in intervention schools compared to control schools for knowledge, food group knowledge, consumption, and MyPlate awareness. Mean rank scores, significance levels from the Mann-Whitney U test, and conclusions from the Mann-Whitney U test are shown in Table D1.

Table D1. Results of Mann-Whitney U tests comparing the difference between pre and post scores for intervention and control schools

Score	Intervention Mean Rank	Control Mean Rank	Significance	Decision to accept or reject null that ranks are equal
Knowledge	549.29	501.62	<0.001*	Reject
Food Group Knowledge	548.48	511.70	0.002*	Reject
Fruit Attitudes	531.80	522.40	0.474	Fail to reject
Vegetable Attitudes	533.04	519.46	0.304	Fail to reject
Fruit Preferences	524.31	528.86	0.731	Fail to reject
Vegetable Preferences	544.17	508.94	0.008*	Reject
Consumption	556.77	504.53	<0.001*	Reject
MyPlate Awareness	582.53	482.27	<0.001*	Reject

* indicates significant difference at α=0.05

Appendix E: Further examination of preferences using regression modes

Methods

A taste test item preference score was calculated by taking the mean of preference scores for fruits (pomegranates, tangelos, avocados, and flavored water) and vegetables (cherry tomatoes, jicama, and spinach) that were taste tested and were asked about in the student survey.

Analysis

Regression models treating student as a fixed effect were used to model changes in preference scores for individual items and fruit and vegetable taste test item preference scores.

Results

The regression models used to do this indicate that the children in the intervention schools had an increase preference scores for pomegranates and spinach over the children in the control schools. Tables E1 and E2 show the results of the regression models where student was treated as a fixed effect for individual fruit and vegetable preferences respectively. Table E3 shows that the children in the intervention schools had an increase in vegetable taste test item preference score over the children in the control schools but not for fruit taste test item preference score.

Table E1. Difference in Difference Estimators from Regression Models with Individual Fruit Preference Items Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Pomegranate	0.482**	0.106	4.52	<0.001
Tangelos	0.272	0.132	2.06	0.055
Avocado	0.020	0.088	0.23	0.822
Grapes	<0.001	0.032	0.00	1.000
Kiwis	0.047	0.036	1.30	0.210
Flavored Water	-0.096	0.089	-1.09	0.291

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Table E2. Difference in Difference Estimators from Regression Models with Individual Vegetable Preference Items Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Cherry Tomatoes	0.008	0.082	0.09	0.0926
Cucumber Slices	0.060	0.053	1.14	0.270
Carrots	0.026	0.061	0.42	0.681
Broccoli	-0.043	0.058	-0.75	0.461
Jicama	0.522	0.182	2.88	0.010
Spinach	0.432**	0.076	5.68	<0.001

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Table E3. Difference in Difference Estimators from Regression Models with Tried Fruit and Vegetable Preference Scores Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Fruit taste test item preference score	0.022	0.064	0.35	0.733
Vegetable taste test item preference score	0.247*	0.090	2.75	0.013

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Appendix F: Further examination of fruit and vegetable attitudes using regression modes

Methods

We performed a principal component analysis on the 5 items in the fruit and vegetable attitude scales. In addition to the overall scale, we identified two subscales: FV: liking and FV: health. The liking subscale included three items and the health subscale included two items from the original scale.

Analysis

Regression models treating student as a fixed effect were used to model changes in fruit and vegetable liking and health attitude scales

Results

The regression models used to do this indicate that there were no significant effects for the fruit and vegetable attitude subscales.

Table F1. Difference in Difference Estimators from Regression Models with Individual Fruit Preference Items Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Fruit: Liking	0.041	0.044	0.94	0.347
Fruit: Health	0.024	0.037	0.64	0.519
Vegetable: Liking	-0.003	0.064	-0.05	0.960
Vegetables: Health	0.003	0.045	0.06	0.952

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Appendix G: Further examination of knowledge, attitudes, and preferences using regression models stratified by percent of students eligible for Free and Reduced Lunch

Methods

The analytic sample was stratified into two groups, students who attend schools where 50% or more of students are free and reduced lunch eligible and students who attend schools where less than 50% of students are free and reduce lunch eligible.

Analysis

Regression models treating student as a fixed effect were used to model changes in knowledge, food group knowledge, fruit and vegetable attitudes, fruit and vegetable preferences, consumption, and MyPlate awareness.

Results

The regression models used to do this indicate that in schools where more than 50% or more of the students are FRL eligible, the children in the intervention schools had an increase in fruit attitudes: liking, fruit attitudes: health, vegetable attitudes, vegetable attitudes: liking, vegetable attitudes: health, vegetable preferences, tried vegetable preferences, consumption, and MyPlate Awareness compared to children in control schools. For students in schools where less than 50% of students are FRL eligible, children in the interventions schools had an increase in knowledge, tried vegetable preferences, and MyPlate awareness compared to children in control schools. Tables G1 and G2 show the results of the regression models where student was treated as a fixed effect for each outcome based on the percent of students who are FRL eligible.

Table G1. Difference in Difference Estimators from Regression Models for Students in Schools with 50% or more of Students Eligible for Free or Reduced Lunch Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Knowledge	0.053	0.330	0.16	0.881
Food Group Knowledge	0.026	0.096	0.27	0.797
Fruit Attitudes	0.176	0.069	2.55	0.063
Fruit Attitudes: Liking	0.172*	0.081	2.12	0.034
Fruit Attitudes: Health	0.174**	0.032	5.50	<0.001
Vegetable Attitudes	0.308*	0.105	2.92	0.043
Vegetable Attitudes: Liking	0.313*	0.092	3.38	0.001
Vegetable Attitudes: Health	0.293*	0.120	2.44	0.015
Fruit Preferences	0.033	0.059	0.56	0.608
Tried Fruit Preferences	0.045	0.059	0.76	0.448
Vegetable Preferences	0.200	0.082	2.43	0.072
Tried Vegetable Preferences	0.398**	0.021	19.38	<0.001
Consumption	0.964	0.373	2.59	0.061
MyPlate Awareness	0.125*	0.029	4.30	0.013

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Table G2. Difference in Difference Estimators from Regression Models for Students in Schools with less than 50% of Students Eligible for Free or Reduced Lunch Using Student Fixed Effects

Outcome	β coefficient	Std. Error	z	p
Knowledge	0.351*	0.138	2.54	0.025
Food Group Knowledge	0.068	0.032	0.52	0.609
Fruit Attitudes	-0.002	0.041	-0.05	0.963
Fruit Attitudes: Liking	0.003	0.046	0.06	0.955
Fruit Attitudes: Health	-0.008	0.046	-0.17	0.864
Vegetable Attitudes	-0.056	0.051	-1.10	0.291
Vegetable Attitudes: Liking	-0.052	0.063	-0.83	0.407
Vegetable Attitudes: Health	-0.071	0.041	-1.74	0.081
Fruit Preferences	-0.014	0.024	-0.57	0.581
Tried Fruit Preferences	-0.023	0.069	-0.33	0.745
Vegetable Preferences	0.058	0.068	0.86	0.406
Tried Vegetable Preferences	0.277*	0.102	2.70	0.007
Consumption	0.130	0.102	1.27	0.226
MyPlate Awareness	0.244*	0.014	3.65	0.003

* Significant at α= 0.05 **Significant at α= 0.001

† When the DID estimator in the model is positive and significant, this indicates an intervention effect in the intended direction.

†† Standard errors are adjusted for clustering at the school level.

Appendix H: Food production record template form

Date: _____
School: _____
Offer Vs Serve: Yes _____ No_____
Grades: _____
Seconds/A La Carte: Yes _____ No_____

Menu Vegetables: DG	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: RO	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: BP (legumes)	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: S	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: O	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: Fruits	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
Menu Vegetables: Milk	Quantity Prep (# of servings, pounds cans)	Serving Size	Amount Prepared (number of servings)	Leftovers (number of servings or same amount as Quantity Prep)	Comments
1% White		8 oz.			
Skim White 8 oz.					
Skim Chocolate		8 oz.			
Other:_____		8 oz.			

Appendix I: Cafeteria Coaching Focus Group Guide

Cafeteria Coaching Focus Group

Purpose: To assess what the students learned, to assess what was successful, to assess what was challenging, to learn what could be improved about the Cafeteria Coaching program.

Thanks for coming today to share your thoughts about your participation as a Cafeteria Coach. My name is XXX and I'm with the University of Iowa, and I will be the moderator today—which means I will be the one asking the questions.

Today we will be talking as a group about your experience with Cafeteria Coaching. I will be asking a lot of questions, and I invite you all to answer them. However, if you would rather not answer a question, you do not have to. I want to make sure I hear everyone's opinions, so I might call on you if I haven't heard from you in a while.

This session will be audio recorded after you introduce yourselves. Your individual responses will be confidential and reported as a whole without your names attached to them.

Before we begin here are a few ground rules to help us stay on track.

1) While we want to hear from all of you, please let one person talk at a time. If everyone is talking at once it is hard to understand what people are saying.
2) Please respect one another. You might have a different opinion than one your classmates, and I ask that you don't make fun of another person's opinion by calling them names or swearing.
3) Also, we won't pressure you into answering any questions. Your opinions, beliefs and ideas will help us improve Cafeteria Coaching at other schools

Any questions before we begin?

Introductions

Now that all of the ground rules have been laid out, I would like to get to know you a little better. Since we are talking about your experience with Cafeteria Coaching and school lunch today, I would like you to tell me your name and tell me about your favorite food that is served in your school lunchroom.

We are going to start the recording device now. Do you have any questions before we begin?

General Cafeteria Coaching experiences

We are going to start with some general questions about your experience participating as a Cafeteria Coach.

First, can you tell me how you got involved in being a cafeteria coach?

What did you do or what training did you get to help you with being a cafeteria coach?

Now can you tell me a little about your experiences in this project? Describe what you did when you were in the lunchroom? How often were you eating with the 4th grade students? What were you expected to do as a cafeteria coach?

What did you like about it?

PROBE for specifics

What did you not like about it?

PROBE for specifics

Cafeteria coaching as a learning activity

Thinking about all of the things that you did the whole year while working as a cafeteria coach, what do you think was the most valuable to you as a student?

What did you learn by being a cafeteria coach?

PROBE for specifics:

- Did you learn anything about being a leader?
- Learn anything about nutrition or school meals?
- Learn anything that surprised you?

Have you shared anything you learned with friends/classmates? Family? What?

PROBE for specifics

Interactions with younger students

When working on this project you spent time with younger students that you might not have interacted with before.

What did you enjoy most about working with younger students?

What did you enjoy least about working with younger students?

Cafeteria Coaching Program Outcomes

We are almost finished.

Do you think this project made a difference/change in your school? Describe these differences. Did you notice specific changes in the younger students over the year? Is yes, what? If no, why do you think not?

Would you do this program again? Would you recommend being a Cafeteria Coach to one of your friends?

Thinking about future schools that might do this project, what else could be provided to make students experiences working as a cafeteria coach better? What could be done differently?

Probes: Did you need more help from your school or teachers? Did you have enough training to be comfortable doing this? Did you have the right number of Cafeteria Coaches in the lunchroom?

Anything else that should be changed to make cafeteria coaching better, either for the coaches or the younger students?

Anything else I need to know or that you would like to share?

Thanks for participating!

Appendix J: General Stakeholder Interview Guide

HSHS Admin-Teacher-FSD-Other Phone Interview

Introduction

Hi, my name is X, and I am calling from the University of Iowa College of Public Health. We are conducting an evaluation of the Healthy Schools, Healthy Students project that occurred at a school in your community during the 2017-2018 academic school year. We have an interview scheduled, does this time still work for you?

We will be asking you to share your perceptions of and suggestions on how to improve the Healthy Schools, Healthy Students project. It is expected that the interview will last 10-15 minutes. Taking part in this evaluation is completely voluntary. You are free to skip any questions that you prefer not to answer.

We will be audio taping the interview in order to make sure your answers are accurately documented. We will not collect your name or any identifying information about you. Your individual responses will be confidential and combined with the responses of other participants.

Any questions before we begin?

I am now turning on the recording device.

I would like to start off by asking some questions about your background and how you became involved in Healthy Schools, Healthy Students.

What is your job title?

How did you become involved in the Healthy Schools, Healthy Students project?

Probe for specifics

Throughout the year, what parts of the Healthy Schools, Healthy Students project were you involved in?

Probe for specifics

Challenges/Successes

Overall, what were your biggest challenges about the Healthy Schools Healthy Students project?

Probe for specifics

How did you deal with those challenges?

What were the biggest successes associated with the Healthy Schools Healthy Students project?

Probe for specifics

Probe: Were there any particular activities that you would deem most successful?

Do you think the overall project could be considered a success?

If yes: Why?

If no: What made it unsuccessful?

If we were to repeat this project next year, what could be done to make it more successful?

Probe for specifics

Is there anything else that you think would be helpful for someone involved in this project to know?

Thank you so much for your participation. Your responses will help us better understand how schools implemented the Healthy Schools Healthy Students project. Feel free to contact me if you have anything else you would like to share.

Appendix K: Nutrition Educator Interview Guide

Nutrition Educator Phone Interview

Introduction

Hi, my name is X, and I am calling from the University of Iowa College of Public Health. We are conducting an evaluation of the Healthy Schools, Healthy Students project that occurred at a school in your community during the 2017-2018 academic school year.

We would like you to participate in a telephone interview. We will be asking you to share your perceptions of and suggestions on how to improve the Healthy Schools, Healthy Students project-particularly the nutrition education component. It is expected that the interview will last 30 minutes. Taking part in this evaluation is completely voluntary. You are free to skip any questions that you prefer not to answer.

We will be audio taping the interview in order to make sure your answers are accurately documented. We will not collect your name or any identifying information about you. Your individual responses will be confidential and combined with the responses of other participants.

Any questions before we begin?

I am now turning on the recording device.

I would like to start off by asking some questions about your background and how you became involved in Healthy Schools, Healthy Students.

What is your job title?

What previous experience have you had with nutrition education?

How did you become involved in the Healthy Schools, Healthy Students project?

Besides delivering the nutrition education sessions throughout the year, were you involved in other parts of the Healthy Schools, Healthy Students project?

> *If they indicate other involvement*: What other parts of Healthy Schools, Healthy Students were you involved in? (i.e. Cafeteria coaching, FSD, key contact)

Implementation

Next, I am going to ask about how the sessions were implemented.

First, can you run through what you would do to prep a typical session?

Can you tell me about coordinating with the schools to be able to go in and deliver the session?

> *Probe*: Whom did you talk to set up the lesson? 4th grade teachers, FSD, office staff?
>
> *Probe:* Was there anything that worked well? That didn't?
>
> *Probe*: Were schools willing to work with you to set up each session?
>
> *Probe:* What resources could have been used to make implementation run more smoothly?

Next, can you tell me about what you would do on the day you were delivering a session?

> *Probe:* How long did you have for each session?
>
> *Probe:* Where did you deliver the session?

Were you able to deliver all six sessions?

> *If no:* Which session did you not deliver?
>
> *Probe:* Was the order of the sessions appropriate?

Were you able to cover all of the learning objectives included in the lesson plans?

If no: Why not?

Probe: did you add or subtract any topics?

Was the content covered by the learning objectives appropriate for the age of the students?

Probe: Was it too simple? Too complex?

Was the amount of content appropriate?

Probe: Was there too much or too little? For each session?

Probe: Were you able to get to all the activities that were included in the lesson plans?

Was there anything you would add or take out now that you've gone through it?

Probe: Did students make any comments about wanting more or less of a certain topic?

How do you think students can use the information that you were teaching?

Probe: How could using this information be beneficial?

Probe: Did you observe changes in knowledge? Signs of retention of knowledge?

I'd like to know a little more about the specific activities that you were asked to do with the students in the Serving Up MyPlate lesson plans. The activities include any discussion or hands on activity done with students, any of the engage sections of the curriculum, any of the physical activity breaks, and the taste tests.

What activities did you think were the most effective in improving the student's nutrition knowledge?

Probe: What makes you think that? (Verbal feedback, evidence of retention, etc.)

What activities did you think were most effective in improving the student's attitude towards fruits and vegetables?

What activities did you think the students liked most? The least?

Which activities were easy to do with students?

If can't think of specific activities, ask about overall

Which activities were challenging to do with students?

If can't think of specific activities, ask about overall

Did any of the activities go differently than planned?

If yes: What did you do to adjust for that?

How did the students respond to the taste tests?

Probe: For the majority of snacks, did students vote yes or no?

Probe: Which snacks got the best reviews?

How did the students do with the physical activity portions of the sessions?

Probe: Was it too easy/hard for them?

Probe: Was it easy to the students to participate?

Which overall session or specific activity did students seem to enjoy the most?

"How well could the students recall nutrition topics in previous lessons?"

Probe: What makes you say this?

Probe: Were they able to name foods from each group by the end of the curriculum?

What activities do you think could be added to the curriculum further educate children about nutrition, healthy eating habits, and MyPlate?

Challenges/Successes

Overall what were your biggest barriers delivering the Serving Up MyPlate Curriculum?

How did you deal with those challenges?

What were the biggest successes associated with delivering the Serving Up MyPlate Curriculum

Probe: Were there any particular activities that you would deem most successful?

To wrap it up I'd like to ask you some questions about how you would evaluate the overall project.

Do you think the overall project could be considered a success?

If no: What made it unsuccessful?

Probe: What could be done or could have been done to make it successful?

Would you be interested in continuing to provide nutrition education to students?

Is there anything else that you think would be helpful for someone who would be delivering nutrition education lessons in schools to know?

Thank you so much for your participation. Your responses will help us better understand how schools implemented the Healthy Schools Healthy Students project. Feel free to contact me if you have anything else you would like to share.

Appendix L: Cafeteria Coaching Fidelity Check Tool

Evaluation Team Member_____

School_____ Date_____

Cafeteria Coaching Site Visit

Number of Cafeteria Coaches _____

Observations

Please describe what the cafeteria coaches are doing and the how the cafeteria coaches are interacting with students while you observe during the site visit

On a scale of 1 to 10, with 1 being no interaction at all, 5 being cafeteria coaches making an effort to interact with some students, and 10 being the cafeteria coaches fully engaged with all students in the lunchroom, rate how interactive the cafeteria coaches are with students _____

Post Observation

Please list one take-away or best practice that you observed during the observation.

Rate the Cafeteria Coaches based on how much you agree or disagree with each statement

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
Cafeteria coaches behaved appropriately	1	2	3	4	5
Cafeteria coaches interacted positively with students	1	2	3	4	5
Cafeteria Coaches used appropriate communication	1	2	3	4	5
Cafeteria Coaches tried to interact with many students	1	2	3	4	5
Cafeteria Coaches encouraged students to eat healthy	1	2	3	4	5
Cafeteria Coaches were enthusiastic about healthy eating	1	2	3	4	5
Cafeteria Coaches helped student feel safe, welcomed and valued.	1	2	3	4	5
Cafeteria Coaches modeled and taught respectful manners.	1	2	3	4	5
Cafeteria Coaches let the students decide how much to eat and how to make choices respectfully.	1	2	3	4	5
Cafeteria Coaches taught/modeled social skills for meals: inside voices, eating etiquette, use of utensils, and gauging time to eat before dismissal.	1	2	3	4	5
Students were interacting with the cafeteria coaches	1	2	3	4	5
Students seemed to enjoy the cafeteria coaches	1	2	3	4	5

Appendix M: Nutrition Education Fidelity Check Tool

Evaluation Team Member_____

School_____ Date_____

Nutrition Education Fidelity Check

Fidelity to Lesson Plan

Topics

Nutrition educator asks students to share "sometimes foods" for each food group	Yes	No
Nutrition educator asks students why these foods should be eaten less	Yes	No
Nutrition educator discusses sugar vs added sugar	Yes	No
Nutrition educator explains how to find out if a food has added sugars	Yes	No

Activities

Nutrition educator displays six beverage cards and asks which has most added sugar	Yes	No
Students guess how much added sugar is in each beverage on their hand out	Yes	No
Students are provided with bag with 20 sugar cubes	Yes	No
Nutrition educator shows them that 1 sugar cube = 1 teaspoon of sugar	Yes	No
Nutrition labels number of grams of added sugar for each beverage	Yes	No
Students document this on their hand out	Yes	No
Students calculate how many teaspoons that is	Yes	No
Students stack sugar cubes to demonstrate how much sugar is in each beverage	Yes	No
Nutrition educator and students discuss activity	Yes	No

Taste tests

Are taste tests performed during the nutrition education lessons for this school?	Yes	No
If yes		
Did students taste Fruit infused water	Yes	No
Did students taste Whole grain crackers	Yes	No

Observations

Classroom Management and Organization	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The educator manages time well	1	2	3	4	5
The educator frequently monitors the behavior of all students	1	2	3	4	5
The educator interacts positively with students	1	2	3	4	5
The educator provides clear directions to students	1	2	3	4	5
Comments:					

Classroom Environment	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The educator makes students feel accepted	1	2	3	4	5
The educator encourages students to be involved	1	2	3	4	5
The educator manages inappropriate behavior effectively	1	2	3	4	5
The educator shows enthusiasm for the curriculum content	1	2	3	4	5
The educator conveys the importance of the content5	1	2	3	4	5
The educator provides clear direction	1	2	3	4	5
The classroom environment is inviting	1	2	3	4	5
Comments:					

Instruction	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The educator is prepared to present the lesson	1	2	3	4	5
The educator monitors students understanding of the curriculum and adjusts instruction when appropriate	1	2	3	4	5
Comments:					

Students	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Students are eager to participate in nutrition education activities	1	2	3	4	5
Students respond appropriately to the educator	1	2	3	4	5
Students ask appropriate questions when they want clarification or do not understand	1	2	3	4	5
Students seem to enjoy the lessons	1	2	3	4	5
Students seem to enjoy the hands-on or inter-active activities	1	2	3	4	5
Comments:					

Classroom Teacher	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The classroom teacher was in the room during the nutrition education lesson	1	2	3	4	5
The classroom teacher participated throughout the nutrition education lesson	1	2	3	4	5
Comments:					