LAURIE M. TISCH CENTER FOR FOOD, EDUCATION & POLICY

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Tisch Report

Edible Schoolyard New York City Evaluation at Manhattan Showcase School, PS 7

Report on data collected 2013-2016

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Laurie M. Tisch Center for Food, Education & Policy
Program in Nutrition
Teachers College, Columbia University

The Center cultivates research about connections between a just, sustainable food system and healthy eating and translates it into recommendations and resources for educators, policy makers, and community advocates. The Center focuses on schools as critical levers for learning and social change.

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Executive Summary

Introduction

This report describes an evaluation of the Edible Schoolyard New York City (ESYNYC) programming at PS 7 elementary school in East Harlem, New York. In 2013, ESYNYC established PS 7 as their Manhattan Showcase School. Through ESYNYC programming, students have engaging, sensory-based experiences with gardening, harvesting, cooking, and eating food together as a community.

ESYNYC engaged the Laurie M. Tisch Center for Food, Education & Policy (Tisch Food Center) to conduct a longitudinal evaluation measuring changes in students' understandings, beliefs, and eating behaviors over multiple years. While health outcomes are not being measured in this study, the long-term goal is that changing students' understandings, beliefs and behaviors could lead to improved health. This evaluation has taken place over four school years to date: baseline data collection prior to any ESYNYC programming (2013), after one (2014), two (2015), and three (2016) years of programming. Between data collection in 2013 and 2014, students received partial programming (7 kitchen classroom lessons and no gardening lessons). Between data collection in 2014 and 2015 as well as 2015 and 2016, students received full programming (9 kitchen classroom lessons and 20 garden lessons).

In addition, Wellness in the Schools (WITS) was initiated and implemented during the course of the ESYNYC evaluation. WITS transitioned the school from the "standard" hot lunch menu to the "alternative" menu which includes more scratch-cooked meals. More specifically, this meant less processed entrées, more interesting cooked vegetables, more whole fruit, and expanded salad bar. This created a dramatic shift in the types of food, as well as presentation, at school lunch at PS 7.

Data Collection

The main outcome data for 2016 were: (1) consumption of fruits and vegetables at school lunch, measured by using digital photography to take a pre-meal photo of what the students had for lunch (both from school food and food brought from home), and a post-meal photo to determine what and how much students ate for lunch for K–8th grade students, and (2) students' understandings, beliefs, and behaviors about fruits and vegetables, candy, sweetened beverages, and other foods, using a multiple choice questionnaire. Students took this Beliefs Questionnaire through "Audience Response System" (ARS). Students used clickers to respond to questions shown on a PowerPoint. These data were collected and analyzed for trends for third, fifth, and eighth grade students.

Results

School lunch consumption data were collected on over 300 students each year. Student questionnaires were collected on approximately100 students each year. Overall, results suggest some positive and some negative changes:

The statistically significant positive changes from the school lunch consumption data from baseline (2013) to 2016 include:

- Percentage of students who had salad bar on tray increased from less than 1% to almost 13%.
- Percentage of students who ate fruit and vegetable steadily increased. Students who ate any fruits and/or vegetables increased from 31% to 46%. More specifically, students who ate vegetables (cooked or salad bar) increased from 11% to 21%, salad bar increased from 0.3% to 10%, and fruit increased from 32% to 45%.
- Among the students who had cooked vegetable on their tray, average portion consumed increased from 8% to 23%. Whereas, for salad bar and fruit, average portion consumed remained the same at 50% and 42% respectively.

The statistically significant negative changes from the school lunch consumption data from baseline (2013) to 2016 include:

- Percentage of students who had vegetable (cooked or salad bar) on their tray decreased from 83% to 46%. This decrease occurred in 2014 and has remained low.
- Percentage of students who ate cooked vegetable increased slightly from 11% to 14%, but this was not statistically significant.
- Percentage of students who ate grain decreased from 91% to 61%. Percentage of students who ate protein decreased from 92% to 65%. Percentage of students who drank milk decreased from 35% to 20%. The decrease in these food groups occurred in 2014. Grain and protein have remained low since 2014. Whereas, milk statistically

Executive Summary (continued)

increased, 7% in 2014 to 14% in 2015, but 2016 is still below baseline.

- Number of total food groups (out of 5) students had on their tray decreased from 3.9 to 3.2. Number of food groups students ate decreased from 2.6 to 2.0.

The statistically significant positive changes in students' reported understandings, beliefs and behaviors from the Beliefs Questionnaire are:

- Third grade students are eating less candy and drink fewer sweetened beverages and intend to keep doing this in the future. They also intend to drink more water.
- Fifth grade students increased their belief that if they eat vegetables they will be healthier.
- Eighth grade students are drinking more water.

The statistically significant negative changes in students' reported understandings beliefs and behaviors are:

- Third grade students like spinach less, are less likely to try a new soup or salad, and are less confident they can make soup.
- Fifth grade students like spinach less and eating less fruit.
- Eighth grade students reported decreased intention to go food shopping with their parents

However, very few questions had statistically significant changes. Third graders answered 29 questions with 5 having favorable changes, and 4 having unfavorable change. Fifth and eighth graders answers 34 questions, with fifth graders having 1 with favorable and 2 with unfavorable changes and eighth graders having 1 favorable and 1 unfavorable.

Conclusions

1) School Lunch Eating Patterns Have Changed: A increasing percentage of students are eating fruits and vegetables from 2013 to 2016, with salad bar consumption being the main contributor to increasing vegetable consumption. Students eating grain and protein was highest in 2013 when these were finger foods (chicken tenders, mozzarella sticks, and pizza). After the switch to the alternative menu in 2014, when grain and protein became more scratch cooked, fewer students have eaten these food groups and this has stayed low.

2) Understandings, beliefs, and behaviors have mostly been unchanged: Overall there were very few reported changes in students' understandings, beliefs, and behaviors related to food intake outside of school lunch.

Research Recommendations

1) Continue Data Collection: Continuing longitudinal data collection for the next several years can provide more data to understand the process of change and the impact of multiple years of ESYNYC programming.

2) Consider Adding a Parallel Qualitative Study: Qualitative data such as in-depth interviews with students can provide a richer understanding of how ESYNYC programming is impacting them and if and how they are translating what they are learning into practice in their day-to-day lives.

Programming & Practice Recommendations

1) Encourage Students to Eat School Lunch: The steady increase in eating fruits and vegetables is encouraging. However, there is still room for improvement, with 54% of students not eating any fruit and vegetables. At the same time the decreases in grain, protein, and milk consumption are concerning. Greater efforts to encourage school meal consumption could help further increase fruit and vegetable consumption and increase grain, protein, and milk consumption. *See the full report for specific recommendations.*

2) Provide Stronger Educational Messages: The outcomes measured on the Beliefs Questionnaire are factors that the nutrition education literature have found lead to the adoption of more healthful eating behaviors. Yet, there were few favorable changes. Reinforcing educational messages around these factors (e.g., preferences for plant foods, benefits of healthful eating, and confidence in cooking) throughout ESYNYC programming in the kitchen classroom and garden as well as in the cafeteria and in the greater school environment could lead to favorable changes on more questions, which in turn could lead to more healthful eating behaviors. *See the full report for specific recommendations.*

Introduction

As a nation we are working collectively to reduce the high rates of childhood obesity, connect people to food through gardening and cooking, and create a food system that promotes ecological sustainability and social justice. Schools are critical in this change process because at school students can have both education about food and daily access to healthy foods through our federal child nutrition programs that provide students with meals and snacks. Combining healthy food access with nutrition education has the potential to both change how students eat and their beliefs and understandings about food.

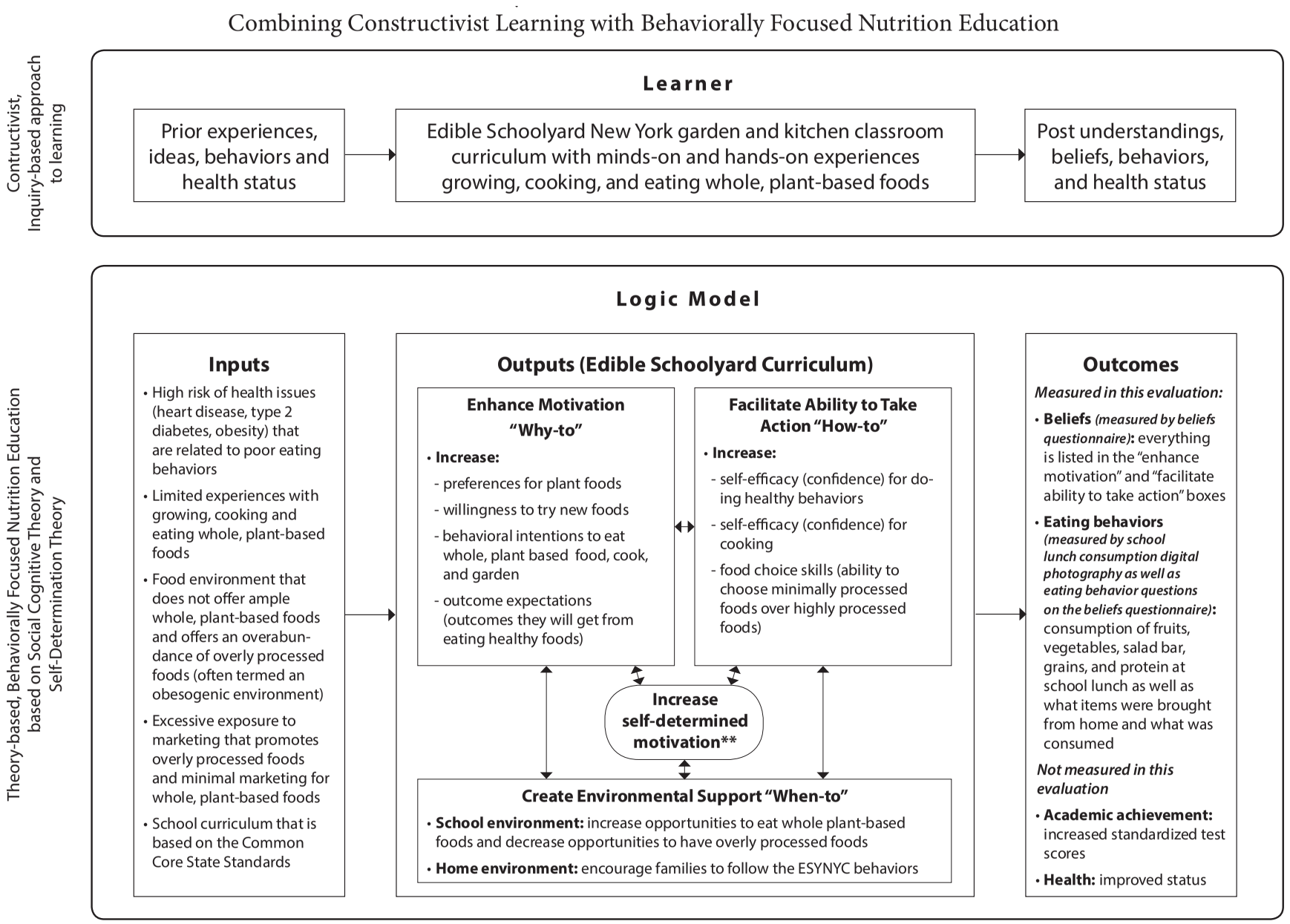
This evaluation provides a better understanding of how one specific program, ESYNYC, influences behaviors and attitudes when students are exposed to education that includes cooking and gardening and school lunches that are more scratched cooked and contain more whole foods and less processed foods.

Study Design

This evaluation is a longitudinal study, in one school building that contains two schools (PS 7 and Global Tech) that is examining the effects of the ESYNYC intervention on changing students' eating behaviors as well as their attitudes towards food. The ultimate goal is that this will improve the students' health (See Figure 1). ESYNYC engaged the Laurie M. Tisch Center for Food, Education & Policy (Tisch Food Center) to conduct this evaluation. To date, data has been collected over four school years: (see below). This report is a comparison across all four years of data collection, to track changes over time.

- ***2013: Baseline data collection:*** Data collection prior to any ESYNYC programming.
- ***2014: Post 1 data collection:*** During this year students received partial Edible Schoolyard NYC programming, specifically, 7 Kitchen Classroom lessons. The kitchen classroom lessons provide students opportunities to explore whole, plant-based foods, learn about the benefits of eating these foods, prepare recipes together and then eat as a community. Additionally, through working with another program, Wellness in the Schools (WITS), the lunch menu was transitioned from the "standard" hot lunch menu to the "alternative" menu which includes more interesting cooked vegetable recipes, more whole fruit, an expanded salad bar and more scratch cooked entrées. This created a dramatic shift in what was served and how they were presented.
- ***2015: Post 2 data collection:*** During this year students received full Edible Schoolyard NYC programming. This included 9 kitchen classroom lessons and 20 garden lessons. Kitchen classroom lessons are usually about once a month. During these lessons student take part in motivational activities that build excitement about eating whole plant foods, learn about food, cook, and eat what they prepared. As they eat they discuss how they will incorporate eating more whole plant foods and less processed foods (e.g., candy, chips, soda) into their day-to-day lives. Students receive 2 gardening lessons a month throughout the school year. The garden lessons are connected to many different academic subjects and allow students to learn about plants structure and function, cultural foods, history of food, and basic gardening skills. Additionally, WITS programming continued, as described above.
- ***2016: Post 3 data collection:*** Edible Schoolyard NYC and WITS programming continued, as described above. Students received 8 kitchen classroom and 8 garden lessons during this school year.

Figure 1: Edible Schoolyard New York City New York City Curriculum Framework



* Edible Schoolyard New York behaviors are: eat more whole, plant-based foods and eat less overly processed (sweetened beverages, candy, chips, pre-packaged baked goods) foods

** Self-determined motivation is the center because this is creating an internal desire to want to the ESYNY behaviors (through their minds-on and hands-on experiences in the curriculum)

Student Outcome Measures

We collected outcome data in two forms:

1) data on fruit and vegetable school lunch consumption using digital photography, reported in three ways: a) what food categories (cooked vegetables, fruit, grain, protein, milk, salad bar) were on students' tray, b) what food categories students ate (at least one bite), and c) the portion of each food category student consumed; and

2) beliefs and understandings about eating fruits and vegetables using a multiple choice Beliefs Questionnaire. The student outcome measures were determined from the Edible Schoolyard New York City Curriculum Framework (Fig. 1).

School Lunch Consumption

In winter 2013, the Tisch Food Center staff, ESYNYC staff, and PS 7 principal met to plan for this evaluation. This team reviewed the 4-week cycle school lunch menu and chose 3 days where vegetables were served as a separate side dish (as opposed to when the vegetables are mixed with other foods in a dish). The 3 vegetables chosen were: spinach, carrots, and green beans. All three were cooked and served hot. Since the menu changed to the alternative menu for the 2014 data collection, the planning team reconvened to review this new 4-week cycle menu and chose 3 days for data collection in which these same three vegetables were served, albeit prepared differently. In 2015 and 2016, the menu changed such that we were not able to observe the same 3 vegetables. In 2015 vegetables observed were broccoli, zucchini coins, sweet potato fries, all cooked and served hot, and raw carrots. In 2016 vegetables were raw and cooked carrots, sweet potato fries or wedges, kale salad, and braised collards. These vegetables were thought to have similar likability to the vegetables observed in the previous years.

Digital photography was used to measure foods on the tray and food intake (food actually consumed) during school lunch. Any food brought from home (e.g. sweetened beverages, packaged snack foods, fruit etc) were added to the tray prior to photographing. On each day of data collection, students were given a label with their unique identifying (ID) code number (with grade and student code). Stickers with that code were placed on student trays so the students unique ID was visible in all photographs. Students kept the same code throughout all years of the evaluation and this same ID was also used for the Beliefs Questionnaire. Photographs were taken before lunch was consumed and immediately after the student completed lunch prior to throwing away their tray.

Beliefs Questionnaire

The survey used was designed specifically for ESYNYC, based on discussion between Tisch Food Center and ESYNYC staff members. Three versions of the questionnaire: K–1, 2–3, and 4–8 were created to reflect students' cognitive development. In 2015, ESYNYC decided to only administer the survey to grades 3, 5, 7, and 8 for all future years of data collection. In 2015, some of the questions were modified to reflect changes in the ESYNYC programming. The kind of data collected on this questionnaire are listed below, with the grades for each:

Enhance Motivation "Why-to"

- preferences for whole plant-based foods (K–8)
- willingness to try new foods (K–8)
- behavioral intentions (eating) (K–8)
- behavioral intentions (food related activities) (K–8)
- outcome expectations (what health outcome they believe they would get from healthy behaviors) (4–8)

Facilitate Ability to Take Action "How-to"

- self-efficacy (confidence) for doing healthy behaviors (2–8)
- self-efficacy (confidence) for cooking (2–8)
- food choice questions (students are shown a whole, minimally processed food and highly processed food and choose which they would want to eat) (K–8)

Eating Behaviors

- eating behaviors for fruits, vegetables, snack foods, candy, and sweetened beverages (K–8)

The questions were administered using PowerPoint® slides, with one question per slide, and responses captured via Meridia® audience response system (ARS) software. Using this system, students used individual wireless "clickers" to enter their responses. We paired the students identifying code (same code as used for the school meal consumption) with the "clicker" they used for the survey.

Data Collection

We collected school lunch consumption data, using digital photography and the Beliefs Questionnaire, using ARS software during all four years of data collection. Details for each year are below.

Data Collection in 2013: In spring 2013, we collected data from all K–7 grade students. We did not collect from 8th grade students since they would graduate out of PS 7 before the ESYNYC intervention would begin. We collected the questionnaires from all classes (14 classes and 300 students). For the 2016 analysis we only used the data from third, fifth, and eighth grade students. We also collected 3 days of digital photos of school lunch consumption. The number of trays with before and after meal photos were 256 on day 1, 262 on day 2, and 285 on day 3, totally 803. This represented 323 students.

Data Collection in 2014: In spring 2014, we collected data from all K–8 grade students. We collected the questionnaires from all classes (14 classes and 259 students). For the 2016 analysis we only used the data from third, fifth, and eighth grade students. We also collected 3 days of digital photos of school lunch consumption. The number of trays with before and after meal photos were 276 on day 1, 295 on day 2, and 292 on day 3, totaling 863. This represented 349 students.

Data Collection in 2015: In spring 2015, we collected school lunch consumption data from all K–8 grade students. Due to classes being on field trips on data collection days, we collected on 5 days to capture 3 days of data from all students. The number of trays with before and after meal photos were 268, 227, 252, 59, and 30 students on the 5 days respectively, totaling 836. This represented 331 students.

We collected the student beliefs questionnaires from 4 grades: third, fifth, seventh, and eighth (8 classes and 148 students). For the 2016 analysis the seventh grade data was not used.

Data Collection 2016: In spring 2016, we collected data school lunch consumption data from all K–8 grade students over 4 days. We also collected data from Global Tech. However, these data were not included in the analysis comparing the four years of data. The number of trays with before and after meal photos were 207, 206, 174, and 150 students over the four days, totaling 737. This represented 307 students.

We collected the student Beliefs Questionnaires from 3 grades from PS 7, third, fifth, and eighth and from seventh grade at Global Tech.

School Lunch Menus for Data Collection Days

Table 1 shows the menus for the 3 days of data collection in 2013 and 2014, 5 days in 2015, and 4 days. Salad bar was offered every day of data collection, with the salad bar having more items in 2014–16 with the WITS program than in 2013.

Please note, green shading is 2013, red shading 2014, gray shading 2015, and yellow shading is 2016. See Appendix A for photos of example students' trays on the days of data collection.

Table 1: School Lunch Menus for day of School Lunch Consumption Digital Photography

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)
02.25.2013	cooked spinach	whole orange bagged apple slices	breading on chicken tenders	chicken in chicken tenders	peanut butter and jelly "bar"
02.27.2013	green beans	whole orange	breading on mozzarella sticks	cheese in mozzarella sticks	peanut butter and jelly sandwiches on whole wheat bread
03.04.2013	roasted carrots salad (not from salad bar)	whole orange bagged apple slices	crust of pizza breading on mozzarella sticks	cheese in pizza or mozzarella sticks	peanut butter and jelly "bar"
03.06.2014	roasted carrots braised collards tomatillos	whole orange whole apple whole banana	herbed rice pilaf pasta in "cheesy based rotini"	chickpeas with tomatillos cheese in "cheesy baked rotini	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
03.26.2014	green beans raw baby carrots with substitute entrée	whole orange whole apple whole banana	corn bread	BBQ chicken (on bone) roasted organic tofu	peanut butter and jelly on whole wheat cheese sandwich on whole wheat hummus and pretzels
03.31.2014	spinach lettuce and tomato (optional with wrap)	whole banana	whole wheat tortillas	chick pea falafel grilled chicken	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
04.28.2015	sweet potato waffle fries	frozen peach cup	whole wheat bun whole wheat crackers	turkey burger chicken breast	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
05.11.2015	broccoli	frozen peach cup	manicotti pasta	cheese filling of manicotti	peanut butter and jelly on whole wheat cheese sandwich on whole wheat

Table 1: School lunch menus for day of school lunch consumption digital p hotography (continued)

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)
05.20.2015	broccoli	frozen peach cup	brown rice hard corn taco shell	beans in chili	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
05.21.2015	zucchini coins beans	whole orange whole apple whole banana	brown rice hard corn taco shell whole wheat penne pasta	chicken on the bone	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
05.26.2015	raw carrots sweet potato chunks	whole orange whole apple	whole wheat bun	turkey burger chicken breast hummus	peanut butter and jelly on whole wheat cheese sandwich on whole wheat
05.03.2016	cooked carrots fresh baby carrots	apple slices whole apple	whole wheat bun rice	turkey burger bean chili	peanut butter and jelly sandwich on whole wheat cheese sandwich on whole wheat
05.10.2016	sweet potato wedges, roasted	peach cup OR whole apple	whole wheat tortilla	chicken chili	peanut butter and jelly sandwich on whole wheat cheese sandwich on whole wheat
05.13.2016	kale salad	peach cup OR strawberry cup OR apple slices OR whole aple	whole wheat tortilla OR whole wheat pizza crust OR whole wheat calzone crust	black beans in tortilla cheese in pizza and calzone chicken chili lentil chili	peanut butter and jelly sandwich on whole wheat cheese sandwich on whole wheat
05.18.2016	collards, braised	apple slices	whole wheat empanada crust whole wheat tortilla brown rice	black beans (inside empanadas) cheese and corn (inside quesadilla)	peanut butter and jelly sandwich on whole wheat cheese sandwich on whole wheat

Data Analysis

After data were collected, the school lunch consumption digital photo data needed to be coded and then analyzed, and the understanding, beliefs, and behaviors from the Beliefs Questionnaire needed to be "cleaned" (data base prepared for analysis) and analyzed.

School Lunch Consumption Digital Photography: Data Coding and Analysis

After the research team returned from taking photographs in the cafeteria, all photographs were uploaded and named with the student code number, date, and labeled as pre- or post-meal.

Prior to coding data, the research team created a detailed coding manual that listed all foods and details about how to code each item (see Appendix B). This coding manual was continually refined as the research team analyzed data.

Side-by-side pairs of photos (before and after lunch) were then visually assessed for foods from each category (fruit, cooked vegetables, and salad bar) and consumption (as 0%, 10%, 25%, 50%, 75%, 100% of the volume that disappeared). A random subset (10%) of the photos was assessed by at least two more researchers, as were any questions that arose when coding intake. Any discrepancies and questions were discussed until consensus was reached.

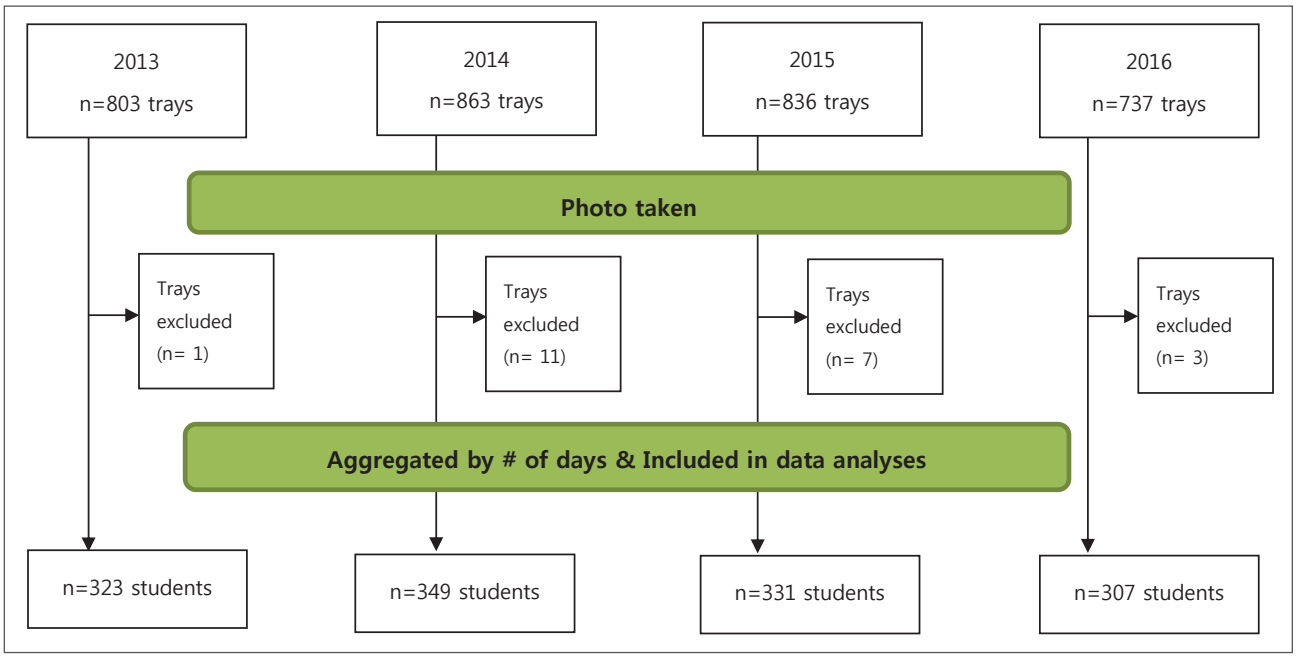
All students who had at least 1 day of before and after meal photos were included in the analysis. This assumes that students missing one or more days of data happened at random.

For each year, each student had one set of data, even if we had meal photos for more than one day. We did this by aggregating all days of data. For each food category (vegetable, fruit, grain, protein, milk, and salad bar) we calculated three variables: "on the tray," "ate any," and "portion consumed."

We conducted the data analysis with a test called Analysis of Variance (ANOVA) for each variable for each food category. We also conducted a test called Tukey's post-hoc comparisons to determine statistically significant differences among the four years. When there were any grade differences (lower grades include k-3rd, and upper grades include 4-8th grades), we conducted analyses separately for lower and upper grades.

Figure 2 presents the number of trays with before and after meal photos from each school year. We excluded trays if one or both photos were poor quality. When students had multiple days of data during the same year, we aggregated all days of data to have one set of data for each student for each year.

Figure 2: School lunch consumption data flow chart



Foods From Home

We conducted descriptive statistics to determine if students had no food, school food only, home food only, or both. Also, for food from home, specific types of foods (e.g., salty snacks, fruit, sugar sweetened beverages) are reported. Percentages are shown for all four years of data.

Belief Questionnaire: Data Analysis

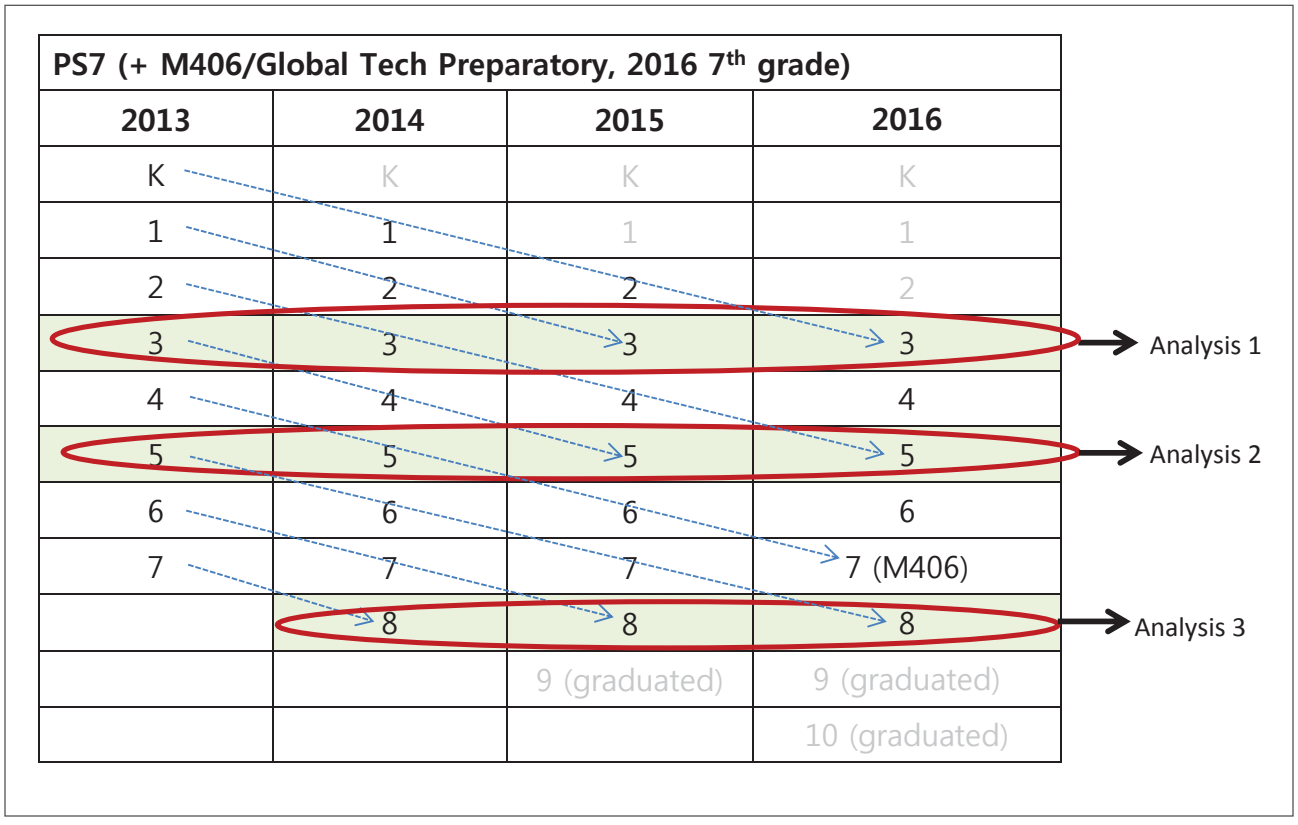
Based on the revised 2015 version of the survey, questions were matched among all four years of data collection. In 2015 and 2016, 3rd, 5th, 7th, and 8th grade students participated in the survey. There were two versions of the survey: one for 3rd (lower) grade and the other for 5th, 7th, and 8th (upper) grades. There were three separate data analyses, as described below. Considering that there are different types of questions and response options based on students' grade and study year, we compare students from the same grade each year over the 4 years, see Figure 3.

- Analysis 1 compares 3rd graders over all four years
- Analysis 2 compares 5th graders over all four years
- Analysis 3 compares 8th graders for 2014–2016

We conducted a test called Analysis of Variance (ANOVA) for each of the five analyses and performed Tukey's post-hoc comparisons to determine differences among the four years.

We also collected data from the seventh grade students at Global Tech. Since this was the first year of data collection for this school, and it is uncertain how much ESYNYC programming these students received, we are reporting only descriptive statistics for the Global Tech seventh grade students.

Figure 3: Beliefs Questionnaire data analysis flow chart



Results

The results section provides the results of the school lunch consumption and the Beliefs Questionnaire.

Lunch Consumption Items on trays and Items Consumed

Table 2 shows what percentage of students had each of the offered meal items on their tray [Tray] and what percentage of students (of those who had it on their tray) ate at least a bite (10% or more) of this food item [Ate].

Table 2: Percentage of students who had meal item on tray and percentage (of those who had it on their tray) who ate at least some (≥ a bite or 10%)

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)
2.25.2013 n=256	cooked spinach TRAY: **84.8%** ATE: **9.7%**	whole orange TRAY: **50.4%** ATE: **24.8%** bagged apple slices TRAY: **11.7%** ATE: **36.7%**	breading on chicken tenders TRAY: **84.8%** ATE: **82.9%**	chicken in chicken tenders TRAY: **84.8%** ATE: **82.9%**	peanut butter and jelly "bar" TRAY: **8.6%** ATE: **59.1%**
2.27.2013 n=262	green beans TRAY: **74.9%** ATE: **10.7%**	whole orange TRAY: **51.9%** ATE: **37.5%**	breading on mozzarella sticks TRAY: **74.8%** ATE: **81.1%**	cheese in mozzarella sticks TRAY: **74.8%** ATE: **82.1%**	peanut butter and jelly sandwiches on whole wheat bread TRAY: **11.5%** ATE: **76.7%**
03.04.2013 n=285	roasted carrots TRAY: **44.4%** ATE: **13.5%** salad (not from salad bar) TRAY: **25.4%** ATE: **8.3%**	whole orange TRAY: **28.5%** ATE: **28.4%** bagged apple slices TRAY: **41.9%** ATE: **44.9%**	crust of pizza TRAY: **10.2%** ATE: **82.8%** breading on mozzarella sticks TRAY: **59.5%** ATE: **82.8%**	cheese in pizza or mozzarella sticks TRAY: **69.7%** ATE: **82.8%**	peanut butter and jelly "bar" TRAY: **19.4%** ATE: **69.1%**

Table 2: Percentage of students who had meal item on tray and percentage (of those who had it on their tray) who ate at least some (≥ a bite or 10%) [continued]

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)*
03.06.2014 n=276	roasted carrots TRAY: **10.6%** ATE: **3.8%** braised collards TRAY: **13.1%** ATE: **21.9%** tomatillos TRAY: **17.1%** ATE: **31.0%**	whole orange TRAY: **15.1%** ATE: **56.8%** whole apple TRAY: **44.9%** ATE: **59.1%** whole banana TRAY: **6.1%** ATE: **26.7%**	herbed rice pilaf TRAY: **16.3%** ATE: **67.5%** pasta in "cheesy baked rotini" TRAY: **41.2%** ATE: **68.3%**	chickpeas with tomatillos TRAY: **16.7%** ATE: **29.3%** cheese in "cheesy baked rotini" TRAY: **40.8%** ATE: **68.0%**	PB&J** TRAY: **13.9%** ATE: **79.4%** cheese sandwich TRAY: **7.3%** ATE: **50.0%**
03.26.2014 n=295	green beans TRAY: **24.9%** ATE: **7.8%** raw baby carrots with substitute entrée TRAY: **7.0%** ATE: **55.6%**	whole orange TRAY: **0.8%** ATE: **50.0%** whole apple TRAY: **21.0%** ATE: **50.0%** whole banana TRAY: **30.4%** ATE: **50.0%**	corn bread TRAY: **58.8%** ATE: **67.5%**	BBQ chicken (on bone) TRAY: **64.2%** ATE: **72.1%** roasted organic tofu TRAY: **0.8%** ATE: **0.0%**	PB&J** TRAY: **11.3%** ATE: **86.2%** cheese sandwich TRAY: **3.9%** ATE: **50.0%** hummus and pretzels TRAY: **7.4%** ATE: **57.9%**
03.31.2014 n=292	cooked spinach TRAY: **12.9%** ATE: **36.4%** lettuce and tomato (optional with wrap) TRAY: **25.1%** ATE: **50.0%**	whole banana TRAY: **52.9%** ATE: **71.1%**	whole wheat tortillas TRAY: **18.8%** ATE: **29.2%**	chick pea falafel TRAY: **16.1%** ATE: **63.4%** grilled chicken TRAY: **32.9%** ATE: **63.1%**	PB&J** TRAY: **20.0%** ATE: **66.7%** cheese sandwich TRAY: **10.2%** ATE: **53.8%**

* all sandwiches on whole wheat
** PB&J = peanut butter and jelly

Table 2: Percentage of students who had meal item on tray and percentage (of those who had it on their tray) who ate at least some (≥ a bite or 10%) [continued]

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)*
04.28.2015 n=232	sweet potato waffle fries TRAY: **46.1%** ATE: **46.2%**	peach cup TRAY: **66.8%** ATE: **61.4%**	whole wheat bun TRAY: **73.5%** ATE: **80.0%**	turkey burger TRAY: **45.6%** ATE: **78.3%** chicken breast TRAY: **33.3%** ATE: **72.7%**	PB&J** TRAY: **15.2%** ATE: **62.9%** cheese sandwich TRAY: **5.2%** ATE: **58.3%**
05.11.2015 n=186	broccoli TRAY: **30.1%** ATE: **28.6%**	peach cup TRAY: **89.2%** ATE: **60.5%**	manicotti pasta TRAY: **45.2%** ATE: **78.0%**	cheese filling of manicotti TRAY: **45.2%** ATE: **76.3%**	PB&J TRAY: **43.5%** ATE: **78.3%** cheese sandwich TRAY: **10.2%** ATE: **63.2%**
05.20.2015 n=210	broccoli TRAY: **25.5%** ATE: **26.2%**	peach cup TRAY: **68.1%** ATE: **70.7%**	brown rice OR TRAY: **45.1%** ATE: **75.0%** hard corn taco shell TRAY: **54.3%** ATE: **81.8%**	beans in chili TRAY: **52.9%** ATE: **59.6%**	PB&J TRAY: **20.1%** ATE: **64.3%** cheese sandwich TRAY: **24.4%** ATE: **76.5%**
05.21.2015 n=55	zucchini coins TRAY: **7.3%** ATE: **0%** beans TRAY: **54.5%** ATE: **43.3%**	whole orange TRAY: **20.4%** ATE: **36.4%** whole apple TRAY: **13.0%** ATE: **57.1%** whole banana TRAY: **37.0%** ATE: **70.0%**	brown rice TRAY: **54.5%** ATE: **50%** hard corn taco shell TRAY: **3.6%** ATE: **100%** whole wheat penne pasta TRAY: **29.1%** ATE: **18.8%**	chicken on the bone TRAY: **74.2%** ATE: **93%**	PB&J TRAY: **7.3%** ATE: **100%** cheese sandwich TRAY: **3.6%** ATE: **50.0%**
05.26.2015 n=27	raw carrots TRAY: **51.9%** ATE: **14.3%** sweet potato chunks TRAY: **40.7%** ATE: **36.4%**	whole orange TRAY: **33.3%** ATE: **44.4%** whole apple TRAY: **3.7%** ATE: **100%**	whole wheat bun TRAY: **77.8%** ATE: **84.2%**	turkey burger TRAY: **51.9%** ATE: **85.7%** chicken breast TRAY: **25.9%** ATE: **57.1%**	PB&J TRAY: **11.1%** ATE: **66.7%** cheese sandwich TRAY: **11.1%** ATE: **66.7%** Hummus TRAY: **18.5%** ATE: **20.0%**

* all sandwiches on whole wheat

** PB&J = peanut butter and jelly

Table 2: Percentage of students who had meal item on tray and percentage (of those who had it on their tray) who ate at least some (≥ a bite or 10%) [continued]

Date	Vegetable(s)	Fruit	Grain(s)	Protein	Substitute grain/protein (sandwich)*
05.03.2016 n=206	carrots TRAY: **17.5%** ATE: **18.5%** fresh baby carrots TRAY: **19.4%** ATE: **58.8%**	apple slices TRAY: **27.2%** ATE: **60.6%** whole apple TRAY: **25.2%** ATE: **34.9%**	whole wheat bun TRAY: **62.6%** ATE: **81.8%** brown rice TRAY: **13.1%** ATE: **81.8%**	turkey burger TRAY: **62.6%** ATE: **86.4%** bean chili TRAY: **13.1%** ATE: **77.3%**	PB&J** TRAY: **9.2%** ATE: **72.7%** cheese sandwich TRAY: **9.2%** ATE: **70.6%**
05.10.2016 n=218	sweet potato wedges, roasted TRAY: **39.9%** ATE: **54.2%**	peach cup TRAY: **56.4%** ATE: **76.1%** whole apple TRAY: **13.1%** ATE: **83.3%**	whole wheat tortilla TRAY: **30.7%** ATE: **73.7%**	chicken chili TRAY: **44.5%** ATE: **72.0%**	PB&J TRAY: **22.0%** ATE: **73.8%** cheese sandwich TRAY: **11.9%** ATE: **61.9%**
05.13.2016 n=182	kale salad TRAY: **21.4%** ATE: **71.9%**	peach cup TRAY: **1.1%** ATE: **50.0%** strawberry cup TRAY: **59.9%** ATE: **78.6%** apple slices TRAY: **8.2%** ATE: **80.0%** whole apple TRAY: **1.1%** ATE: **50.0%**	whole wheat tortilla TRAY: **6.6%** ATE: **90.0%** whole wheat pizza crust TRAY: **65.4%** ATE: **96.2%** whole wheat calzone crust TRAY: **2.7%** ATE: **75.0%**	black bean TRAY: **6.6%** ATE: **90.0%** cheese TRAY: **68.1%** ATE: **91.7%**	PB&J TRAY: **3.3%** ATE: **100.0%** cheese sandwich TRAY: **3.8%** ATE: **85.7%**
05.18.2016 n=167	collard greens, braised TRAY: **22.8%** ATE: **5.9%**	apple slices TRAY: **55.1%** ATE: **85.7%**	whole wheat empanada crust TRAY: **28.1%** ATE: **97.7%** whole wheat tortilla TRAY: **9.0%** ATE: **80.0%** brown rice TRAY: **12.0%** ATE: **73.3%**	black bean in empanada TRAY: **28.1%** ATE: **97.1%** cheese and corn in tortilla TRAY: **9.0%** ATE: **80.0%** chicken chili TRAY: **10.2%** ATE: **58.3%** lentil chili TRAY: **3.0%** ATE: **40.0%**	PB&J TRAY: **23.4%** ATE: **78.8%** cheese sandwich TRAY: **3.0%** ATE: **80.0%**

* all sandwiches on whole wheat
** PB&J = peanut butter and jelly

Trends for Food Categories on Tray

Table 3 presents data on the percentage of students who had each food category on their tray for each year. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix C.

Table 3: Percentage of students with food categories on tray

Food Categories	2013	2014	2015	2016	p-value*
Anything from school lunch	91.2	*85.2*	*85.4*	*85.1*	.013
Fruit and /or vegetable	99.7	99.8	99.6	99.4	.701
Cooked vegetable	82.4	*39.5*	*39.7*	*37.1*	<.001
Salad bar	0.7	**6.4**	**16.7**	**12.8**	.001
Any vegetable (cooked or salad bar)	82.6	*44.2*	*48.6*	*46.2*	<.001
Salad bar only vegetable on tray	0.3	3.7	**7.5**	**8.1**	<.05
Fruit	67.0	65.2	71.0	65.5	.213
Grain#	96.5	*81.1*	**97.4**	*85.7*	<.001
Grain from hot meal	82.4	*50.4*	**62.2**	**65.8**	<.001
Grain from sandwich option	15.0	*31.4*	*34.8*	**20.9**	<.001
Protein#	96.5	93.3	97.2	93.6	.007
Protein from hot meal	82.4	*62.2*	*63.5*	**70.9**	<.001
Protein from sandwich option	15.0	*31.6*	*35.4*	**24.2**	<.001
Milk	44.9	**55.4**	*17.3*	*22.7*	<.001
Total number of food categories (out of 5)	3.9	*3.4*	*3.3*	*3.2*	<.001

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

\# For grain and protein, taking and eating more of the hot meal option is seen as a favorable change. Taking and eating more from the sandwich option, while good that the students are eating it is seen as unfavorable, as it shows a rejection of the hot meal option.

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter.

Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix C.*

Summary of statistically significant results

Overall

- Students who received school lunch decreased from 91% in 2013 to 85% in all other years.

Fruits and vegetables

- Percentage of students with cooked vegetables on the tray decreased in 2014, from 82% to 39%, and stayed at about that level in 2015 and 2016.

+ Percentage of students who chose to take salad bar increased from less than 1% to a high of almost 17%% in 2015. Although this dropped to 13% in 2016, this decrease was not statistically significant.

+ Percentage of students whose only vegetable was salad bar is increasing. The increase was statistically significant from 2014 to 2015.

Grain and Protein

- Percentage of students with grain on their tray decreased from 2013 to 2014 (97% to 81%). This increased to baseline level in 2015, but decreased again in 2016 (86%).

± Percentage of students with grain and protein from the hot meal decreased from 2013 to 2014. This increased in 2016, but has not yet reached the 2013 level.

± Percentage of students who chose the sandwich option (indicates rejection of hot meal grain and protein) increased from 2013 to 2014 (15% to 31%). This decreased in 2016 (21% for grain, 24% for protein), but has not decreased to baseline (2013).

Milk

- Percentage of students with milk on the tray was (45%) in 2013. After increasing in 2014 (55%), the percentage has significantly decreased and was 23% in 2016.

Food Categories

- Total number of food groups on the tray was higher in 2013 (3.9) than all other years, with the lowest level in 2016 (3.2).

Trends for Food Categories Students Ate

Table 4 presents data on the percentage of students who ate (at least a bite) for each food category. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix D.

Table 4: Percentage of students who ate any[a] of the food category

Food Categories	2013	2014	2015	2016	p-value*
Fruit and /or vegetable	30.7	**42.6**	**43.2**	**46.4**	<.001
Cooked vegetable	11.1	12.0	14.0	13.8	NS
Cooked vegetable (only student with vegetable on tray)	13.9	**35.3**	**38.2**	**41.2**	<.001
Salad bar	0.3	3.2	**9.4**	**9.7**	<.001
Any vegetable (cooked or salad bar)	11.2	14.8	**19.4**	**21.4**	<.001
Fruit	31.6	**44.3**	**42.9**	**45.0**	<.001
Fruit (only student with fruit on tray)	56.2	**80.7**	*62.1*	**70.9**	<.001
Grain	91.0	*60.2*	*64.6*	*60.5*	<.001
Grain from hot meal	76.1	*33.4*	**43.8**	**52.9**	<.001
Grain from sandwich option#	11.9	**21.3**	**25.9**	*13.1*	<.001
Protein	91.6	*71.4*	*67.4*	*65.1*	<.001
Protein from hot meal	76.5	*43.3*	*48.4*	**57.2**	<.001
Protein from sandwich option#	11.9	**21.6**	**25.3**	*15.5*	<.001
Milk	34.5	*7.4*	**13.9**	**19.6**	<.001
Total number of food categories (out of 5)	2.6	2.4	*1.9*	*2.0*	<.001

[a] "any" means ate at least a bite (10%). This is for all students, even students who did not have the food category on their tray.

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

\# For grain and protein from the sandwich option, while taking this is seen as unfavorable (from Table 3) a higher percentage of students eating more of any school meal item is always seen as favorable.

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix D.*

Summary of statistically significant results

Fruit and Vegetables

+ Percentage of students eating fruits and/or vegetables increased from 31% to 46%.

± Percentage of student with cooked vegetable on their tray who ate them increased from 14% to 41%. However, the percentage of students who had cooked vegetables on their tray dropped significantly in 2014 (Table 3). Overall the percentage of students eating vegetables has stayed constant (11-14%).

+ Percentage of students eating vegetables (cooked or salad bar) increased from 11% to 21%.

+ Percentage of students eating salad bar increased from 0.3% to 10%.

+ Percentage of students eating fruit increased from 32% to 45%.

Grain and Protein

- Percentage of students who ate grain or protein dropped from about 91% in 2013. This decreased to 61% for grain and 65% for protein in 2016.

± Specifically for grain and protein from the hot meal: percentage of students eating grain and protein decreased significantly from 91% for both in 2013 to 33% for grain and 43% for protein in 2014. Grain increased in both 2015 (44%) and 2016 (53%). Protein increased in 2016 (57%). However, this has still not returned to the 2013 levels.

Milk

- The percentage of student who drank milk dropped from 35% in 2013 to 7% in 2014. This is despite 2014 having the highest percentage of students with milk on their tray (Table 3). While this increased in 2015 and 2016 milk consumption is still below 2013 levels.

Food Categories

- The total number of food groups students consumed dropped in 2015 (from about 2.5 to 2.0 out of 5) and did not increase in 2016.

Trends for Portion Consumed for Food Categories

Table 5 presents data on the portion consumed of each food category for each year. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix E.

Table 5: Portion consumed (in percentage) for students who had food category on tray

Food Categories	2013	2014	2015	2016	p-value*
Cooked vegetable	7.7	14.7	**24.5**	**22.1**	<.001
Salad bar	50.0	45.6	47.3	49.9	.970
Fruit	40.7	**60.4**	*36.4*	*43.3*	<.001
Grain from hot meal	78.1	*57.0*	*51.0*	*58.6*	<.001
Grain from sandwich option#	58.9	*42.7*	*46.0*	*40.0*	.004
Protein from hot meal	79.7	*44.9*	**54.8**	**61.4**	<.001
Protein from sandwich option#	58.7	*41.6*	*45.2*	*42.8*	.009

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

\# While choosing the sandwich option shows a rejection of the hot meal (see Table 3). Eating a larger portion of anything served at school lunch is seen as favorable.

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix E.*

Summary of statistically significant results

Fruits and vegetables

\+ Portion consumed of cooked vegetables increased from 8% in 2013 to about 23% in 2015 and 2016.

± Portion consumed of fruit increased from 2013 (41%) to 2014 (60%). This decreased in 2015 (36%) and increased slightly in 2016 (43%). However, 2015 and 2016 are statistically the same as baseline.

Grain and Protein

\- Portion consumed of grain from hot meal decreased from 78% in 2013 to 57% for in 2014. This stayed statistically the same in 2015 and 2016.

\- Portion consumed of grain from sandwich option decreased from 59% in 2013 to 43% in 2014. This stayed statistically the same in 2015 and 2016.

± Portion consumed of protein from hot meal decreased from 80% in 2013 to 45% in 2014. Portion of protein consumed increased in 2015 (55%) and 2016 (61%), but is still statistically below baseline level.

- Portion consumed of protein from sandwich option decreased from 2013 (59%) to 2014 (42%) and has stayed statistically the same in 2015 and 2016.

Changes that were Significantly Different for Younger versus Older Students

Table 6 presents data on trends that were different for younger (K–3rd grade) and older (4th–8th grade) Students. These data are presented in Table 6. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix F.

Table 6: Comparison between younger (K-3rd grade) and older (4th-8th grade) students

Food Categories	2013	2014	2015	2016	p-value*
Trays with salad bar (younger)	0.5	5.2	**20.9**	**16.0**	<.001
Trays with salad bar (older)	0.8	**7.1**	**13.7**	**10.3**	<.001
Trays with fruit (younger)	81.7	*69.8*	*68.1*	*73.7*	.004
Trays with fruit (older)	53.1	62.6	**73.2**	**66.2**	<.001
Students eating any fruit# (younger)	37.3	**77.0**	*51.2*	*65.0*	<.001
Students eating any fruit# (older)	83.1	82.4	*70.6*	*76.0*	.03
Portion of fruit eaten# (younger)	23.9	**55.6**	*26.9*	*30.9*	<.001
Portion of fruit eaten# (older)	64.7	62.6	*43.7*	*54.0*	<.001

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

\# Only for students who had fruit on the tray.

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix F.*

Summary of statistically significant results

Fruits and vegetables

+ Percentage of students with salad bar on their tray increased for both younger (0.5% in 2013 to 16% in 2016) and older students (0.8% in 2013 to 10% in 2016). Younger students made greater increases.

- Percentage of younger students who had fruit on their tray decreased from 82% to 74%.

+ Percentage of older students who had fruit on their tray increased from 53% to 66%.

± Percentage of younger students who ate any fruit increased in 2014 but then decreased in 2015 and while the percentage increased in 2016, the increase from 2015 to 2016 is not statistically significant.

- Percentage of older students who ate fruit decreased in 2015 and although the percentage increased in 2016, this increase was not statistically significant.

± Portion consumed of fruit for younger students increased from 24% in 2013 to 56% in 2014 but then this decreased to 27% in 2015. While the percentage in 2015 and 2016 are higher than 2013, they are statistically significant, so overall portion consumed has stayed stable.

- Portion consumed for fruit for older students decreased in 2015 (2013 65% and 2015 44%. This increased to 54% in 2016 but is still below baseline (2013).

Trends for Food From Home

Table 7 presents the data on the source of students' food (school lunch, home, both, none). Table 8 presents the types of foods students brought from home. These data are only descriptive. We did not conduct statistical tests.

Table 7: Percentage of students who had food from school and home

Source of food	2013 (n=802)	2014 (n=852)	2015 (n=829)	2016 (n=875)
No food	1.7	4.2	4.2	5.5
Food from home only	6.6	9.0	10.0	7.7
School food only	75.3	74.5	72.9	71.1
Both school and home food	16.3	12.3	12.9	15.3

Table 8: Percentage of students with different types of home food

Type of food	2013 (n=802)	2014 (n=852)	2015 (n=829)	2016 (n=875)
Anything brought from home	22.9	23.5	22.9	23.1
Sugar sweetened beverages	13.7	14.1	12.1	11.4
Water	2.3	3.1	4.3	2.9
Salty snacks	8.0	10.7	10.4	9.6
Candy	2.4	3.2	3.5	3.1
Granola or baked goods	6.5	7.7	6.2	8.1
Vegetables	0.2	0.2	0	0.5
Fruit	1.7	2.6	2.3	2.3

Trends from the Questionnaire data

As describe above, we analyzed the Beliefs Questionnaire for the PS 7 students in 3rd, 5th and 8th grade (see Figure 3 on page 15). Presented below are only the questions that have statistically significant changes over the four years of data collection.

Trends for Third Grade Students

The third grader Beliefs Questionnaire had 29 questions that were compared over the four years. Most questions did not show any changes over the years, with only the 9 questions shown below having statistically significant differences over the years of data collection, see Table 9. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix G.

Table 9: Third grade questionnaire, questions with significant changes

Questions	2013	2014	2015	2016	p-value*
2. I like the taste of spinach (0–1)[a]	.41	.45	**.78**	*.52*	.022
10. I eat candy (1-3)[b]	2.40	2.25	**1.94**	**1.91**	<.001
12. I drink soda, fruit drink or other sweetened beverages (1–3)[b]	2.56	2.65	2.40	**2.12**	.020
17. I would try a new soup (1–3)[c]	2.71	2.24	2.53	*2.15*	.012
18. I would try a new salad (1–3)[c]	2.35	2.41	2.72	*2.08*	.021
24. I can make a soup (1–4)[d]	3.09	3.00	2.69	*2.22*	.017
39. I would eat candy (1–4)[f]	1.78	2.00	2.19	**2.46**	.043
40. I would eat drink soda, fruit drink and other sweetened drinks (1–4)[f]	1.97	2.00	1.88	**2.65**	.028
42. I would drink water (1–4)[g]	3.13	3.13	3.58	**3.85**	.010

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

Answer choices footnotes same as in Appendix, which is why some letters are skipped

a. 0=don't like; 1=like
b. 1=hardly ever; 2=a few times a week; 3=every day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
f. 1=most days; 2=some days; 3=once in a while; 4=hardly ever
g. 1=hardly ever; 2=once in a while; 3=some days; 4=most days

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix G.*

Summary of statistically significant results

± Although the percentage of students who liked the taste of spinach increased in 2015 (from 41% in 2013 to 78%), it significantly dropped to 52% in 2016. And, 2016 is statistically similar to 2013 and 2014. Thus, the gains in 2015 were lost in 2016.

\+ The third graders reported eating less candy and sweetened beverages over the years of data collection, from 2.40 to 1.91 on the 3-point scale. The decrease was statistically significant in 2015 for candy and in 2016 for sweetened beverages.

\- Third graders were less willing to try a new soup (2.71 to 2.15 on 3-point scale) or a new salad (2.35 to 2.08 on 3-point scale), with this downward trend becoming statistically significant in 2016. Third graders also had less confidence in their ability to make soup (3.09 to 2.22 on 4-point scale.

\+ Third graders intended to eat candy and sweetened beverages less often and drink water more often. Answers are reversed for candy and sweetened beverages to make higher score represent more favorable responses. This was a 4-point scale,candy increased from 1.78 to 2.46, sweetened beverages from 1.97 to 2.65, and water from 3.13 to 3.85.

Trends for Fifth Grade Students

The fifth grade Beliefs Questionnaire had 34 questions that were compared over the four years of data collection, with only the four questions presented below having statistically significant change. See Table 10. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix H.

Table 10: Fifth grade questionnaire, questions with significant changes

Questions	2013	2014	2015	2016	p-value*
2. I like the taste of spinach (1–4)[a]	3.37	2.73	2.78	*2.05*	.004
14. I eat fruit (1–5)[b]	4.03	4.00	4.05	*3.25*	.009
31. If I eat vegetables everyday, I will be...(1–4)[g]	2.82	2.87	**3.76**	**3.83**	<.001
45. I would drink water (1–4)[i]	2.72	2.68	**3.51**	**3.86**	<.001

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

Answer choices footnotes same as in Appendix, which is why some letters are skipped

a. 1=really don't like; 2=don't like; 3=like; 4=really like

b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day

g. 1=very weak; 2=weak; 3=strong; 4=very strong

i. 1=hardly ever; 2=once in a while; 3=some days; 4=most days

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix H.*

Summary of statistically significant results

- Fifth graders reported liking the taste of spinach less (3.37 to 2.05 on 4-point scale). This decrease was statistically significant in 2016.

- Fifth graders reported eating less fruit. On the 5-point scale, the amount of fruit they reported eating went from a mean of about 4 "about everyday" down to 3.25, with option 3 being "a few times a week."

+ Fifth graders beliefs that if they ate vegetables they will be healthier increased going rom 2.72 to 3.86 on the 4-point scale.

Trends for Eighth Grade Students

The eighth grade Beliefs Questionnaire had 34 questions that could be compared over the three years of data collection. Data were not collected from eighth graders in 2013. Only the two questions presented below had statistically significant changes. See Table 11. For details on sample size for each year, standard deviation, and pair-wise statistical comparisons for all years, see Appendix I.

Table 11: Eighth grade questionnaire, questions with significant changes

Questions	2014	2015	2016	p-value*
45. I would drink water (1–4)[i]	2.70	**3.73**	**3.69**	<.001
48. I would go food shopping with my family (1–4)[i]	3.36	*2.61*	*2.80*	.007

* p-value is the statistical significance from the Analysis of Variance (ANOVA) across the four years of data collection.

Answer choices footnotes same as in Appendix, which is why some letters are skipped

i 1=hardly ever; 2=once in a while; 3=some days; 4=most days

Explanation of colors, bold and italic on the tables: The tables present a snapshot of statistically significant changes over the four years. Baseline (2013) data is gray. Favorable changes are green and bold. If a changes gets more favorable the green is lighter. Unfavorable changes are presented as red italic. *For complete statistical analysis that includes number of students, means, standard deviations, and pair-wise statistical comparisons for all years with all other years, please see the appropriate Appendix I.*

Summary of statistically significant results

+ Eighth grade students report increased intentions to drink water, with 2015 and 2016 being significantly higher than 2014.

- Eighth grader students reported decreased intentions to go food shopping with their families.

Global Tech Descriptive Statistics for 2016

Since we collected school lunch consumption and understanding beliefs and behaviors from the Beliefs Questionnaire from students at Global Tech for the first time in 2016, and we did not have data on which students had been at PS 7 and had previous programming, we conducted only descriptive statistics on the data from Global Tech students. See Appendix J.

Additional Analyses Across Data Sets and Years of Data Collection

We conducted four additional analyses. See Appendix K.

Comparing Upper Grades in Global Tech versus PS 7

Generally, Global Tech's scores are lower than MS 7 students this year even though MS7 students in 2013 had relatively lower scores. See Appendix K, Table 1.

Following Students from Second to Fifth Grade

The 2nd to 5th grade trend on the self-efficacy of following a recipe (Q28. I can follow a recipe) appears to have trended up over the four years of data collection. See Appendix K, Table 2.

Following Students from Fifth to Eighth Grade

There is a consistent, positive trend in liking the taste of beans among older students (5th to 8th grade trend). There is also a consistent decreased in scores on questions that asked about cooking with family, working in garden, and food shopping with family. It is possible that this downward trend is natural as students move from fifth to eighth grade, but without a control group, it is hard to interpret this trend. See Appendix K, Table 3.

Correlation Between Fruit and Vegetable Intake from School Lunch Consumption Data and Beliefs Questionnaire

There are positive correlations between taste preferences, measured on the Beliefs Questionnaire and consumption of fruit and vegetables among 3rd grade students. Most of these correlations are with fruit (on tray and eating). Since younger students typically like fruit more than vegetables, that may be an explanation for why there were more taste preference associations with fruit consumption than with vegetable consumption. See Appendix K, Table 4.

Limitations

This evaluation was limited in several ways:

1) ***No Control Group:*** There was not a control group to compare with the students from PS 7, thus it is unclear if these results would have happened regardless of programming. Due to limited funding, it was not possible to collect data from a control school.

2) ***Small Sample Size:*** The number of students from which we have data over all four years is very small. Instead of matching data of the same students over all the years, which would be a stronger analysis, we analyzed all students in which we had data from all years.

3) ***Beliefs Questionnaire Limitations:*** The analysis of the Belief Questionnaire has two limitations. First, it is self-reported data. Students could have responded in socially desirable ways. Second, for each grade it is different students each year and the sample size of students is small. This means the natural differences in groups (e.g., some classes may be more enthusiastic about ESYNYC programming than others) make it harder to find changes.

4) ***Digital Photography Limitation:*** School lunch consumption was based on digital photography. Digital photography is limited in its ability to capture foods that are traded, dropped on the floor or taken to be consumed at a later time. It is also feasible that small bites of fruits and vegetables were missed because they were hard to see in the photographs.

Conclusions

1) ***School Lunch Eating Patterns Have Changed:*** A steadily increasing percentage of students are eating fruits and vegetables from 2013 to 2016. This trend held for fruits and vegetables overall, vegetables, with salad bar consumption contributing most of the increase while students eating cooked vegetables has remained low. Students eating grain and protein was highest in 2013 when these were finger foods (chicken tenders, mozzarella sticks, and pizza). After the switch to the alternative menu in 2014, when grain and protein became more scratch cooked, fewer students have eaten these foods groups and this has stayed low. However, the percentage of students who are choosing the hot meal protein and grain instead of the sandwich option is increasing. Also the percentage of students eating the protein from the hot meal as well as the portion consumed have increased. This appears to be showing an increased acceptance of the more scratch cooked protein and grain options on the alternative menu.

2) ***Understandings, beliefs, and behaviors have mostly been unchanged:*** While there were some questions that showed favorable and unfavorable changes from the data on the Beliefs Questionnaire, it is difficult to make any overall conclusions. The questions that changed are different across the three grades measured. More importantly, overall there were very few reported changes in students' understandings, beliefs, and behaviors related to food intake outside of school lunch.

Research Recommendations

1) ***Continue Data Collection:*** We recommend continuing longitudinal data collection for the next several years, to track if students continue to increase fruit and vegetable consumption at lunch and continue to change their beliefs, attitudes, intentions, and confidence levels from the ESYNYC programming. We think this will be particularly important with the new garden and kitchen classroom opening.

   More years of data collection would also allow for more analyses of how lower grade students, who will have had ESYNYC programming for most or all of their time in school change their behaviors and beliefs compared to upper grade students who began the ESYNYC programming several years into their schooling. This seems particularly relevant with the younger students showing larger increases in eating salad bar and some positive results on the third grade Belief Questionnaire. Additionally, more years of data collection would allow for more analyses of the types of fruits and vegetables that are most acccepted by students and to follow how beliefs, attitudes, intentions and confidence levels change over time.

2) ***Consider Adding a Parallel Qualitative Study:*** A parallel qualitative study that includes interviews with a small purposeful sample of students could uncover if and how students are: a) integrating their experiences with ESYNYC programming and school lunch, b) sharing their experiences in school with their family and friends, and c) using what they have learned to navigate the food environment in their community and their home to try to choose more whole plant-based foods and fewer highly processed foods (e.g., candy, chips, sweetened beverages).

Program and Practice Recommendations

1) ***Encourage Students to Eat School Lunch:*** The steady increase in eating fruits and vegetables is encouraging. However, there is still room for improvement, with 54% of students not eating any fruit and vegetables. At the same time the decreases in grain, protein, and milk consumption are concerning. Greater efforts to encourage school meal consumption could help further increase fruit and vegetable consumption and also increase consumption of the total meal. Below are some strategies to consider.

   Connect ESYNYC Programming to School Lunch Cafeteria Experience: The data show a dramatic increase in salad bar, which are fresh, raw vegetables similar to what students experience in the garden and kitchen classroom. Directly linking the educational experiences with the salad bar in the cafeteria may further increase consumption of salad bar, as well as other meal components.

   Work with School Lunch Staff to Encourage Taking and Eating the Cooked Vegetable: The data show the percentage of students with the hot vegetable on the tray decreased in 2014 and has stayed low. Very few students eat the hot vegetable (14%). If students receive encouragement from staff and see other students taking and eating the cooked vegetables they may eat them.

   Work with School Staff to Maximize Time Students Have to Eat: While we did not collect data on how many students were still eating when asked to dispose of their tray, our staff have repeatedly observed students still eating when it is time to leave lunch. Organizing the logistics at lunch so that students have more time may encourage students to eat more of all of the meal components provided in school lunch.

2) ***Provide Stronger Educational Messages:*** The outcomes measured on the Beliefs Questionnaire are factors that the nutrition education literature have found lead to the adoption of more healthful eating behaviors. Yet, there were few favorable changes. Reinforcing educational messages around these factors (e.g., preferences for plant foods, benefits of healthful eating, and confidence in cooking) throughout ESYNYC programming in the kitchen classroom and garden as well as in the cafeteria and in the greater school environment could lead to favorable changes on more questions, which in turn could lead to more healthful eating behaviors. Below are some strategies to consider:

   Creating opportunities for students to try new foods: Provide as many opportunities in the garden, kitchen classroom, and cafeteria (e.g., tastings) for students to try new foods. According to nutrition education research, when students have more opportunities to try whole, plant-based foods they increase their preferences, willingness to try, and consumption of these foods.

   Reinforce messages about the benefits of eating more whole plant-based foods and fewer highly processed foods such as candy, chips, and soda: These messages may increase students' beliefs about the outcomes they may get from these behaviors (called outcome expectations). Nutrition education research has shown that when students hear these messages multiple times, in multiple places (kitchen classroom, garden, cafeteria), and from multiple people (kitchen classroom teacher, garden teacher, classroom teacher, cafeteria staff) they are more likely to attend to these messages and change their beliefs, which can increase consumption.

   Provide opportunities to practice cooking and making healthful choices: Opportunities to practice leads to increased confidence (self-efficacy). Nutrition education research has found that levels of self-efficacy are highly correlated with behavior change.

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Appendix A – Examples of Students Trays on the Days of School Lunch Consumption Data Collection

2013, February 25

spinach, apple slices, chicken tenders (with dipping sauce) and milk

2013, February 25

spinach, orange, chicken tenders (with dipping sauce) and milk

2013, February 27

green beans, orange, mozzarella sticks and milk

2013, March 4

roasted carrots, apple slices, mozzarella sticks (with dipping sauce), roll, and milk

2013, March 4

salad, orange, pizza (long), and milk

2013, March 4

salad, apple slices, pizza (slice) and milk

2013, Alternative Lunch 1

apple slices, peanut butter and jelly bar, and milk

2013, Alternative Lunch 2

peanut butter and jelly on whole wheat and milk

2014, March 6

chickpeas with tomatillos, banana, herbed rice pilaf, milk

2014, March 6

roasted carrots, apple, cheesy baked rotini, and milk

2014, March 6

braised collards, orange, cheesy baked rotini, and milk

2014, March 26

green beans, apple, BBQ chicken, corn bread, and milk

2014, March 26

green beans, banana, roasted tofu, and milk.

2014, March 31

spinach, banana, grilled chicken, and milk.

2014, March 31

lettuce and tomato, banana, whole wheat tortilla, chick pea falafel, and milk

2014, Alternative 1

banana, peanut butter and jelly on whole wheat, and milk

2014, Alternative 2

apple, cheese sandwich on whole wheat, milk

2014, Alternative 3

raw baby carrots, apple, hummus, pretzels

2015, April 28

sweet potato waffle fries, peach cup, chicken breast on whole wheat bun, whole wheat crackers, milk

2015, May 11

broccoli, peach cup, cheese-filled manicotti, milk

2015, May 20

broccoli, peach cup, chili, rice, hard corn taco shell, and milk

2015, May 21

beans, apple, chicken on the bone, brown rice

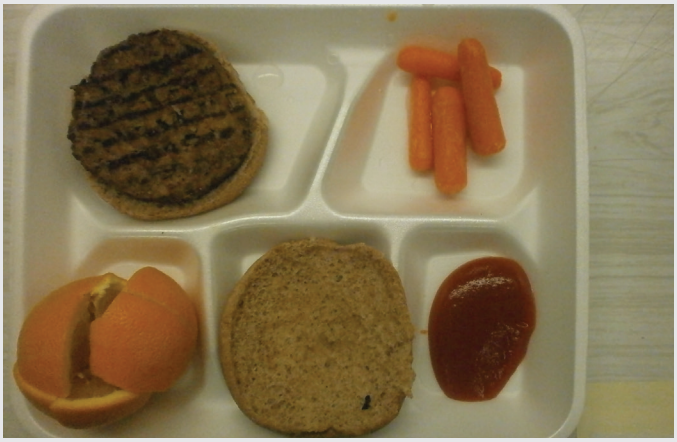
2015, May 21

beans, banana, chicken on the bone, hard corn taco shell

2015, May 21

zucchini coins, carrots (from salad bar), banana, chicken on the bone, whole wheat penne pasta

2015, May 26

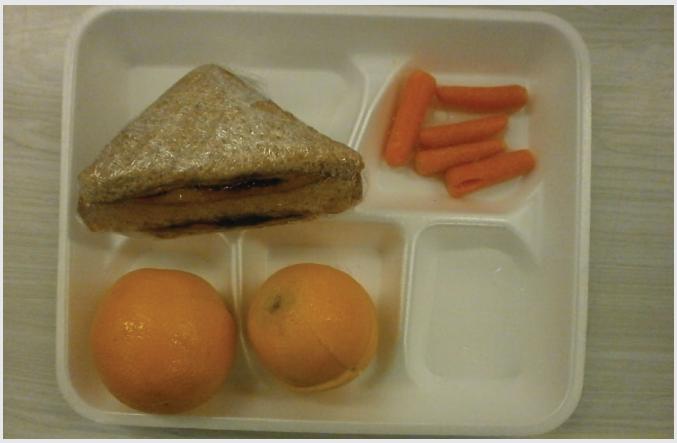


raw carrots, orange, turkey burger, whole wheat bun

2015, May 26

sweet potato chunks, orange, hummus, chicken breast, whole wheat bun

2015, Alternative 1



raw carrots, orange, peanut butter and jelly on whole wheat

2015, Alternative 1 with salad

cucumbers (from salad bar), orange, peanut butter and jelly on whole wheat, hummus

2015, Alternative 2

peaches, cheese on whole wheat, whole wheat crackers, milk

2015, Alternative 2 with salad

lettuce (from salad bar), peach cup, cheese sandwich on whole wheat

2015, April 28

sweet potato waffle fries, peach cup, chicken breast on whole wheat bun, whole wheat crackers, milk

2015, May 11

broccoli, peach cup, cheese-filled manicotti, milk

2015, May 20

broccoli, peach cup, chili, rice, hard corn taco shell, and milk

2015, May 21

beans, apple, chicken on the bone, brown rice

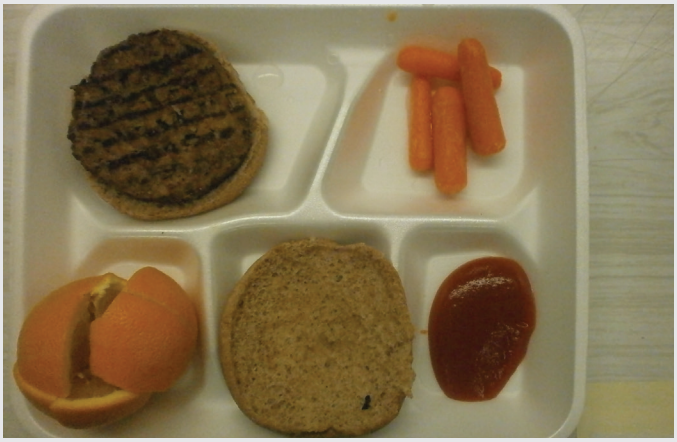
2015, May 21

beans, banana, chicken on the bone, hard corn taco shell

2015, May 21

zucchini coins, carrots (from salad bar), banana, chicken on the bone, whole wheat penne pasta

2015, May 26

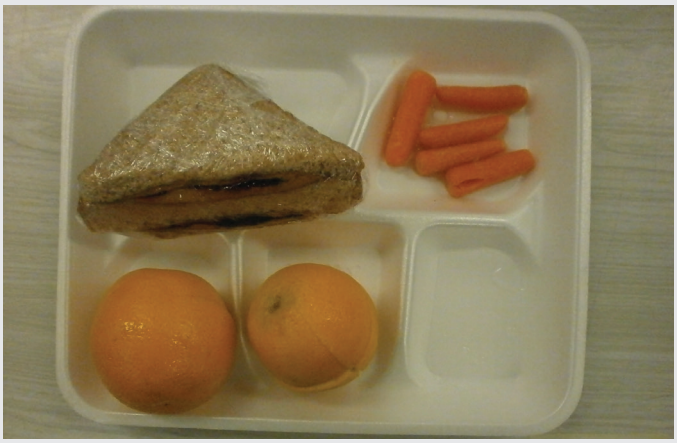


raw carrots, orange, turkey burger, whole wheat bun

2015, May 26

sweet potato chunks, orange, hummus, chicken breast, whole wheat bun

2015, Alternative 1



raw carrots, orange, peanut butter and jelly on whole wheat

2015, Alternative 1 with salad

cucumbers (from salad bar), orange, peanut butter and jelly on whole wheat, hummus

2015, Alternative 2

peaches, cheese on whole wheat, whole wheat crackers, milk

2015, Alternative 2 with salad

lettuce (from salad bar), peach cup, cheese sandwich on whole wheat

2016, May 3

raw carrots, apple, turkey burger on bun, milk, chocolate chip cookie

2016, May 3

cooked carrots, apple slices, turkey burger on bun, milk, chocolate chip cookie

2016, May 3

apple, chili, brown rice, milk, chocolate chip cookie

2016, May 10

sweet potatoes, cucumbers (salad bar), peach cup, tortilla, chicken (inside tortilla), milk

2016, May 10

sweet potatoes, apple, chicken

2016, May 13

kale salad, apple slices, pizza

2016, May 13

kale salad, strawberry cup, black bean and cheese burrito, milk

2016, May 13

kale salad, strawberry cup, cheese calzone, milk

2016, May 18

collards, lentil chili, brown rice, milk (2)

2016, May 18

apple slices, chicken chili, lentil chili, milk

2016, May 18

collard greens, salad (salad bar), apple slices, black bean empanadas,

2016, May 18

collard greens, apple slices, cheese and corn tortilla

2016, Alternative 1

apple, peach cups (2), peanut butter and jelly sandwich,

2016, Alternative 2

kale salad, cheese sandwich, milk (2)

Edible School Yard Photo Analysis - Coding Booklet

Includes assumptions from 2013,2014, 2015 & 2016 Data

Variables	Instructions & Assumptions
Pre or Post Only	• Indicates if there is only a pre- or post- picture for that case. This means there is unknown data regarding how much was eaten (for pre-only pictures) and how much was served (for post-only pictures). • "No Pic" designation in this column was to identify the Case IDs listed in other validation studies who were meant to have pictures, but no picture was actually taken in the lunchroom on the designated day. • In the 2016 data, for Pre-only pictures in which some of the food was eaten in the picture, code what was eaten as of that picture in order to minimize the amount of unknowns (99).
Case	• If there is a duplicate case number assigned to two different trays on the same day, name the second one as L## within parenthesis. o In some cases, the label may be a completely different color or in different handwriting. In other cases, the same label may have been photographed with two trays of very different food. o In these cases, the labeling of the picture should be renamed to L-(##). For the 2015 data, we tried to match all possible trays together in order to minimize this separation. o Ex. There were two F55 (3/4/13) trays so the one with pre & post-pictures is named F55 while the second post-picture, which refers to a completely different tray is named (F55). o Ex. A34 (3/31/13) originally included pictures of two completely different trays with different colored labels, even though both were labeled A34. Thus these were split into A34 and (A34).
Day	This refers to the date of data collection, written as YYMMDD
S_Anything	• If S_Anything = "2", then leave rest of S_columns blank.
S_Veggie(cooked)_YN	• If salad was the only vegetable on the tray, then it is considered in this category, not in the S_Salad category.
S_Veggie_type	Lettuce & Tomato: • This category includes lettuce & sliced tomatoes that were given out along with the wraps on 3/31/14. Usually the lettuce & tomato was placed in a small compartment of the tray. Raw Carrots: • Refer to the baby carrots given in the Grab & Go boxes during the 2014 data collection period. o Ex. C06 (3/26/14) Tomatillos • Tomatillos were mixed with the chickpeas in the 2014 data collection period.
S_Veggie(cooked)_%	• This category only applies to the amount eaten of S_Veggie_type, not S_Veggie_extra. • Code "99" when part or all of the veggies are covered in the post picture by any other items on the tray foods. • Code of "7" for percent eaten is only used with the Raw Carrots on 3/31/14. This code refers to the range of a bite taken to under 100% of the carrots eaten. This was included because it was not possible to identify correct percentages of the baby carrots eaten in the Grab & Go boxes. • When only a post picture is available, code "99" because we do not know how much was served to the child. o Exception is if the child clearly ate all of the vegetable and you can see the colored juices it left behind. In this case, code "6". • Code "99" for all pre pictures since we do not know how much was eaten by the child.

1

	• If the child has both cooked spinach and lettuce & tomato on their tray, then code the spinach and count the lettuce & tomato as Extra Veggie.
	  ○ Example: B35 (3/31/14)
	
	Spinach:
	• If there was a slight change in the spinach, we assumed 1 bite taken (e.g. D21 & C43).
	• If there are just a few pieces of veggies left, but it is clear the kid attempted to eat all of it (they just didn't scrape the edges well), code as "6".
	  ○ Example is D09 (2/27/13)
	
	Green Beans:
	• If there are just a few pieces of veggies left, but it is clear the kid attempted to eat all of it (they just didn't scrape the edges well), code as "6".
	  ○ Example is D09 (2/27/13)
	
	Carrots:
	• Count the carrots in the pre & post pictures to determine the percentage eaten.
	
	Lettuce & Tomato:
	• This is a volume-based decision. Use the volume in the pre-picture to determine the percentage eaten in the post picture.
	  ○ In some cases, the lettuce & tomato will represent 50-50%. In other cases, there may be more lettuce than tomato.
	  ▪ Ex. In B53 (3/31/14) the child ate only lettuce, which was coded as 50% of the vegetable based on volume served.
	  ▪ Ex. In C43 (3/31/14) the child ate only the lettuce, which was coded as 75% of the vegetable based on the volume served.
	• In the event the child has at least 4 cherry tomatoes with ranch dressing on them, then it can be counted in this category. The assumption is that 4 cherry tomatoes is almost 1/2 cup of vegetable so it would be enough volume to code.
	• If there are less than 4 cherry tomatoes on the tray (in the pre-picture), then do not code as Veggie or Salad.
	• If the child has a small compartment of the tray filled with cherry tomatoes that are plain (no ranch dressing), then count as a Salad.
	• If the child has extra lettuce (more than just the small compartment that is typically served), then count as an Extra Veggie (code as a "1").
	
	Raw Carrots:
	• Code of "7" for is only used raw carrots served on 3/31/14. This code refers to the range of a bite taken to under 100% of the food items eaten. This was included because it was not possible to identify the amount of carrots served in the package within the Grab & Go boxes, or how much was eaten.

S_Veggie(cooked)_extra	• Code "1" only if the child had a second tray with another vegetable or a second square with a vegetable other than salad on their tray. • This column is not applicable for different serving sizes of the vegetables as these may vary with age of children & time of lunch (for example, if it is close to the end of the day, more vegetables may be served to avoid waste). • The amount of the extra vegetable eaten is not coded. • If the child has both cooked spinach and lettuce & tomato on their tray, then code the spinach and count the lettuce & tomato as Extra Veggie. • If the child has extra lettuce (more than just the small compartment that is typically served), then count as an Extra Veggie (code as a "1").
S_Salad_YN	• Code "1" only considered when the salad is in addition to a regular S_Veggie. • Data collection should include a picture of the salad bar so that the items served can be

2

	recognized on the lunch trays as from the salad bar
S_Salad_size	• Includes plain cherry tomatoes that fill a small compartment of the tray. ○ Example: G06 (3/31/14) & G14 (3/31/14)
S_Salad_%	Salad: • Look for changes in the arrangement of the lettuce & other parts of the salad to tell if any was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child.

S_Fruit_YN	• If the child has 2 pieces of fruit, count the one they ate for the columns of S_Fruit_Type & S_Fruit_%. Leave the fruit they did not eat for the S_Fruit_Extra column.
	  ○ Ex. C28 (2/25/13)
	• For cases in which only a post picture is available and there are no remnants of fruit on the tray (orange peel or seeds, apple bag, etc.), then code "99" for all S_Fruit columns because we cannot determine if the child had fruit.
	  ○ Ex. A03 (2/27/13)

S_Fruit_Type	• There is no distinction between apple slices or a whole apple. ○ As of 2016 data, the code #2 was retired for apples and codes 6 (apple slices) and 7 (whole apple) were created so that a distinction could be made between the type of presentation of the fruit. • The peach cup served in 2015 was called CUP-A-FRUIT Freestone Peaches from Big Valley. It was 4.4 oz in size and ingredients were freestone peaches, sugar, ascorbic & citric acid. •

S_Fruit_%	• If some of the fruit was eaten (as demonstrated by peel or pieces of the fruit on the tray, or an open bag of apples), but it was not possible to determine the amount eaten, code "88" to demonstrate that an attempt to eat the fruit was made.
	  ○ Reasons the amount eaten could not be determined include: part of the picture was cut off, the fruit was blocked by a different item on the tray, the peel of the orange is flipped in such a way that you cannot see if it is empty or has flesh, or you can see there are still slices in the apple bag but cannot determine how many.
	• Code "99" for all pre pictures since we do not know how much was eaten by the child.
	
	Orange:
	• If there is any orange peel or orange seeds on the tray, but no actual remnants of the flesh of the orange, assume they ate it all and code as "6".
	
	Apple Slices:
	• The manufacturer of the Grab Apple 2oz packs stated there are approx. 5 apple slices. We sometimes counted 6 in total. If we could count 6, the S_Fruit_% was calculated using 6. If we could not tell, then we used the manufacturer's estimate of 5 to calculate S_Fruit_%.
	• The peels of the apple slices represent 25% of the whole fruit. So if the child ate everything but the peels, code as "5".
	  ○ Ex. H32 (3/4/13)
	• If the bag of apples appeared open in the pre picture, but then disappeared in the post picture (and no remnants of the fruit was left on the tray), code as "99".
	
	Peach Fruit Cup:
	• Code "88" when fruit cup was opened (can visibly see foil was opened even if it was put back on top), but there is no picture to show how much was eaten.
	  ○ Ex. B31 (5/11/15)
	• Data collectors drew before and after lines with sharpie markers and took extra side-angled pictures of the fruit cups in order to assist the data coder in determining the percentage eaten.

S_Fruit_extra	Count the number of extra fruit on the tray and input the number of extra portions.
S_Entrée_YN	• 3/4/13 had two types of pizza as entrée: one was a typical triangular shaped slice of pizza and the other was an oval shaped pizza with a much thicker crust.
S_Entrée_%	• This variable was removed in the 2014 data coding process due to the following reason: So the 2013 data was originally coded, the Protein & Grain components of the lunch meal were always together (breaded chicken fingers, peanut butter sandwich, pizza with cheese, breaded mozzarella sticks). For the 2013 data, the amount eaten was coded under S_Entree_%. However, when Wellness In The Schools (WITS) came in to P.S. 7, the organization changed the menu for 2014 and the Protein & Grain components were no longer combined in one food item.Instead, there were items like chickpeas in tomatillo sauce (protein + cooked vegetable) and rice (grain), or a piece of cornbread (grain) and a chicken breast on the bone (protein).Once it was confirmed that the meals were compartmentalized differently than in 2013, it became clear that Protein & Grain had to be coded separated. This change was carried forward to the Alternative Entrees as well. This involved updating the 2013 data to add the Grain, Protein, Alt. Grain & Alt. Protein columns.TheS_Entree% and S_Alt_ Entrée_% columns were kept in the 2013 data because both had already been coded. In most cases the related Grain & Protein % columns were the same amount (although there were kids quite skilled at eating only the breading or only the filling). For the 2014 data, the previous definition of an entrée did not apply since the Grain & Protein components were separate. Thus, the S_Entrée_% &S_Alt._Entrée_% columns were removed since the S_Grain_%, S_Protein_%, S_Alt_Grain_%, S_Alt_Protein_% columns were used and could be combined if needed to compare S_Entrée_%or S_Alt_Entrée_% from 2013.
S_Grain_YN	
S_Grain_type	• This category does not distinguish between whole and refined grains. Whole grains began being served during the 2014 data collection period • Breading refers to breading on chicken fingers and mozzarella sticks. • When more than one grain was offered for lunch and the child took both grains, rice was coded under S_Grain and the corn tortilla was coded under S_ExtraGrain.
S_Grain_%	• Code "99" if the space where the entrée was served is completely covered in the post picture by other items on the tray and as a result, you cannot determine with confidence how much, if any, of the entrée was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child. Chicken Fingers: • Assume 4 chicken fingers were served to each child, even if less are seen in the pre picture. Mozzarella Sticks: • Assume 5 mozzarella sticks were served to each child, even if less are seen in the pre picture. • The breading of the mozzarella sticks represents 50% and the cheese inside represents 50%. Pizza: • On long, oval pizzas, the cheese represents 25%. • On regular, triangle sliced pizza, the cheese represents 50%. Turkey Burger: • If hamburger disappears from tray and there are some crumbs on the tray, assume the whole thing was eaten. • For 5/3/2016 entries, in Post-only pictures, if the student has ketchup on the tray, then assume they had a turkey burger for lunch and code as all eaten.

	Chicken Wrap: • If chicken wrap disappears from tray and there are some crumbs on the tray, assume the whole thing was eaten. Calzone: • For the large cheese calzones served on 5/13/2016, if the student just ate the crust of the calzone, but none of the middle, then code as Grain_%=3 and Protein_%=1. Empanadas: • The serving of black bean empanadas on 5/18/2016 was four.
S_ExtraGrain_YN	
S_ExtraGrain_type	
S_ExtraGrain_%	
S_Protein_YN	
S_Protein_type	Chickpeas: • Refers to chickpeas served in their normal state. Chicken on Bones: • Refers to chicken served on the bone such as chicken thigh, wing or drumstick. Chicken Breast: • Refers to chicken breast served without bone. On the days when turkey burgers & chicken breasts were served on the same hamburger bun, turkey burgers were defined as the default protein to be coded unless it was clear that chicken breast was chosen instead.
S_Protein_%	• Code "99" if the space where the entrée was served is completely covered in the post picture by other items on the tray and as a result, you cannot determine with confidence how much, if any, of the entrée was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child. Chicken Fingers: • Assume 4 chicken fingers were served to each child, even if less are seen in the pre picture. Mozzarella Sticks: • Assume 5 mozzarella sticks were served to each child, even if less are seen in the pre picture. • The breading of the mozzarella sticks represents 50% and the cheese inside represents 50%. Pizza: • On long, oval pizzas, the cheese represents 25%. • On regular, triangle sliced pizza, the cheese represents 50%. Beans: • Count beans in pre and compare to post to estimate percentage eaten. Pieces of tomato in the chili were included in this count as well. Turkey Burger: • If hamburger disappears from tray and there are some crumbs on the tray, assume the whole thing was eaten. • For 5/3/2016 entries, in Post-only pictures, if the student has ketchup on the tray, then assume they had a turkey burger for lunch and code as all eaten. Chicken Wrap: • If chicken wrap disappears from tray and there are some crumbs on the tray, assume the whole

	thing was eaten. Calzone: • For the large cheese calzones served on 5/13/2016, if the student just ate the crust of the calzone, but none of the middle, then code as Grain_%=3 and Protein_%=1.
S_Roll_YN	• Rolls were only served on 03/04/13 of the three years of data collection.
S_Roll_%	• When the roll disappeared from the tray, it was assumed it was eaten and coded as "6". • Code "99" for all pre pictures since we do not know how much was eaten by the child.
S_Crackers_YN	• Whole wheat pre-packaged crackers were only served on 04/28/15 of the three years of data collection.
S_Crackers_%	• Crackers were coded as all/some/none eaten because the number of crackers taken by each child varied greatly.
S_Cookies_YN	• Cookies were only offered on 5/3/2016.
S_Cookies_%	
S_Cookies_extra	
S_Milk_YN	• On post-only pictures, when it is not obvious if there was a milk or fruit chosen, we have put 99 for the related columns. • For cases in which only a post picture is available and no milk carton is in the picture, code "99" for all S_Milk columns because we cannot determine if the child took milk. o Ex. F26 (2/25/13)
S_Milk_opened	• If the milk carton is on its side, that means it was completely drank and as such, code as "1". o Exception: if it is clearly visible in both pre & post pictures that the milk was originally laid on its side and was not opened, the proceed to code as "2" ▪ Ex. G06 & H28 (both from 3/4/13) • Code "99" for all pre pictures since we do not know if the milk was opened by the child.
S_ Milk_extra	
S_Water_YN	This variable is only for the cups of water provided by the school. All water bottles were coded under H_Water_YN. • For Post-only pictures, code as 1 or 2 depending on whether there is or is not a cup of water on the tray since the students usually do not take the water cup with them as they might with a carton of milk.
S_Alt_ Entrée_YN	
S_Alt_ Entrée_%	• This variable was removed in the 2014 data coding process for the reasons explained under S_Entrée_%. •
S_Alt_ Grain_YN	
S_Alt_ Grain_type	
S_Alt_ Grain_%	• Code of "7" for is only used with the hummus & pretzels on 3/31/14. This code refers to the range of a bite taken to under 100% of the food items eaten. This was included because it was not possible to identify correct percentages of the items eaten in the Grab & Go boxes. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
S_Alt_ Protein_YN	
S_Alt_ Protein_type	
S_Alt_ Protein_%	• If the child left a lot of peanut butter on the tray, especially if he/she scraped it off with a spoon, but the rest of the sandwich is gone, code as "5".

	• Code of "7" for is only used with the hummus & pretzels on 3/31/14. This code refers to the range of a bite taken to under 100% of the food items eaten. This was included because it was not possible to identify correct percentages of the items eaten in the Grab & Go boxes. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_Anything	• If H_Anything="2", then leave the rest of H_columns blank.
H_SB_YN	• If child has thermos in picture and the kind of beverage/contents in it cannot be determined, code "1" for H_SB_YN and code "99" for the other H_SB_columns.
H_SB_type	• The sweetened dairy product category includes chocolate milk, yogurt, Ensure & Pediasure Sidekicks drinks o Ex. C41 (3/4/13) for Ensure & H05 (3/4/13) for Pediasure • Lemonade should be coded under Fruit Juice category ("2") • Vitamin Water should be coded under Sports Drink category ("5") • The Arizona Iced Tea-Lemonade mixture was coded as Iced Tea ("4") o Ex. E21 from 5/18/16
H_SB_size	• The $1.00 Topical Fantasy Drinks are 24oz. • If there is more than one sweetened beverage, add the total amount of ounces. Then include a comment in the cell with the breakdown of how that total was reached (this will be indicated by a little red flag in the upper right corner of the cell). • Code "99" if you cannot determine the size of the package from the picture or from performing research. • For the generic Capri Sun or Kool-aid drinks, assume 6 oz size. o Ex. F29 (3/26/14)
H_SB_howmuch	• If the sweetened beverage container is laying on its side, that means it was completely drank and as such, code as "1". • For drinks that are open and have been partially consumed, code as "2". • Only select "1" if it is obvious the beverage was completely consumed, like in the case of a completely flattened out Capri Sun. • If the straw was inserted into the Capri Sun or Kool-aid drink, but the package is not flattened out, assume "2". • If the top of the beverage is not visible in the picture to tell if it was opened or any of the beverage was consumed, code "99". • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_Water_YN	• If child has thermos in picture and the kind of beverage/contents in it cannot be determined, code "99".
H_saltysnack_YN	
H_saltysnack_type	• The Other category ("5") is to be used for salty snacks that do not fit into the other four categories. Please also include a comment in the Comment column describing the salty snack. • If the child has multiple types of salty snacks, pick the least healthy to code for the type. o Ex. C32 (2/25/13) had chips and pistachios so the code for this column is "1" as chips are less healthy than pistachios.
H_saltysnack_size	• If the child has multiple types of salty snacks, add up the ounces of each to arrive at the total H_saltysnack_size. Include a comment in the cell with the breakdown of how that total was reached (this will be indicated by a little red flag in the upper right corner of the cell). • Assume all Frito-Lay chip products that show 2/$1 on the bag are 1.25 oz. o Picture F04 (2/27/13) clearly shows the ounces. • Code "99" if you cannot determine the size of the package from the picture or from performing research.

	• If salty snack is in a Ziploc baggie from home, try to estimate the size based on the assumed brand, number of chips/crackers/etc. that can be counted and the nutrition fact information found during research. Include a comment in the cell with the breakdown of how that total was reached (this will be indicated by a little red flag in the upper right corner of the cell). If the number of chips/crackers/etc. cannot be easily counted or estimated, code "99".
H_saltysnack_howmuch	• Code "2" if the bag was open but it is not clear whether everything was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_saltysnack_brand	
H_candy_YN	• Candy category includes: Jell-o, gum with sugar, Fruit by the Foot, fruit snacks & Gel Parfait (E11 from 2/27/13).
H_candy_size	• If the child has multiple types of candy, add up the ounces of each to arrive at the total H_candy_size. • If only a piece of candy is on the child's tray but no package is in the pictures, code "99" for this variable. Also code "99" for H_candy_howmuch if it is not readily discernible that they ate whatever piece they had on their tray. o B52 (2/27/13) • Code "99" if you cannot determine the size of the package from the picture or from performing research. • Gummi Candy Mini Burger 21 oz in large box/60 pieces=0.35 oz each, http://www.candywarehouse.com/candy-type/gummy-and-jelly-candy/products/gummy-mini-cheese-burgers-60-piece-box/
H_candy_howmuch	• If only a piece of candy is on the child's tray but no package is in the pictures, code "99" for this variable. Also code "99" for H_candy_howmuch if it is not readily discernible that they ate whatever piece they had on their tray. o B52 (2/27/13) • Code "2" if the bag was open but it is not clear whether everything was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_candy_brand	
H_granola_YN	• Granola category includes granola, cereal (both sweetened & unsweetened), cereal bars & granola bars. • In the 2016 data, the 1 oz. containers of Cheerios were coded as H_granola, even if they were given as part of the school breakfast program.
H_granola_size	• If the child has multiple items that fall within this category, add up the ounces of each to arrive at the total H_granola_size. Include a comment in the cell with the breakdown of how that total was reached (this will be indicated by a little red flag in the upper right corner of the cell). • Code "99" if you cannot determine the size of the package from the picture or from performing research.
H_granola_howmuch	• Code "2" if the bag was open but it is not clear whether everything was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_bakedgood_YN	• Graham crackers are considered a baked good & should be coded in this category.
H_bakedgood_size	• If the child has multiple types of baked goods, add up the ounces of each to arrive at the total H_bakedgood_size. Include a comment in the cell with the breakdown of how that total was reached (this will be indicated by a little red flag in the upper right corner of the cell). Then translate the ounces to the categories provided below (small/medium/large). • Reference size for this category is a 2" Chips Ahoy cookie. As per our research, there are 34 cookies in a 13 oz bag, so each cookie weighs 0.38oz. This relates to the size categories as

	follows: ○ Small = 1 cookie/0.38oz (~50 calories) ○ Medium = 2 cookies/0.75oz (~100 cal) ○ Large = 2+ cookies/>0.75oz (>150 cal) • If the baked good is in a Ziploc baggie from home, try to estimate the size based on the assumed brand, number of cookies/muffins/etc. that can be counted and the nutrition fact information found during research. If the number of cookies/muffins/etc. cannot be easily counted or estimated, code "99". ○ F02 (3/4/13) • Code "99" if you cannot determine the size of the package from the picture or from performing research.
H_bakedgood_howmuch	• Code "2" if the bag was open but it is not clear whether everything was eaten. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_bakedgood _brand	• Note if in a Ziploc baggie from home & give an idea of what kind of baked good it is. • Also note if baked good is homemade as appropriate.
H_veggie_YN	
H_veggie _size	• 6 baby carrots=1/2 cup
H_veggie_howmuch	• Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_fruit_YN	• Fruit cups from home fall into this category. • Raisins fall into this category.
H_fruit _size	• Small banana = "3"
H_fruit_howmuch	• Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_sandwich_YN	• Empanadas are included in this category. • A Lunchable meal with crackers, cheese & meat (like ham) is considered a sandwich. Estimate the % of total food contents that these items represent to calculate the ounces and thus the H_sandwich_size. ○ Ex. D28 (3/4/13)
H_sandwich _size	• The reference for this variable is cheese or peanut butter sandwich with 2 slices of regular loaf bread = medium ("2"). • If the sandwich is already half eaten in the pre-picture, code "99" for this variable because we do not know if the child brought two halves or only one half. • According to choosemyplate.gov, 2 slices of regular bread = 2oz. ○ This is the reference to code as a "2". • According to choosemyplate.gov, a large bagel = 4 oz. Thus, sandwiches made on bagels get coded as "3". • A Lunchable meal with crackers, cheese & meat (like ham) is considered a sandwich. Estimate the % of total food contents that these items represent to calculate the ounces and thus the H_sandwich_size. ○ Ex. D28 (3/4/13) • Visual estimation of the sandwich was used to determine if it was small or large as compared to the reference "medium" size. • Kaiser roll sandwiches were also coded as "2". • A sandwich with only 1 piece of bread or 1 tortilla folded in half was considered "small". • If two sandwiches, each with 2 slices of regular loaf bread, are in the pre picture, this is coded as a "large" sandwich.

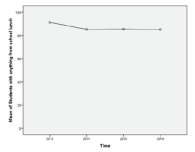
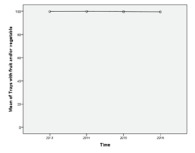
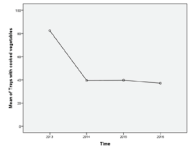
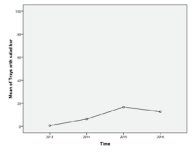
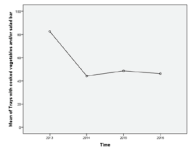
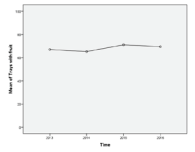
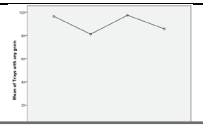
H_sandwich_howmuch	• If the sandwich is already half eaten in the pre-picture, code "99" for this variable because we do not know if the child brought two halves or only one half and thus cannot accurately determine the percentage eaten. o Exception is if the sandwich is completely eaten as per the post picture in which case, code as "6" for this variable. • Code "99" for all pre pictures since we do not know how much was eaten by the child.
H_entreé_YN	• This category includes string cheese.
H_entreé_size	• The reference for the size of entrees from home is the size of a typical lunch tray and how much food is served for the entrees of the school lunch. o Visual estimation of the food brought by the child versus the amount of food served as the entrée is how size was determined.
H_entreé_howmuch	• Code "99" for all pre pictures since we do not know how much was eaten by the child.
Comments	• Includes items that may be meaningful to the analysis, but were not necessarily coded. • On 05/20/15, shredded cheese was served with the taco boats. Not every child had shredded cheese and as such it seemed more like a topping than an integrated part of the lunch menu. Thus, we did not code the shredded cheese under S_Protein and instead included a comment in this column. The comment explains if the child did or did not have the shredded cheese serving and if so, how much was eaten.

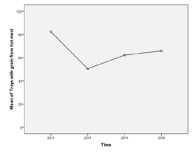
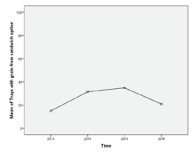
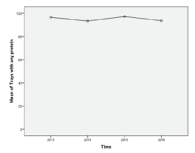
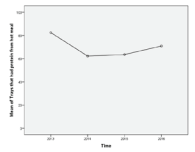
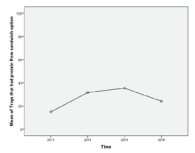
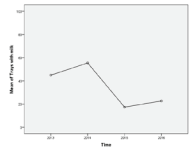
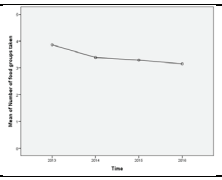
General Assumptions:

- Code of "99" means cannot determine or item disappeared from tray.
- If between two categories relating to the percentage eaten by the child, always round down.
  - Ex. For S_Veggie(cooked)_%, if the child ate a third of the carrots, code "3" for 25% instead of "4" for 50%.
- Not capturing sharing of food between children.
  - If a mozzarella stick appeared on a tray that had the alternate entree or pizza, we did not count the mozzarella stick.
  - Ex. A03 (3/4/13) - some apples appeared in the post picture but there was no apple bag in the pre picture. We assumed the apple slices were shared from another kid and thus did not code this information.
  - Ex. B55 (3/4/13) - kid brought lunch from home but some school carrots appear in post picture. Not coded.
  - Ex. F51 (3/4/13) - kid has a mozzarella stick on their tray in the pre picture even though their lunch was pizza. Not coded
  - If post-it note indicates that food was shared with another student, the items were coded as if the student who brought the food ate it all. The students whose post-it notes indicated they ate someone else's shared food, but no food was photographed, were coded as if nothing was eaten since they did not bring lunch.
    - Ex. I22 on 4/28/15 & 5/11/15
- Extra slices of pizza or entrees were also not captured in these results. Extra rolls were not captured in these results.
  - Ex. H39 (3/4/13) - kid had a second piece of pizza & a mozzarella stick on tray. Neither are coded.
- Some pre & post pictures may be very close in time of the picture taken if the pre-picture was taken late in the process and the post picture was taken at the beginning of that process.
- In pre-only pictures, code "99" for % columns even if the child has eaten some of the item.
- On post-only pictures, when it is not obvious if there was a milk or fruit chosen, we have put 99 for the related columns.
- Estimated sizes for the foods in the H_categories are based on visual appearance of the food package in addition to nutrition facts. Comment for each cell provides details to any necessary calculations as well as the links to the nutrition fact information.
- When it cannot be determined what a food item is, do not code the item and instead note it in the Comments column.
  - Ex. F54 (2/25/13) - there is something on the plate that looks like a muffin, but can't tell what it is
  - Ex. H30 (2/25/13) - lid behind the milk in the post picture
  - Ex. G12 (2/27/13) - black things in the Ziploc bag

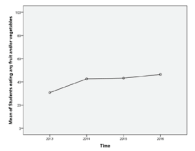
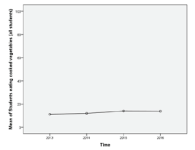
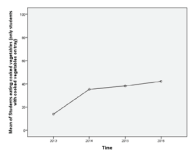
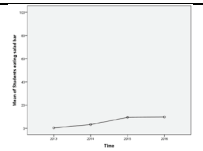
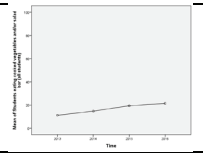
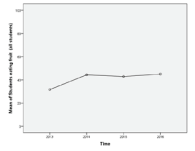
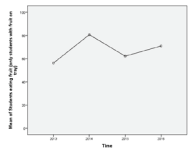
- If a small item of food appears on a tray, but it was product of sharing (as indicated by the lack of product packaging in the pictures, etc.), do not code the item and instead note it in the Comment column. Be as specific as possible if the food item is identifiable.
    - Ex. E01 (3/4/13)
- In the event it was not clear how much was eaten due to quality of picture or position of the food, the amount coded was only the portion that was clearly eaten.
    - Ex. A43 (3/26/14)
- Chips and other packaged foods: enlarge to see oz/grams (convert grams to oz); if needed, Google brand to determine # of oz. Include comment with the link of where the information was found.
- On 5/3/2016, in Post pictures, if the students have ketchup on their tray, then assume they had a hamburger for lunch and code it as all eaten.
- In the 2016 data, for pre-pictures in which some of the food is eaten, code what they ate as of the pre-picture, to minimize the amount of unknowns.

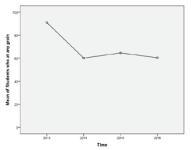
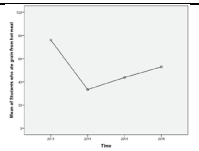
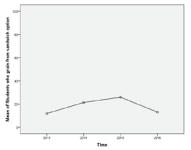
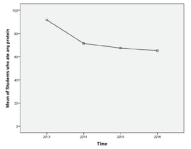
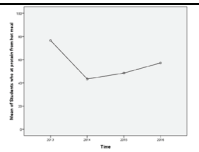
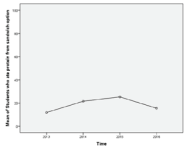
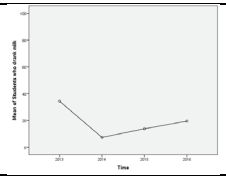
Appendix C — Table 3: Percentage of students with food categories on tray

Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Anything from school lunch	1309	n=323 91.2 (24.8)^{A}	n=349 85.2 (29.2)^{B}	n=330 85.4 (29.0)^{B}	n=307 85.1 (29.6)^{B}	**3.610 (.013)**	
Fruit and/or vegetable	1225	n=307 99.7 (4.0)	n=325 99.8 (2.6)	n=308 99.6 (4.4)	n=285 99.4 (5.0)	0.473 (.701)	
Cooked vegetable	1224	n=307 82.4 (30.3)^{A}	n=325 39.5 (36.0)^{B}	n=308 39.7 (35.7)^{B}	n=284 37.1 (38.0)^{B}	**118.824 (<.001)**	
Salad bar	1224	n=307 0.7 (5.6)^{A}	n=325 6.4 (18.6)^{B}	n=308 16.7 (26.8)^{C}	n=284 12.8 (26.2)^{C}	**34.663 (.001)**	
Any vegetable (cooked or salad bar)	1223	n= 307 82.6 (30.0)^{A}	n= 325 44.2 (37.4)^{B}	n=308 48.6 (37.3)^{B}	n= 283 46.2 (40.1)^{B}	**77.101 (<.001)**	
Fruit	1223	n=306 67.0 (38.3)	n=325 65.2 (37.0)	n=308 71.0 (37.1)	n=284 69.5 (36.6)	1.499 (.213)	
Grain	1223	n=307 96.5 (14.2)^{A}	n=325 81.1 (28.7)^{B}	n=306 97.4 (13.4)^{A}	n=285 85.7 (27.7)^{B}	**40.846 (<.001)**	

Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Grain from hot meal	1224	n=307 82.4 (30.5)^{A}	n=325 50.4 (38.5)^{B}	n=307 62.2 (38.0)^{C}	n=285 65.8 (35.3)^{D}	**42.923 (<.001)**	
Grain from sandwich option	1224	n=307 15.0 (28.5)^{A}	n=325 31.4 (38.1)^{B}	n=307 34.8 (38.1)^{B}	n=285 20.9 (31.2)^{A}	**22.101 (<.001)**	
Protein	1224	n=307 96.5 (14.2)^{AB}	n=325 93.3 (20.3)^{A}	n=307 97.2 (14.2)^{B}	n=285 93.6 (19.8)^{AB}	**4.026 (.007)**	
Protein from hot meal	1224	n=307 82.4 (30.5)^{A}	n=325 62.2 (40.3)^{B}	n=307 63.5 (38.2)^{B}	n=285 70.9 (35.3)^{C}	**20.142 (<.001)**	
Protein from sandwich option	1224	n=307 15.0 (28.5)^{A}	n=325 31.6 (38.1)^{BC}	n=307 35.4 (38.1)^{B}	n=285 24.2 (32.5)^{AC}	**20.958 (<.001)**	
Trays with milk	1220	n=305 44.9 (42.3)^{A}	n=325 55.4 (45.1)^{B}	n=307 17.3 (33.6)^{C}	n=283 22.7 (34.7)^{C}	**65.213 (<.001)**	
Total number of food groups (out of 5)	1223	n=305 3.9 (0.8)^{A}	n=325 3.4 (0.8)^{B}	n=308 3.3 (0.7)^{BC}	n=285 3.2 (0.8)^{C}	**48.012 (<.001)**	

Appendix D — Table 4: Percentage of students who ate any* of the food category

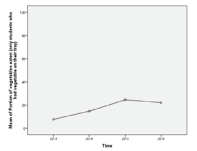
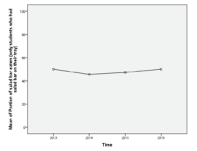
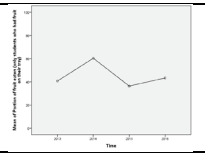
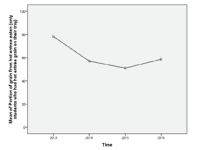
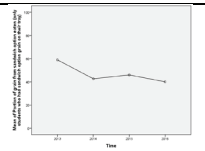
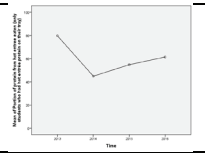
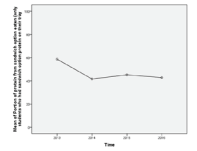
Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Fruit and/or vegetable	1225	n=307 30.7 (35.2)^{A}	n=325 42.6 (38.5)^{B}	n=308 43.2 (38.5)^{B}	n=285 46.4 (38.2)^{B}	**10.085 (<.001)**	
Cooked vegetable	1182	n= 290 11.1 (26.5)	n= 314 12.0 (25.1)	n= 302 14.0 (27.3)	n= 276 13.8 (27.1)	0.822 (.482)	
Cooked vegetables (only students with vegetable on tray)	741	n=253 13.9 (30.2)^{A}	n=168 35.3 (44.6)^{B}	n=181 38.2 (46.0)^{B}	n=139 42.1 (45.2)^{B}	**20.682 (<.001)**	
Salad bar	1218	n=307 0.3 (4.0)^{A}	n=322 3.2 (13.2)^{A}	n=306 9.4 (21.4)^{B}	n=283 9.7 (24.0)^{B}	**21.699 (<.001)**	
Any vegetable (cooked or salad bar)	1192	n=289 11.2 (26.2)^{A}	n=311 14.8 (28.4)^{AB}	n=307 19.4 (29.7)^{BC}	n=285 21.4 (32.4)^{C}	**7.234 (<.001)**	
Fruit	1125	n=284 31.6 (40.1)^{A}	n=292 44.3 (41.2)^{B}	n=286 42.9 (44.1)^{B}	n=263 45.0 (39.7)^{B}	**6.517 (<.001)**	
Fruit (only students with fruit on tray)	833	n=199 56.2 (46.5)^{A}	n=205 80.7 (35.0)^{B}	n=225 62.1 (45.1)^{AC}	n=204 70.9 (38.5)^{BC}	**13.441 (<.001)**	

Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Grain	1187	n=294 91.0 (23.9)^{A}	n=288 60.2 (38.4)^{B}	n=320 64.6 (37.9)^{B}	n=285 60.5 (37.7)^{B}	**52.115 (<.001)**	
Grain from hot meal	1173	n=298 76.1 (36.3)^{A}	n=305 33.4 (35.8)^{B}	n=297 43.8 (38.9)^{C}	n=273 52.9 (37.8)^{D}	**71.898 (<.001)**	
Grain from sandwich option	1207	n=305 11.9 (26.1)^{A}	n=315 21.3 (34.8)^{B}	n=304 25.9 (34.8)^{B}	n=283 13.1 (26.3)^{A}	**14.236 (<.001)**	
Protein	1172	n=293 91.6 (23.1)^{A}	n=287 71.4 (37.5)^{B}	n=307 67.4 (37.4)^{B}	n=285 65.1 (37.1)^{B}	**36.537 (<.001)**	
Protein from hot meal	1170	n=298 76.5 (36.3)^{A}	n=303 43.3 (40.0)^{B}	n=298 48.4 (39.6)^{B}	n=271 57.2 (38.1)^{C}	**42.899 (<.001)**	
Protein from sandwich option	1208	n=305 11.9 (26.1)^{A}	n=316 21.6 (34.9)^{BC}	n=304 25.3 (34.2)^{B}	n=283 15.5 (27.7)^{AC}	**11.376 (<.001)**	
Milk	1194	n=297 34.5 (40.3)^{A}	n=310 7.4 (20.0)^{B}	n=305 13.9 (30.6)^{BC}	n=282 19.6 (33.0)^{C}	**39.980 (<.001)**	

Appendix D – Supplement to Table 4: Percentage of students who ate any* of the food category (continued)

Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Total number of food groups (out of 5)	1113	n=246 2.6 (0.8)^{A}	n=262 2.4 (1.0)^{A}	n=320 1.9 (1.0)^{B}	n=285 2.0 (1.0)^{B}	**37.526 (<.001)**	

Appendix E — Table 5: Portion consumed (in percentage) for students who had food category on tray

Food Categories	n	% mean (SD)				F-statistics (p-value)	Profile plots
		2013	2014	2015	2016		
Cooked vegetable	741	n=253 7.7 (21.7)^{A}	n=168 14.7 (24.4)^{AC}	n=181 24.5 (36.1)^{B}	n=139 22.1 (31.7)^{BC}	**15.035 (<.001)**	
Salad bar	174	n=3 50.0 (50.0)	n=26 45.6 (38.6)	n=88 47.3 (41.8)	n=57 49.9 (41.5)	0.082 (.970)	
Fruit	833	n=199 40.7 (41.8)^{A}	n=205 60.4 (36.2)^{B}	n=225 36.4 (38.6)^{A}	n=204 43.3 (36.6)^{A}	**15.696 (<.001)**	
Grain from hot meal	911	n=261 78.1 (27.4)^{A}	n=193 57.0 (38.5)^{B}	n=232 51.0 (37.2)^{B}	n=225 58.6 (36.0)^{B}	**28.693 (<.001)**	
Grain from sandwich option	433	n=68 58.9 (34.8)^{A}	n=124 42.7 (32.6)^{B}	n=154 46.0 (34.9)^{B}	n=87 40.0 (35.2)^{B}	**4.490 (.004)**	
Protein from hot meal	941	n=260 79.7 (27.0)^{A}	n=215 44.9 (35.0)^{B}	n=235 54.8 (36.0)^{C}	n=231 61.4 (35.5)^{C}	**46.632 (<.001)**	
Protein from sandwich option	453	n=68 58.7 (35.0)^{A}	n=126 41.6 (32.9)^{B}	n=156 45.2 (35.3)^{B}	n=103 42.8 (37.0)^{B}	**3.917 (.009)**	

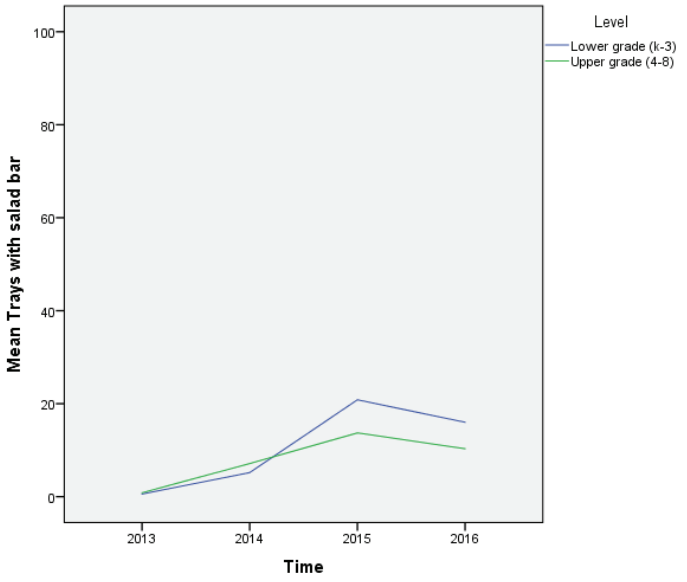
Appendix F — Table 6: Comparison between younger (K–3rd grade) and older (4th–8th grade) students

Tests of Between-Subjects Effects

Dependent Variable: Trays with salad bar

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.213[a]	7	.745	17.068	.000
Intercept	10.314	1	10.314	236.369	.000
Time	4.895	3	1.632	37.397	.000
Level	.208	1	.208	4.765	.029
Time * Level	**.440**	**3**	**.147**	**3.358**	**.018**
Error	53.059	1216	.044		
Total	68.311	1224			
Corrected Total	58.272	1223			

a. R Squared = .089 (Adjusted R Squared = .084)



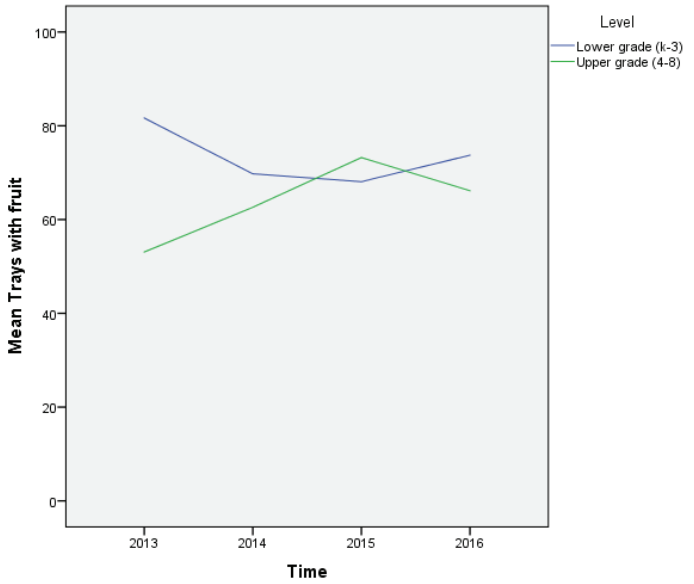
Trays with salad bar	n	% mean (SD)				F-statistics (p-value)
		2013	2014	2015	2016	
Lower grades (k-3)	522	n=149 0.5 (4.9)[A]	n=119 5.2 (18.0)[A]	n=130 20.9 (28.3)[B]	n=124 16.0 (26.8)[B]	**26.484 (<.001)**
Upper grades (4-8)	702	n=158 0.8 (6.2)[A]	n=206 7.1 (18.9)[B]	n=178 13.7 (25.4)[C]	n=160 10.3 (25.6)[BC]	**11.661 (<.001)**

Tests of Between-Subjects Effects

Dependent Variable: Trays with fruit

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.851[a]	7	1.122	8.403	.000
Intercept	557.045	1	557.045	4173.301	.000
Time	.397	3	.132	.992	.396
Level	2.695	1	2.695	20.192	.000
Time * Level	**4.461**	**3**	**1.487**	**11.140**	**<.001**
Error	162.176	1215	.133		
Total	737.507	1223			
Corrected Total	170.027	1222			

a. R Squared = .046 (Adjusted R Squared = .041)



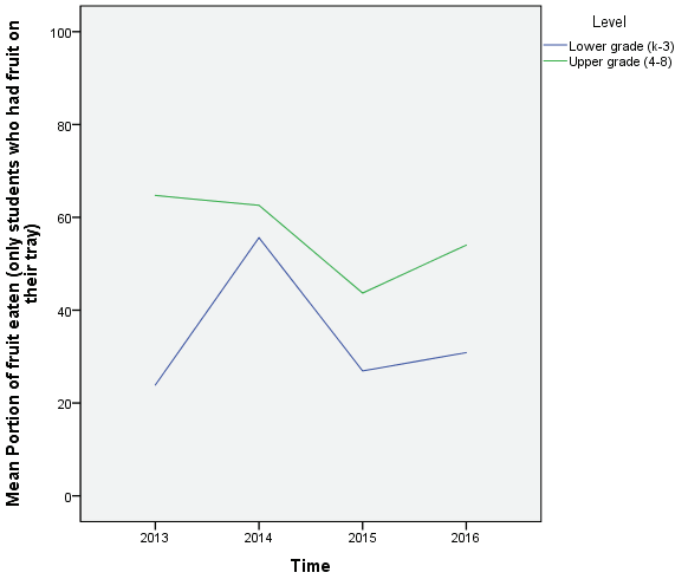
Trays with fruit	n	% mean (SD)				F-statistics (p-value)
		2013	2014	2015	2016	
Lower grades (k-3)	522	n=149 81.7 (28.9)^{A}	n=119 69.8 (36.1)^{B}	n=130 68.1 (37.3)^{B}	n=124 73.7 (33.1)^{AB}	**4.498 (.004)**
Upper grades (4-8)	701	n=157 53.1 (41.0)^{A}	n=206 62.6 (37.4)^{B}	n=178 73.2 (36.9)^{B}	n=160 66.2 (38.9)^{AB}	**7.887 (<.001)**

Tests of Between-Subjects Effects

Dependent Variable: Portion of fruit eaten (only students who had fruit on their tray)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	194593.863[a]	7	27799.123	20.970	.000
Intercept	1622639.268	1	1622639.268	1224.019	.000
Time	57765.792	3	19255.264	14.525	.000
Level	95218.822	1	95218.822	71.827	.000
Time * Level	**28770.909**	**3**	**9590.303**	**7.234**	**<.001**
Error	1093673.981	825	1325.665		
Total	2976705.729	833			
Corrected Total	1288267.844	832			

a. R Squared = .151 (Adjusted R Squared = .144)



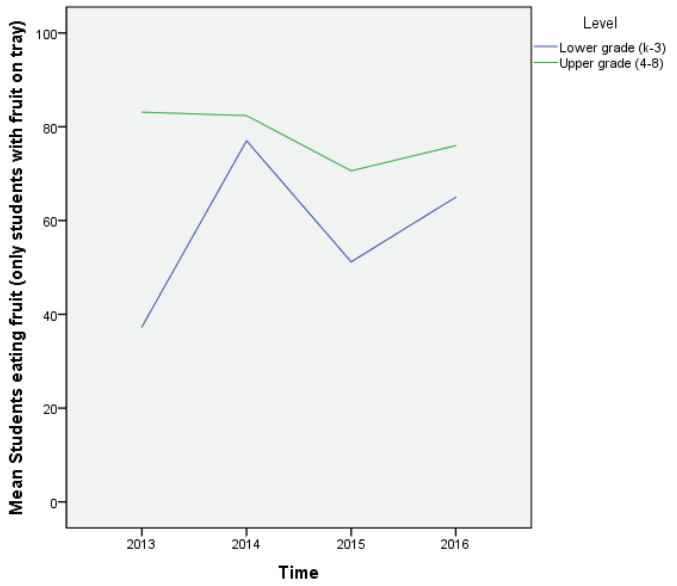
Portion of fruit eaten (only students who had fruit on their tray)	n	% mean (SD)				F-statistics (p-value)
		2013	2014	2015	2016	
Lower grades (k-3)	375	n=117 23.9 (35.7)[A]	n=66 55.6 (40.0)[B]	n=98 26.9 (34.8)[A]	n=94 30.9 (32.9)[A]	**12.435 (<.001)**
Upper grades (4-8)	458	n=82 64.7 (38.0)[A]	n=139 62.6 (34.2)[A]	n=127 43.7 (40.0)[B]	n=110 54.0 (36.4)[AB]	**7.731 (<.001)**

Tests of Between-Subjects Effects

Dependent Variable: Students eating fruit (only students with fruit on tray)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	19.912[a]	7	2.845	18.006	.000
Intercept	363.956	1	363.956	2303.851	.000
Time	4.828	3	1.609	10.187	.000
Level	8.227	1	8.227	52.075	.000
Time * Level	**4.578**	**3**	**1.526**	**9.660**	**<.001**
Error	130.331	825	.158		
Total	528.958	833			
Corrected Total	150.244	832			

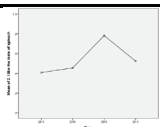
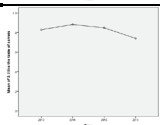
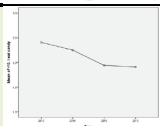
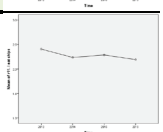
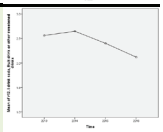
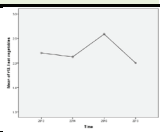
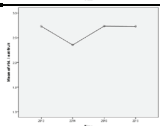
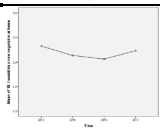
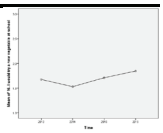
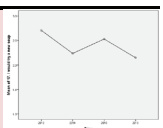
a. R Squared = .133 (Adjusted R Squared = .125)



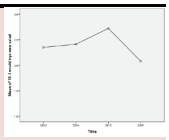
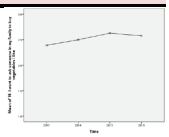
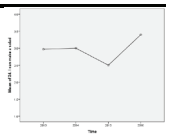
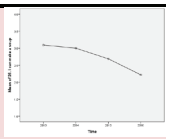
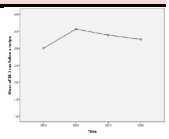
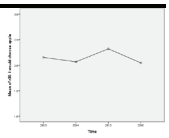
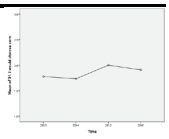
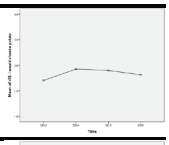
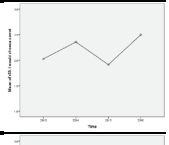
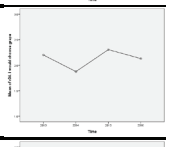
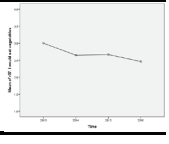
Students eating fruit (only students with fruit on tray)	n	% mean (SD)				F-statistics (p-value)
		2013	2014	2015	2016	
Lower grades (k-3)	375	n=117 37.3 (45.0)^{A}	n=66 77.0 (39.6)^{B}	n=98 51.2 (45.3)^{AC}	n=94 65.0 (40.7)^{BC}	**14.198 (<.001)**
Upper grades (4-8)	458	n=82 83.1 (33.5)^{AB}	n=139 82.4 (32.5)^{A}	n=127 70.6 (43.2)^{B}	n=110 76.0 (35.9)^{AB}	**3.009 (.030)**

Appendix G – Supplement Table 9: Third grade questionnaire, questions with significant changes

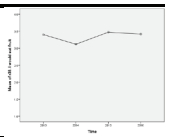
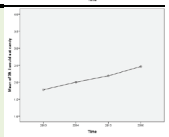
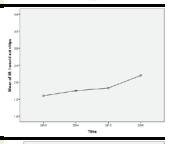
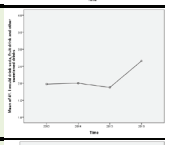
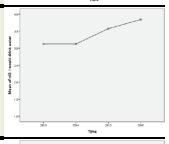
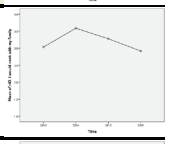
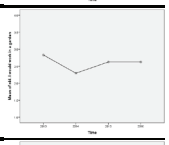
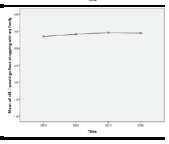
Appendix G — Table 9: Third grade questions matched for 4 years: 4 independent group multiple comparisons with ANOVA, all questions (table shows only questions with significant changes)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics (p-value)	Profile plot
		2013	2014	2015	2016		
2. I like the taste of spinach	0/1[a]	n=27 .41 (.50)^{A}	n=11 .45 (.52)^{AB}	n=32 .78 (.42)^{B}	n=21 .52 (.52)^{AB}	**3.391 (.022)**	
3. I like the taste of carrots	0/1[a]	n=41 .83 (.38)	n=17 .88 (.33)	n=33 .85 (.36)	n=27 .74 (.45)	.594 (.620)	
10. I eat candy	1-3[b]	n=42 2.40 (.66)^{A}	n=16 2.25 (.45)^{AB}	n=33 1.94 (.50)^{B}	n=22 1.91 (.53)^{B}	**5.872 (.001)**	
11. I eat chips	1-3[b]	n=42 2.40 (.59)	n=17 2.24 (.75)	n=35 2.29 (.57)	n=26 2.19 (.49)	.806 (.493)	
12. I drink soda, fruit drink or other sweetened drinks	1-3[b]	n=41 2.56 (.59)^{A}	n=17 2.65 (.49)^{A}	n=30 2.40 (.67)^{AB}	n=25 2.12(.67)^{B}	**3.416 (.020)**	
13. I eat vegetables	1-3[b]	n=39 2.21 (.77)^{AB}	n=16 2.13 (.81)^{AB}	n=34 2.59 (.61)^{A}	n=25 2.00 (.87)^{B}	**3.388 (.021)**	
14. I eat fruit	1-3[b]	n=41 2.73 (.50)	n=17 2.35 (.79)	n=34 2.74 (.51)	n=26 2.73 (.45)	2.369 (.074)	
15. I would try a new vegetable at home	1-3[c]	n=40 2.33 (.73)	n=15 2.13 (.64)	n=33 2.06 (.70)	n=26 2.23 (.71)	.905 (.441)	
16. I would try a new vegetable at school	1-3[c]	n=40 1.68 (.86)	n=17 1.53 (.80)	n=31 1.71 (.78)	n=26 1.85 (.83)	.528 (.664)	
17. I would try a new soup	1-3[c]	n=41 2.71 (.56)^{A}	n=17 2.24 (.90)^{AB}	n=34 2.53 (.66)^{AB}	n=27 2.15 (.91)^{B}	**3.841 (.012)**	

Appendix G – Supplement Table 9: Third grade questionnaire, questions with significant changes (continued)

Questions (matched for 4 yrs)	Response	Mean (SD) 2013	2014	2015	2016	F-statistics (p-value)	Profile plot
18. I would try a new salad	1-3[c]	n=40 2.35 (.80)[AB]	n=17 2.41 (.62)[AB]	n=36 2.72 (.51)[A]	n=13 2.08 (.86)[B]	**3.376 (.021)**	
19. I want to ask someone in my family to buy vegetables I like	1-3[c]	n=41 2.39 (.77)	n=14 2.50 (.76)	n=35 2.63 (.69)	n=26 2.58 (.76)	.720 (.542)	
24. I can make a salad	1-4[d]	n=37 2.97 (.96)	n=15 3.00 (1.00)	n=30 2.50 (1.33)	n=15 3.40 (1.06)	2.418 (.071)	
26. I can make a soup	1-4[d]	n=32 3.09 (1.03)[A]	n=13 3.00 (.71)[AB]	n=32 2.69 (1.00)[AB]	n=23 2.22 (1.20)[B]	**3.544 (.017)**	
28. I can follow a recipe	1-4[d]	n=35 3.00 (1.00)	n=16 3.56 (.63)	n=31 3.39 (.84)	n=23 3.26 (1.01)	1.741 (.163)	
30. I would choose apple	1-3[e]	n=39 2.15 (.87)	n=15 2.07 (.88)	n=28 2.32 (.86)	n=22 2.05 (.95)	.484 (.694)	
31. I would choose corn	1-3[e]	n=36 1.78 (.80)	n=15 1.73 (.80)	n=31 2.00 (.52)	n=22 1.91 (.75)	.747 (.527)	
32. I would choose potato	1-3[e]	n=30 1.70 (.70)	n=13 1.92 (.49)	n=29 1.90 (.56)	n=16 1.81 (.75)	.604 (.614)	
33. I would choose carrot	1-3[e]	n=38 2.03 (.88)	n=14 2.36 (.93)	n=23 1.91 (.95)	n=20 2.50 (.76)	2.103 (.105)	
34. I would choose grape	1-3[e]	n=40 2.20 (.97)	n=16 1.88 (1.02)	n=36 2.31 (.89)	n=23 2.13 (.97)	.783 (.506)	
37. I would eat vegetables	1-4[f]	n=42 3.00 (1.13)	n=17 2.65 (1.00)	n=36 2.67 (1.04)	n=26 2.46 (1.30)	1.365 (.257)	

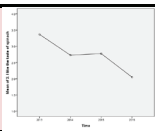
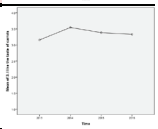
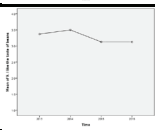
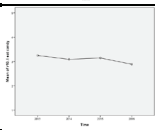
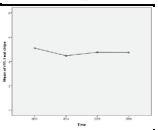
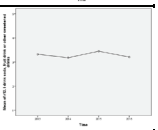
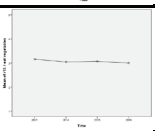
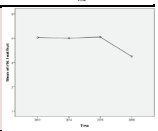
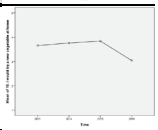
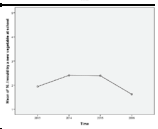
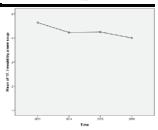
Appendix G – Supplement Table 9: Third grade questionnaire, questions with significant changes (continued)

Questions (matched for 4 yrs)	Response	Mean (SD) 2013	2014	2015	2016	F-statistics (p-value)	Profile plot
38. I would eat fruit	1-4[f]	n=40 3.40 (.96)	n=17 3.12 (.99)	n=36 3.47 (.94)	n=24 3.42 (.88)	.572 (.634)	
39. I would eat candy	1-4[f]	n=36 1.78 (.93)[A]	n=17 2.00 (.94)[AB]	n=32 2.19 (.97)[AB]	n=26 2.46 (.95)[B]	2.814 (**.043**)	
40. I would eat chips	1-4[f]	n=40 1.60 (.81)	n=16 1.75 (.86)	n=35 1.83 (.86)	n=25 2.20 (.87)	2.640 (.053)	
41. I would drink soda, fruit drink and other sweetened drinks	1-4[f]	n=39 1.97 (1.16)[AB]	n=17 2.00 (.79)[AB]	n=32 1.88 (.91)[A]	n=26 2.65 (1.16)[B]	3.162 (**.028**)	
42. I would drink water	1-4[g]	n=40 3.13 (1.07)[A]	n=16 3.13 (1.20)[AB]	n=33 3.58 (.87)[AB]	n=26 3.85 (.54)[B]	3.942 (**.010**)	
43. I would cook with my family	1-4[g]	n=29 3.03 (.98)	n=17 3.59 (.62)	n=36 3.28 (1.06)	n=24 2.92 (1.10)	1.852 (.142)	
44. I would work in a garden	1-4[g]	n=41 2.83 (1.20)	n=17 2.29 (1.10)	n=32 2.63 (1.18)	n=24 2.63 (1.24)	.822 (.485)	
45. I would go food shopping with my family	1-4[g]	n=23 3.35 (.98)	n=17 3.41 (.87)	n=35 3.46 (.92)	n=27 3.44 (.75)	.079 (.971)	

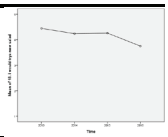
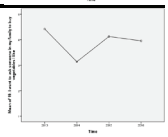
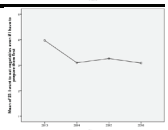
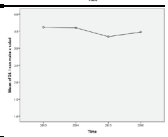
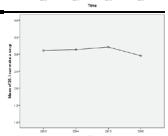
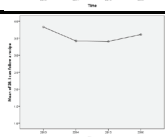
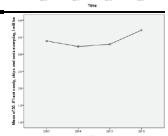
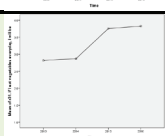
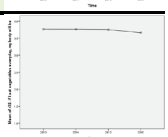
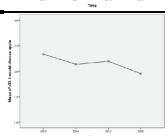
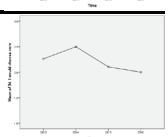
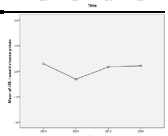
a. 0=don't like; 1=like
b. 1=hardly ever; 2=a few times a week; 3=every day
c. 1=no; 2=maybe; 3=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=most processed; 2=minimally processed; 3=whole food
f. 1=most days; 2=some days; 3=once in a while; 4=hardly ever
g. 1=hardly ever; 2=once in a while; 3=some days; 4=most days

Appendix H – Supplement Table 10: Fifth grade questionnaire, questions with significant changes

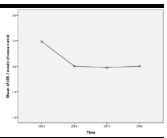
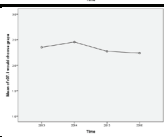
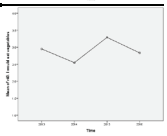
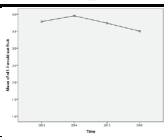
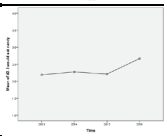
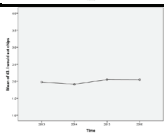
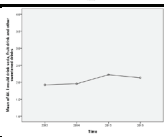
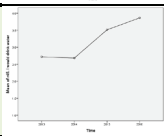
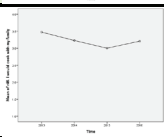
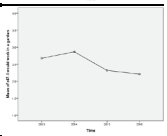
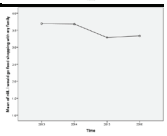
Appendix H — Table 10: Fifth grade questions matched for 4 years: 4 independent group multiple comparisons with ANOVA, all questions (table shows only questions with significant changes)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics(p-value)	Profile plot
		2013	2014	2015	2016		
2. I like the taste of spinach	1-4[a]	n=38 3.37 (1.72) [A]	n=22 2.73 (.98) [AB]	n=40 2.78 (1.10)[AB]	n=21 2.05 (1.16) [B]	**4.650 (.004)**	
3. I like the taste of carrots	1-4[a]	n=38 3.16 (1.08)	n=22 3.55 (.80)	n=39 3.38 (.96)	n=21 3.33 (.86)	.822 (.484)	
9. I like the taste of beans	1-4[a]	n=35 3.37 (.94)	n=22 3.50 (.96)	n=39 3.13 (.95)	n=24 3.13 (.95)	1.039 (.378)	
10. I eat candy	1-5[b]	n=36 3.25 (1.34)	n=22 3.09 (1.15)	n=41 3.15 (1.35)	n=18 2.89 (1.23)	.320 (.811)	
11. I eat chips	1-5[b]	n=38 3.55(1.22)	n=21 3.24(1.14)	n=42 3.38(1.03)	n=24 3.38(1.17)	.375 (.771)	
12. I drink soda, fruit drink or other sweetened drinks	1-5[b]	n=34 3.32 (1.39)	n=22 3.18 (1.14)	n=40 3.45 (1.15)	n=24 3.21 (1.18)	.309 (.819)	
13. I eat vegetables	1-5[b]	n=37 3.16 (1.34)	n=22 3.05 (1.29)	n=42 3.07 (1.13)	n=24 3.00 (1.06)	.098 (.961)	
14. I eat fruit	1-5[b]	n=38 4.03 (.82)[A]	n=22 4.00 (1.02) [AB]	n=42 4.05 (.99) [AB]	n=24 3.25 (1.19) [B]	**4.032 (.009)**	
15. I would try a new vegetable at home	1-5[c]	n=38 3.66 (1.24)	n=21 3.76 (1.22)	n=38 3.84 (1.17)	n=24 3.04 (1.04)	2.491 (.064)	
16. I would try a new vegetable at school	1-5[c]	n=36 1.94 (1.47)	n=22 2.41 (1.44)	n=23 2.39 (1.59)	n=24 1.63 (1.01)	1.736 (.164)	
17. I would try a new soup	1-5[c]	n=36 4.64 (.87)	n=22 4.23 (1.31)	n=24 4.25 (1.29)	n=23 4.00 (.95)	1.764 (.159)	

Appendix H – Supplement Table 10: Fifth grade questionnaire, questions with significant changes (continued)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics(p-value)	Profile plot
		2013	2014	2015	2016		
18. I would try a new salad	1-5[c]	n=36 4.44 (1.23)	n=21 4.24 (.94)	n=23 4.26 (1.25)	n=24 3.75 (1.19)	1.726 (.167)	
19. I want to ask someone in my family to buy vegetables I like	1-5[c]	n=38 4.42 (1.20)[A]	n=22 3.14 (1.75)[B]	n=24 4.13 (1.26)[AB]	n=23 3.96 (1.43)[AB]	**4.055 (.009)**	
23. I (can, in 2013) want to eat vegetables even if I have to prepare them first	1-5[c]	n=36 3.97 (1.54)	n=21 3.10 (1.79)	n=23 3.26 (1.63)	n=24 3.08 (1.50)	2.137 (.100)	
24. I can make a salad	1-4[d]	n=34 3.62 (.55)	n=20 3.60 (.75)	n=41 3.34 (.79)	n=21 3.48 (1.08)	.918 (.435)	
26. I can make a soup	1-4[d]	n=37 3.11 (1.05)	n=22 3.14 (.89)	n=38 3.21 (.96)	n=23 2.96 (1.15)	.303 (.823)	
28. I can follow a recipe	1-4[d]	n=35 3.83 (.62)	n=19 3.42 (1.02)	n=37 3.41 (.98)	n=23 3.61 (.58)	1.878 (.138)	
30. If I eat candy, chips and soda everyday, I will be…	1-4[e]	n=36 3.39 (1.08)	n=22 3.23 (.92)	n=41 3.29 (.96)	n=24 3.71 (.69)	1.251 (.294)	
31. If I eat vegetables everyday, I will be…	1-4[f]	n=33 2.82 (1.36)[A]	n=15 2.87 (1.25)[A]	n=41 3.76 (.73)[B]	n=23 3.83 (.65)[B]	7.988 (<.001)	
32. If I eat vegetables everyday, my body will…	1-4[g]	n=34 3.76 (.50)	n=21 3.76 (.70)	n=40 3.75 (.54)	n=24 3.67 (.87)	.134 (.939)	
33. I would choose apple	1-3[h]	n=36 2.33 (.76)	n=22 2.14 (.89)	n=36 2.19 (.82)	n=21 1.95 (.86)	.976 (.407)	
34. I would choose corn	1-3[h]	n=38 2.26 (.72)	n=22 2.50 (.67)	n=38 2.11 (.69)	n=20 2.00 (.79)	2.117 (.102)	
35. I would choose potato	1-3[h]	n=34 2.15 (.66)	n=19 1.84 (.69)	n=36 2.08 (.55)	n=19 2.11 (.57)	1.072 (.365)	

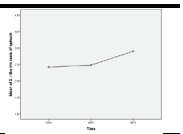
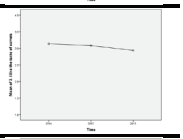
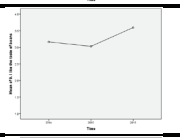
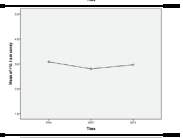
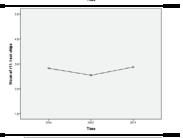
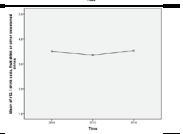
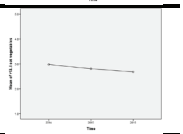
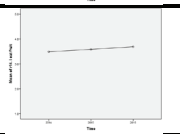
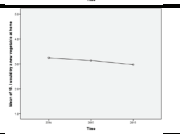
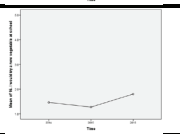
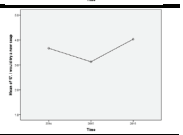
Appendix H – Supplement Table 10: Fifth grade questionnaire, questions with significant changes (continued)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics(p-value)	Profile plot
		2013	2014	2015	2016		
36. I would choose carrot	1-3[h]	n=31 2.48 (.81)	n=18 2.00 (.97)	n=37 1.97 (.90)	n=19 2.00 (.94)	2.260 (.086)	
37. I would choose grape	1-3[h]	n=37 2.35 (.89)	n=22 2.45 (.91)	n=22 2.27 (.94)	n=21 2.24 (.94)	.241 (.867)	
40. I would eat vegetables	1-4[i]	n=39 2.95 (.83) [AB]	n=22 2.55 (1.06) [A]	n=38 3.29 (.84)[B]	n= 2.83 (1.05) [AB]	3.274 (.024)	
41. I would eat fruit	1-4[i]	n=37 3.78 (.63)	n=22 3.95 (.21)	n=42 3.74 (.73)	n=24 3.50 (.88)	1.796 (.152)	
42. I would eat candy	1-4[j]	n=37 2.19 (1.02)	n=22 2.27 (1.08)	n=38 2.21 (.99)	n=6 2.67 (1.03)	.396 (.756)	
43. I would eat chips	1-4[j]	n=39 1.97 (1.06)	n=22 1.91 (1.15)	n=42 2.05 (1.03)	n=23 2.04 (.88)	.107 (.956)	
44. I would drink soda, fruit drink and other sweetened drinks	1-4[j]	n=38 1.92 (1.08)	n=22 1.95 (.95)	n=41 2.22 (1.13)	n=23 2.13 (.81)	.670 (.572)	
45. I would drink water	1-4[i]	n=39 2.72 (1.39) [A]	n=22 2.68 (1.25) [A]	n=41 3.51 (1.00) [B]	n=22 3.86 (.35) [B]	7.650 (<.001)	
46. I would cook with my family	1-4[i]	n=38 3.47 (.95)	n=22 3.23 (1.07)	n=40 3.00 (.93)	n=24 3.21 (.83)	1.634 (.185)	
47. I would work in a garden	1-4[i]	n=37 2.68 (1.25)	n=22 2.86 (.99)	n=41 2.32 (1.15)	n=24 2.21 (1.10)	1.895 (.134)	
48. I would go food shopping with my family	1-4[i]	n=36 3.69 (.58)	n=22 3.68 (.72)	n=42 3.29 (.92)	n=24 3.33 (.92)	2.438 (.068)	

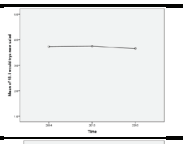
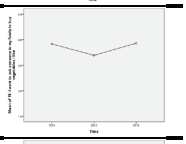
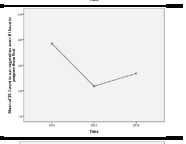
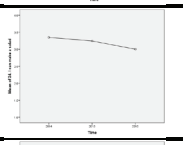
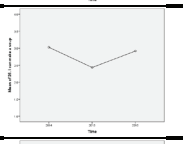
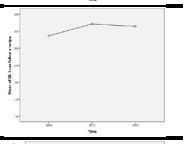
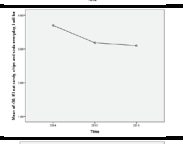
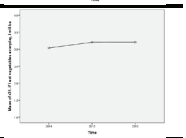
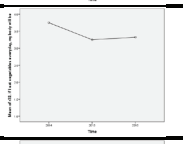
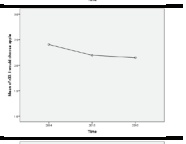
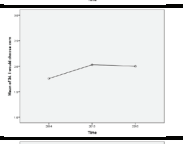
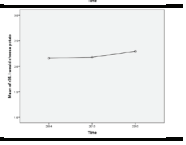
a. 1=really don't like; 2=don't like; 3=like; 4=really like
b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=very healthy; 2=healthy; 3=unhealthy; 4=very unhealthy
f. 1=very unhealthy; 2=unhealthy; 3=healthy; 4=very healthy
g. 1=very weak; 2=weak; 3=strong; 4=very strong
h. 1=most processed; 2=minimally processed; 3=whole food
i. 1=hardly ever; 2=once in a while; 3=some days; 4=most days
j. 1=most days; 2=some days; 3=once in a while; 4=hardly ever

Appendix I – Supplement Table 11: Eighth grade questionnaire, questions with significant changes

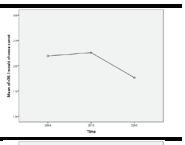
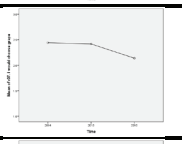
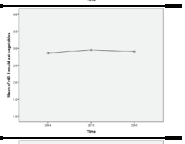
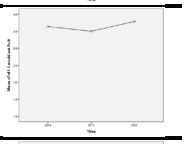
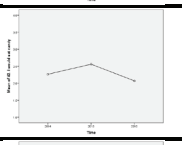
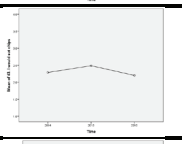
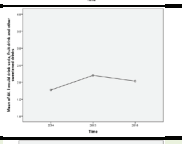
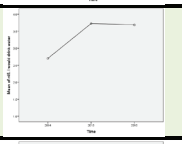
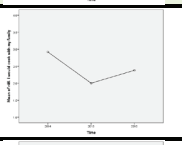
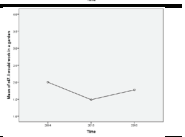
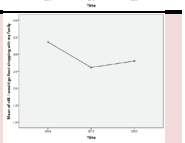
Appendix I — Table 11: Eighth grade questions matched for 3 years: 3 independent group multiple comparisons with ANOVA, all questions (table shows only questions with significant changes)

Questions (matched for 3 yrs)	Response	Mean (SD)			F-statistics (p-value)	Profile plot
		2014	2015	2016		
2. I like the taste of spinach	1-4[a]	n=31 2.42 (.99)	n=23 2.48 (1.16)	n=30 2.90 (1.37)	1.438 (.243)	
3. I like the taste of carrots	1-4[a]	n=37 3.14 (1.00)	n=37 3.08 (1.04)	n=32 2.94 (1.24)	.295 (.745)	
9. I like the taste of beans	1-4[a]	n=37 3.16 (1.09)	n=35 3.03 (.95)	n=32 3.59 (.87)	2.989 (.055)	
10. I eat candy	1-5[b]	n=37 3.08 (1.16)	n=35 2.80 (.99)	n=29 2.97 (1.15)	.587 (.558)	
11. I eat chips	1-5[b]	n=34 2.82 (1.17)	n=35 2.54 (1.15)	n=31 2.87 (1.38)	.702 (.498)	
12. I drink soda, fruit drink or other sweetened drinks	1-5[b]	n=38 3.50 (1.43)	n=34 3.35 (1.25)	n=32 3.53 (1.14)	.185 (.831)	
13. I eat vegetables	1-5[b]	n=39 2.97 (1.22)	n=36 2.81 (1.06)	n=31 2.68 (1.28)	.551 (.578)	
14. I eat fruit	1-5[b]	n=39 3.49 (.97)	n=36 3.58 (1.08)	n=32 3.69 (.82)	.377 (.687)	
15. I would try a new vegetable at home	1-5[c]	n=37 3.24 (1.36)	n=37 3.14 (1.38)	n=31 2.97 (1.17)	.373 (.690)	
16. I would try a new vegetable at school	1-5[c]	n=39 1.46 (.91)	n=33 1.27 (.67)	n=30 1.80 (1.30)	2.324 (.103)	
17. I would try a new soup	1-5[c]	n=36 3.67 (1.22)[AB]	n=32 3.13 (1.36)[A]	n=32 4.03 (1.12)[B]	**4.352 (.015)**	

Appendix I – Supplement Table 11: Eighth grade questionnaire, questions with significant changes (continued)

Questions (matched for 3 yrs)	Response	Mean (SD)			F-statistics (p-value)	Profile plot
		2014	2015	2016		
18. I would try a new salad	1-5[c]	n=33 3.73 (1.40)	n=35 3.74 (1.20)	n=32 3.66 (1.41)	.039 (.961)	
19. I want to ask someone in my family to buy vegetables I like	1-5[c]	n=36 3.83 (1.50)	n=31 3.39 (1.28)	n=29 3.86 (1.36)	1.147 (.322)	
23. I (can, in 2013) want to eat vegetables even if I have to prepare them first	1-5[c]	n=33 3.85 (1.25)[A]	n=34 2.18 (1.29)[B]	n=31 2.68 (1.47)[B]	**13.701 (<.001)**	
24. I can make a salad	1-4[d]	n=23 3.35 (1.03)	n=33 3.24 (1.06)	n=24 3.00 (1.25)	.615 (.543)	
26. I can make a soup	1-4[d]	n=36 3.03 (1.00)	n=30 2.43 (1.30)	n=24 2.92 (1.10)	2.415 (.095)	
28. I can follow a recipe	1-4[d]	n=30 3.37 (.93)	n=35 3.71 (.75)	n=14 3.64 (.63)	1.574 (.214)	
30. If I eat candy, chips and soda everyday, I will be…	1-4[e]	n=33 3.70 (.64)	n=33 3.18 (1.16)	n=31 3.10 (1.19)	3.268 (.042)	
31. If I eat vegetables everyday, I will be…	1-4[f]	n=27 3.04 (.94)	n=34 3.21 (1.12)	n=29 3.21 (1.24)	.220 (.803)	
32. If I eat vegetables everyday, my body will be …	1-4[g]	n=36 3.75 (.44)[A]	n=36 3.25 (.91)[B]	n=31 3.32 (.98)[AB]	**4.031 (.021)**	
33. I would choose apple	1-3[h]	n=37 2.41 (.69)	n=36 2.19 (.71)	n=27 2.15 (.66)	1.345 (.265)	
34. I would choose corn	1-3[h]	n=33 1.76 (.71)	n=35 2.03 (.62)	n=23 2.00 (.74)	1.533 (.222)	
35. I would choose potato	1-3[h]	n=38 2.16 (.64)	n=34 2.18 (.76)	n=24 2.29 (.62)	.311 (.733)	

Appendix I – Supplement Table 11: Eighth grade questionnaire, questions with significant changes (continued)

Questions (matched for 3 yrs)	Response	Mean (SD)			F-statistics (p-value)	Profile plot
		2014	2015	2016		
36. I would choose carrot	1-3[h]	n=31 2.19 (.83)	n=27 2.26 (.90)	n=17 1.76 (.90)	1.854 (.164)	
37. I would choose grape	1-3[h]	n=34 2.44 (.89)	n=36 2.42 (.84)	n=29 2.14 (.95)	1.092 (.340)	
40. I would eat vegetables	1-4[i]	n=35 2.86 (.97)	n=36 2.94 (.86)	n=29 2.90 (1.08)	.072 (.930)	
41. I would eat fruit	1-4[i]	n=36 3.64 (.64)	n=36 3.50 (.74)	n=28 3.79 (.57)	1.489 (.231)	
42. I would eat candy	1-4[i]	n=38 2.26 (.98)	n=34 2.56 (.86)	n=29 2.07 (1.07)	2.071 (.132)	
43. I would eat chips	1-4[j]	n=35 2.29 (.83)	n=35 2.49 (1.01)	n=30 2.20 (1.16)	.714 (.492)	
44. I would drink soda, fruit drink and other sweetened drinks	1-4[j]	n=35 1.77 (.88)	n=35 2.20 (.83)	n=31 2.03 (.91)	2.138 (.123)	
45. I would drink water	1-4[i]	n=20 2.70 (1.34)[A]	n=33 3.73 (.80)[B]	n=32 3.69 (.78)[B]	**8.663 (<.001)**	
46. I would cook with my family	1-4[i]	n=37 2.92 (1.14)[A]	n=34 2.00 (.98)[B]	n=29 2.38 (1.21)[AB]	**6.151 (.003)**	
47. I would work in a garden	1-4[i]	n=36 2.00 (.99)	n=35 1.49 (.70)	n=31 1.77 (.99)	2.909 (.059)	
48. I would go food shopping with my family	1-4[i]	n=36 3.36 (.93)[A]	n=36 2.61 (1.13)[B]	n=30 2.80 (1.00)[B]	**5.185 (.007)**	

a. 1=really don't like; 2=don't like; 3=like; 4=really like
b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=very healthy; 2=healthy; 3=unhealthy; 4=very unhealthy
f. 1=very unhealthy; 2=unhealthy; 3=healthy; 4=very healthy
g. 1=very weak; 2=weak; 3=strong; 4=very strong
h. 1=most processed; 2=minimally processed; 3=whole food
i. 1=hardly ever; 2=once in a while; 3=some days; 4=most days
j. 1=most days; 2=some days; 3=once in a while; 4=hardly ever

Appendix J — Global Tech (M406) Descriptive Statistics for School Lunch Consumption Digital Photo Data and Understandings, Beliefs, and Behaviors Questionnaire Data

School Lunch Consumption Digital Photography	n	% mean (SD)
Students with anything from school lunch	98	86.7 (34.1)
Trays with cooked vegetables	85	51.8 (50.3)
Trays with salad bar	85	2.4 (15.2)
Trays with cooked vegetables and/or salad bar	85	52.9 (50.2)
Students eating cooked vegetables (all students)	82	40.2 (49.3)
Students eating salad bar (all students)	85	2.4 (15.2)
Students eating cooked vegetables and/or salad bar (all students)	85	40.0 (49.3)
Students eating cooked vegetables (only students with cooked vegetables on tray)	41	80.5 (40.1)
Trays with fruit	82	48.8 (50.3)
Students eating fruit (all students)	69	24.6 (43.4)
Students eating fruit (only students with fruit on tray)	27	63.0 (49.2)
Trays with fruit and/or vegetable	85	98.8 (10.8)
Students eating any fruit and/or vegetables	85	52.9 (50.2)
Trays with grain from hot meal	85	71.8 (45.3)
Trays with grain from sandwich option	85	15.3 (36.2)
Trays with any grain	85	87.1 (33.8)
Students who ate grain from hot meal	79	51.9 (50.3)
Students who ate grain from sandwich option	84	14.3 (35.2)
Students who ate any grain	85	62.4 (48.7)
Trays that had protein from hot meal	85	78.8 (41.1)
Trays that had protein from sandwich option	85	18.8 (39.3)
Trays with any protein	85	95.3 (21.3)
Students who ate protein from hot meal	78	62.8 (48.6)
Students who ate protein from sandwich option	84	17.9 (38.5)
Students who ate any protein	85	72.9 (44.7)
Trays with milk	83	27.7 (45.0)
Students who drank milk	78	21.8 (41.6)
Number of food groups taken	85	3.1 (0.9)
Number of food groups eaten	85	2.2 (1.2)
Portion of vegetables eaten (only students who had vegetable on their tray)	41	66.1 (41.8)
Portion of salad bar eaten (only students who had salad bar on their tray)	2	100 (0.0)
Portion of fruit eaten (only students who had fruit on their tray)	27	47.4 (47.4)
Portion of grain from hot entree eaten (only students who had hot entrée grain on their tray)	55	57.6 (43.6)
Portion of grain from sandwich option eaten (only students who had sandwich option grain on their tray)	12	56.3 (30.4)
Portion of protein from hot entree eaten (only students who had hot entrée protein on their tray)	60	63.3 (43.1)
Portion of protein from sandwich option eaten (only students who had sandwich option protein on their tray)	15	52.3 (32.3)

Appendix J– Global Tech (M406) Descriptive Statistics for School Lunch Consumption Digital Photo Data and Understandings, Beliefs, and Behaviors Questionnaire Data (continued)

Understandings, Beliefs, Behaviors Questions	Response	N	Mean	Std. Deviation
2. I like the taste of spinach	1-4[a]	32	2.06[B]	.98
3. I like the taste of carrots	1-4[a]	33	3.00[AB]	.94
9. I like the taste of beans	1-4[a]	32	2.81[B]	.97
10. I eat candy	1-5[b]	34	3.12[B]	1.23
11. I eat chips	1-5[b]	36	3.47	1.13
12. I drink soda, fruit drink or other sweetened drinks	1-5[b]	36	3.75[AB]	1.08
13. I eat vegetables	1-5[b]	34	2.82[B]	1.09
14. I eat fruit	1-5[b]	36	3.50[AB]	1.11
15. I would try a new vegetable at home	1-5[c]	34	3.00[AB]	1.28
16. I would try a new vegetable at school	1-5[c]	35	1.83[C]	1.32
17. I would try a new soup	1-5[c]	35	3.66[BC]	1.14
18. I would try a new salad	1-5[c]	35	3.26	1.38
19. I want to ask someone in my family to buy vegetables I like	1-5[c]	35	3.40	1.36
23. I (can, in 2013) want to eat vegetables even if I have to prepare them first	1-5[c]	36	2.75[B]	1.25
24. I can make a salad	1-4[d]	31	3.52	.96
26. I can make a soup	1-4[d]	32	2.97	1.03
28. I can follow a recipe	1-4[d]	35	3.37[B]	.97
30. If I eat candy, chips and soda everyday, I will be…	1-4[e]	35	3.17	.89
31. If I eat vegetables everyday, I will be…(R)	1-4[f]	36	3.31	1.04
32. If I eat vegetables everyday, my body will be …	1-4[g]	36	3.44[B]	.97
33. I would choose apple	1-3[h]	34	2.32	.77
34. I would choose corn	1-3[h]	35	1.86[AB]	.65
35. I would choose potato	1-3[h]	30	1.83	.79
36. I would choose carrot	1-3[h]	27	2.11	.93
37. I would choose grape	1-3[e]	34	2.29[AB]	.91
40. I would eat vegetables	1-4[i]	36	2.78	1.05
41. I would eat fruit	1-4[i]	36	3.47[B]	.77
42. I would eat candy (R)	1-4[i]	35	2.00[B]	.87
43. I would eat chips (R)	1-4[i]	36	2.00	.93
44. I would drink soda, fruit drink and other sweetened drinks (R)	1-4[i]	36	1.81[AB]	.89
45. I would drink water	1-4[i]	32	3.84[B]	.45
46. I would cook with my family	1-4[i]	34	2.74	1.05
47. I would work in a garden	1-4[i]	35	1.71[B]	.93
48. I would go food shopping with my family	1-4[i]	36	3.03[B]	1.03

a. 1=really don't like; 2=don't like; 3=like; 4=really like
b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no
e. 1=very healthy; 2=healthy; 3=unhealthy; 4=very unhealthy
f. 1=very unhealthy; 2=unhealthy; 3=healthy; 4=very healthy
g. 1=very weak; 2=weak; 3=strong; 4=very strong
h. 1=most processed; 2=minimally processed; 3=whole food
i. 1=hardly ever; 2=once in a while; 3=some days; 4=most days

ESYNYC Additional analyses (since 10.14.2016)

Additional analyses were performed to see whether or not there are survey score differences between students in Global Tech and PS7. Seventh grade students in Global Tech and (1) 7th grade 2013 baseline data in PS7; (2) 5th & 8th grade 2016 combined data in PS7; and (3) 8th grade only 2016 data in PS7 were compared. Green highlights represent desirable differences between two schools (PS7 having better scores). There were three questions that PS7 students scored better, while no score was more desirable in Global Tech students. Significant differences of baseline data comparisons between Global Tech 2016 and PS7 2013 data were highlighted in blue but there is no desirable direction for those. Please see Table 1.

Table 1. Global Tech and PS7 upper grade comparison with 2016 data

M406/Global Tech Preparatory - 7th grade: Descriptive statistics in 2016	Response options	Mean (SD)			
		Global Tech	PS7 2013 7th	PS7 2016 5th & 8th	PS7 2016 8th
1. I like the taste of leafy greens (like kale, Swiss chard, collards)	1-4[a]	n=31 2.13 (.92)	NA	n=37 **2.65 (.89)***	n= 25 2.60 (.91)
2. I like the taste of spinach[†]	1-4[a†]	n=32 2.06 (.98)	**n=32 3.00[†] (.0)*****	n=46 2.28 (1.13)	n= 25 2.48 (1.08)
3. I like the taste of carrots	1-4[a]	n=33 3.00 (.94)	n=6 2.17 (1.17)	n=51 3.02 (1.07)	n= 30 2.80 (1.16)
4. I like the taste of tomatoes	1-4[a]	n=34 2.26 (1.26)	NA	n=50 2.40 (1.09)	n= 27 2.44 (1.19)
5. I like the taste of salad	1-4[a]	n=34 3.15 (1.02)	NA	n=53 3.38 (.88)	n= 30 3.20 (1.03)
6. I like the taste of squash	1-4[a]	n=28 1.43 (.79)	NA	n=49 1.73 (.92)	n= 27 1.89 (1.12)
7. I like the taste of whole grains (like oats and brown rice)	1-4[a]	n=32 3.09 (.96)	NA	n=47 3.21 (.72)	n= 27 3.48 (.51)
8. I like the taste of whole wheat bread	1-4[a]	n=33 2.64 (.93)	NA	n=45 2.67 (1.04)	n= 26 2.69 (1.05)
9. I like the taste of beans	1-4[a]	n=32 2.81 (.97)	n=37 3.22 (0.85)	n=55 **3.36 (.91)****	n= 31 **3.55 (.85)****
10. I eat candy	1-5[b]	n=34 3.12 (1.23)	**n=35 2.06 (1.28)****	n=47 2.94 (1.17)	n= 29 2.97 (1.15)
11. I eat chips	1-5[b]	n=36 3.47 (1.13)	n=34 3.38 (1.35)	n=55 3.09 (1.31)	n= 31 2.87 (1.38)
12. I drink soda, fruit drink or other sweetened drinks	1-5[b]	n=36 3.75 (1.08)	**n=38 3.13 (1.14)***	n=56 3.39 (1.15)	n= 32 3.53 (1.14)
13. I eat vegetables	1-5[b]	n=34 2.82 (1.09)	**n=37 3.65 (1.16)***	n=55 2.82 (1.19)	n= 31 2.68 (1.28)
14. I eat fruit	1-5[b]	n=36 3.50 (1.11)	n=33 3.21 (1.27)	n=56 3.50 (1.01)	n= 32 3.69 (.82)
15. I would try a new vegetable at home	1-5[c]	n=34 3.00 (1.28)	n=37 2.49 (.93)	n=55 3.00 (1.11)	n= 31 2.97 (1.17)
16. I would try a new vegetable at school	1-5[c]	n=35 1.83 (1.32)	**n=38 3.50 (1.20)*****	n=54 1.72 (1.17)	n= 30 1.80 (1.30)
17. I would try a new soup	1-5[c]	n=35 3.66 (1.14)	**n=16 1.63 (.96)*****	n=55 4.02 (1.05)	n= 32 4.03 (1.12)
18. I would try a new salad	1-5[c]	n=35 3.26 (1.38)	n=39 3.59 (1.23)	n=56 3.70 (1.31)	n= 32 3.66 (1.41)
19. I want to ask someone in my family to buy vegetables I like	1-5[c]	n=35 3.40 (1.35)	n=17 3.00 (1.32)	n=52 3.90 (1.38)	n= 29 3.86 (1.36)

M406/Global Tech Preparatory - 7th grade: Descriptive statistics in 2016	Response options	Mean (SD)			
		Global Tech	PS7 2013 7th	PS7 2016 5th & 8th	PS7 2016 8th
20. I want to go shopping with my family to buy vegetables I like	1-5[c]	n=35 2.74 (1.38)	NA	n=50 2.98 (1.55)	n= 29 2.83 (1.51)
21. I want to pick out vegetables I like and put them in the shopping basket	1-5[c]	n=33 3.09 (1.44)	NA	n=54 3.20 (1.50)	n= 31 2.90 (1.40)
22. I want to ask someone in my family to make vegetables I like for dinner	1-5[c]	n=37 3.11 (1.41)	NA	n=54 3.31 (1.48)	n= 31 3.23 (1.48)
23. I want to eat vegetables even if I have to prepare them first	1-5[c]	n=36 2.75 (1.25)	NA	n=55 2.85 (1.48)	n= 31 2.68 (1.47)
24. I can make a salad	1-4[d]	n=31 3.52 (.96)	n=36 3.11 (1.24)	n=45 3.22 (1.18)	n= 24 3.00 (1.25)
25. I can make a dressing	1-4[d]	n=31 2.71 (1.24)	NA	n=38 2.92 (1.15)	n= 18 3.00 (1.03)
26. I can make a soup	1-4[d]	n=32 2.97 (1.03)	n=30 3.23 (.90)	n=47 2.94 (1.11)	n= 24 2.92 (1.10)
27. I can cut with a knife	1-4[d]	n=33 3.88 (.55)	NA	n=52 3.71 (.85)	n= 30 3.63 (.96)
28. I can follow a recipe	1-4[d]	n=35 3.37 (.97)	**n=10 2.10 (1.29)****	n=37 3.62 (.59)	n= 14 3.64 (.63)
29. I can measure with a measuring cup	1-4[d]	n=33 3.39 (.86)	NA	n=40 3.50 (.91)	n= 18 3.33 (1.03)
30. If I eat candy, chips and soda everyday, I will be	1-4[e]	n=35 1.83 (.89)	n=33 1.94 (1.14)	n=55 1.64 (1.04)	n= 31 1.90 (1.19)
31. If I eat vegetables everyday, I will be	1-4[e]	n=36 3.31 (1.04)	n=36 3.06 (1.07)	n=52 3.48 (1.06)	n= 29 3.21 (1.24)
32. If I eat vegetables everyday, my body will be	1-4[f]	n=36 3.44 (.97)	**n=34 2.76 (1.10)****	n=55 3.47 (.94)	n= 31 3.32 (.98)
33. I would choose apple	1-3[g]	n=34 2.32 (.77)	n=38 2.50 (.73)	n=48 2.06 (.76)	n= 27 2.15 (.66)
34. I would choose corn	1-3[g]	n=35 1.86 (.65)	n=31 1.71 (.69)	n=43 2.00 (.76)	n= 23 2.00 (.74)
35. I would choose potato	1-3[g]	n=30 1.83 (.79)	n=28 2.11 (.88)	n=43 **2.21 (.60)***	n= 24 **2.29 (.62)***
36. I would choose carrot	1-3[g]	n=27 2.11 (.93)	n=27 2.41 (.84)	n=36 1.89 (.92)	n= 17 1.76 (.90)
37. I would choose grape	1-3[g]	n=34 2.29 (.91)	n=22 1.86 (.77)	n=50 2.18 (.94)	n= 29 2.14 (.95)
38. I would choose rice	1-2[h]	n=32 1.19 (.40)	NA	n=52 1.13 (.34)	n= 29 1.14 (.35)
39. I would choose bread	1-2[h]	n=30 1.13 (.35)	NA	n=48 1.15 (.36)	n= 24 1.17 (.38)
40. I would eat vegetables	1-4[i]	n=36 2.78 (1.05)	**n=32 3.31 (.69)***	n=53 2.87 (1.06)	n= 29 2.90 (1.08)
41. I would eat fruit	1-4[i]	n=36 3.47 (.77)	**n=33 2.73 (.94)****	n=52 3.65 (.74)	n= 28 3.79 (.57)
42. I would eat candy (R)*	1-4[i]	n=35 2.00 (.87)	**n=35 1.37 (.60)****	n=35 2.17 (1.07)	n= 29 2.07 (1.07)
43. I would eat chips (R)*	1-4[i]	n=36 2.00 (.93)	n=34 1.71 (.91)	n=53 2.13 (1.04)	n= 30 2.20 (1.16)
44. I would drink soda, fruit drink and other sweetened drinks (R)*	1-4[i]	n=36 1.81 (.89)	n=36 2.17 (.94)	n=54 2.07 (.87)	n= 31 2.03 (.91)
45. I would drink water	1-4[i]	n=32 3.84 (.45)	**n=32 3.16 (.85)*****	n=54 3.76 (.64)	n= 32 3.69 (.78)

M406/Global Tech Preparatory - 7th grade: Descriptive statistics in 2016	Response options	Mean (SD)			
		Global Tech	PS7 2013 7th	PS7 2016 5th & 8th	PS7 2016 8th
46. I would cook with my family	1-4[i]	n=34 2.74 (1.05)	n=33 2.27 (1.28)	n=53 2.75 (1.12)	n= 29 2.38 (1.21)
47. I would work in a garden	1-4[i]	n=35 1.71 (.93)	**n=36** **2.92 (1.00)*****	n=55 1.96 (1.05)	n= 31 1.77 (.99)
48. I would go food shopping with my family	1-4[i]	n=36 3.03 (1.03)	**n=34** **1.85 (.96)*****	n=54 3.04 (.99)	n= 30 2.80 (1.00)

a. 1=really don't like; 2=don't like; 3=like; 4=really like
b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=most processed; 2=minimally processed; 3=whole food
f. 1=hardly ever; 2=once in a while; 3=some days; 4=most days

†please note that preference question response options have been changed from a 5-point scale to 4-point scale in 2015. The 5-point scale was collapsed to 4-point scale for 2013 and 2014 data. Therefore, the mean scores of the preference questions may not exactly comparable between 2013 & 2014 data vs. 2015 & 2016 data.

Following results are from the analyses comparing the same students over 4 years as they have grown older. However, because of small sample size that included all 4 years (n=3-4), students were not matched. Group comparisons were performed.

Analysis of students in 2nd (2013), 3rd (2014), and 5th (2016) grade.

Total n=33			
2013: 2nd grade	**2014: 3rd grade**	**2015: 4th grade**	**2016: 5th grade**
n=23	n=17	NA	n=23
Data with all three years, n=12			

Again, due to small sample size (n=3 or 4) per each question with all 4 year longitudinal data, individual matching analyses were not performed. Group analyses were performed to see whether or not there are positive trends in the same group of students, starting at 2nd grade until they became 5th grade. Green highlights indicate desirable changes over time.

Table 2. Second to fifth grade trend over 4 years: 2013, 2014, (no 2015 data), and 2016 comparisons

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics (p-value)
		2013=2nd	2014=3rd	2015=4th	2016=5th	
2. I like the taste of spinach	0/1[a]	n= 8 .25 (.46)	n=11 .45 (.52)	NA	n=20 .35 (.49)	.404 (.671)
3. I like the taste of carrots	0/1[a]	n= 22 .83 (.35)	n=17 .88 (.33)	NA	n=20 .85 (.37)	.039 (.962)
10. I eat candy	1-3[b]	n=18 2.11 (.47)	n=16 2.25 (.45)	NA	n=18 1.83 (.79)	2.197 (.122)
11. I eat chips	1-3[b]	n=21 2.38 (.59)	n=17 2.24 (.75)	NA	n= 23 2.22 (.74)	.351 (.705)
12. I drink soda, fruit drink or other sweetened drinks	1-3[b]	n=21 2.05 (.67)[A]	n=17 2.65 (.49)[B]	NA	n=23 2.13 (.81)[AB]	**4.087 (.022)**
13. I eat vegetables	1-3[b]	n=23 2.43 (.73)	n=16 2.13 (.81)	NA	n=23 2.04 (.88)	1.473 (.238)
14. I eat fruit	1-3[b]	n=22 2.59 (.67)	n=17 2.35 (.79)	NA	n=23 2.30 (.88)	.840 (.437)
15. I would try a new vegetable at home	1-3[c]	n= 20 2.45 (.69)	n=15 2.13 (.64)	NA	n=23 2.09 (.73)	1.636 (.204)
16. I would try a new vegetable at school	1-3[c]	n=22 1.59 (.67)	n=17 1.53 (.80)	NA	n=23 1.22 (.52)	2.057 (.137)
17. I would try a new soup	1-3[c]	n=23 2.70 (.70)	n=17 2.24 (.90)	NA	n=22 2.59 (.59)	2.067 (.136)
18. I would try a new salad	1-3[c]	n=22 2.55 (.80)	n=17 2.41 (.62)	NA	n=23 2.48 (.79)	.153 (.859)
26. I can make a soup	1-4[d]	n=19 2.95 (1.03)	n=13 3.00 (.71)	NA	n=22 3.00 (1.15)	.016 (.984)
28. I can follow a recipe	1-4[d]	n=19 3.00 (1.15)[A]	n=16 3.56 (.63)[AB]	NA	n=22 3.64 (.58)[B]	**3.420 (.040)**
30. I would choose apple	1-3[e]	n=22 2.45 (.80)	n=15 2.07 (.88)	NA	n=20 2.00 (.86)	1.751 (.183)
31. I would choose corn	1-3[e]	n=22 2.00 (.82)	n=15 1.73 (.80)	NA	n=19 1.95 (.78)	.526 (.594)
32. I would choose potato	1-3[e]	n=17 2.00 (.50)	n=13 1.92 (.49)	NA	n=19 2.11 (.57)	.483 (.620)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics (p-value)
		2013=2nd	2014=3rd	2015=4th	2016=5th	
33. I would choose carrot	1-3[e]	n=18 1.78 (.88)	n=14 2.36 (.93)	NA	n=18 2.06 (.94)	1.586 (.216)
34. I would choose grape	1-3[e]	n=21 2.05 (.97)	n=16 1.88 (1.02)	NA	n=20 2.20 (.95)	.489 (.616)
37. I would eat vegetables	1-4[f]	n=20 2.50 (.95)	n=17 2.65 (1.00)	NA	n=23 2.87 (1.06)	.740 (.482)
38. I would eat fruit	1-4[f]	n=21 3.29 (1.10)	n=17 3.12 (.99)	NA	n=23 3.48 (.90)	.649 (.527)
39. I would eat candy	1-4[f]	n=18 1.89 (.96)	n=17 2.00 (.94)	NA	n=6 2.67 (1.03)	1.510 (.234)
40. I would eat chips	1-4[f]	n=21 1.81 (.81)	n=16 1.75 (.86)	NA	n=22 2.09 (.87)	.932 (.400)
41. I would drink soda, fruit drink and other sweetened drinks	1-4[f]	n=23 2.26 (.81)	n=17 2.00 (.79)	NA	n=22 2.14 (.83)	.505 (.606)
42. I would drink water	1-4[g]	n=18 3.50 (1.04)[AB]	n=16 3.13 (1.20)[A]	NA	n=21 3.86 (.36)[B]	***2.968 (.060)***
43. I would cook with my family	1-4[g]	n=23 3.61 (.94)	n=17 3.59 (.62)	NA	n=23 3.26 (.81)	1.262 (.291)
44. I would work in a garden	1-4[g]	n=19 2.79 (1.27)	n=17 2.29 (1.10)	NA	n=23 2.26 (1.10)	1.275 (.287)
45. I would go food shopping with my family	1-4[g]	NA	n=17 3.41 (.87)	NA	n=23 3.30 (.93)	.138 (.712)

a. 0=don't like; 1=like
b. 1=hardly ever; 2=a few times a week; 3=every day
c. 1=no; 2=maybe; 3=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=most processed; 2=minimally processed; 3=whole food
f. 1=most days; 2=some days; 3=once in a while; 4=hardly ever
g. 1=hardly ever; 2=once in a while; 3=some days; 4=most days
Italic means marginal significant
Letters "A,B, AB" indicate group differences: including the same letter in superscript means that two groups do not have significant differences

Analysis of students 5th (2013), 6rd (2014), 7th (2015), and 8th (2016)

Total n=66			
2013: 5th grade	**2014: 6th grade**	**2015: 7th grade**	**2016: 8th grade**
n=39	n=39	n=30	n=28
Data with all four years, n=14			

Due to small sample size (n=3 or 4) per each question with all 4 year longitudinal data, individual matching analyses were performed. Group analyses were performed to see whether or not there are positive trends in the same group of students, starting at 5th grade until they became 8th grade. Green highlights indicate desirable changes over time, and pink highlights indicate undesirable changes.

Table 3. Fifth to eighth grade trend over 4 years: 2013, 2014, 2015, and 2016 comparisons

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics (p-value)
		2013=5th	2014=6th	2015=7th	2016=8th	
2. I like the taste of spinach	1-4[a]	n=30 2.40 (.89)	n=33 2.91 (1.04)	n=13 2.69 (.75)	n=21 2.57 (1.03)	1.532 (.211)
3. I like the taste of carrots	1-4[a]	n=38 2.66 (.75)[A]	n=34 3.38 (1.02)[B]	n=29 3.00 (1.20)[AB]	n=26 2.81 (1.17)[AB]	**3.246 (.024)**
9. I like the taste of beans	1-4[a]	n=35 2.77 (.60)[A]	n=35 3.40 (.98)[B]	n=29 3.45 (1.02)[B]	n=27 3.52 (.89)[B]	**5.110 (.002)**
10. I eat candy	1-5[b]	n=36 3.25 (1.34)	n=35 3.60 (1.26)	n=27 2.85 (.99)	n=25 2.96 (1.10)	2.405 (.071)
11. I eat chips	1-5[b]	n=38 3.55 (1.22)[AB]	n=34 3.65 (.95)[A]	n=29 3.14 (.95)[AB]	n=27 2.85 (1.38)[B]	**3.239 (.025)**
12. I drink soda, fruit drink or other sweetened drinks	1-5[b]	n=34 3.32 (1.39)	n=34 3.68 (.81)	n=29 3.31 (1.11)	n=28 3.61 (1.07)	.924 (.431)
13. I eat vegetables	1-5[b]	n=37 3.16 (1.34)	n=35 3.11 (1.32)	n=30 3.03 (1.33)	n=27 2.63 (.88)	.996 (.397)
14. I eat fruit	1-5[b]	n=38 4.03 (.82)	n=35 4.09 (.61)	n=30 3.83 (.99)	n=28 3.71 (.76)	1.444 (.233)
15. I would try a new vegetable at home	1-5[c]	n=38 3.66 (1.24)	n=33 3.67 (1.29)	n=29 3.45 (1.40)	n=27 2.89 (1.15)	2.400 (.071)
16. I would try a new vegetable at school	1-5[c]	n=36 1.94 (1.47)[A]	n=17 3.12 (1.54)[B]	n=28 2.04 (1.17)[AB]	n=26 1.73 (1.22)[A]	**4.048 (.009)**
17. I would try a new soup	1-5[c]	n=36 4.64 (.87)	n=33 4.24 (1.23)	n=28 4.04 (.92)	n=28 4.00 (1.09)	2.644 (.052)
18. I would try a new salad	1-5[c]	n=36 4.44 (1.23)[A]	n=35 3.54 (1.42)[B]	n=29 3.86 (1.43)[AB]	n=28 3.71 (1.33)[AB]	**2.942 (.036)**
24. I can make a salad	1-4[d]	n=34 3.62 (.55)	n=29 3.41 (.91)	n=25 3.44 (.87)	n=21 3.19 (1.17)	1.071 (.365)
26. I can make a soup	1-4[d]	n=37 3.11 (1.05)	n=30 2.87 (1.14)	n=28 3.11 (.96)	n=21 2.95 (1.07)	.389 (.761)
28. I can follow a recipe	1-4[d]	n=35 3.83 (.62)[A]	n=29 3.34 (.97)[AB]	n=25 3.60 (.71)	n=13 3.62 (.65)[B]	2.143 (.100)
30. If I eat less candy, chips, and soda, I will be	1-4[e]	n=36 3.39 (1.08)	n=33 3.55 (1.00)	n=28 3.36 (1.16)	n=28 3.11 (1.17)	.817 (.487)
31. If I eat vegetables everyday, I will be	1-4[e]	n=33 2.82 (1.36)	n=28 3.18 (1.06)	n=29 3.17 (1.10)	n=25 3.20 (1.22)	.730 (.536)
32. If I eat vegetables everyday, my body will be	1-4[f]	n=34 3.76 (.50)	n=33 3.73 (.63)	n=28 3.46 (.69)	n=27 3.30 (.99)	**2.936 (.036)**
33. I would choose apple	1-3[g]	n=36 2.33 (.76)	n=31 2.13 (.72)	n=28 2.25 (.75)	n=24 2.21 (.59)	.470 (.704)
34. I would choose corn	1-3[g]	n=38 2.26 (.72)	n=31 2.26 (.63)	n=30 2.20 (.76)	n=20 1.95 (.76)	.974 (.408)
35. I would choose potato	1-3[g]	n=34 2.15 (.66)	n=33 2.12 (.60)	n=27 2.11 (.64)	n=20 2.35 (.59)	.714 (.546)
36. I would choose carrot	1-3[g]	n=31 2.48 (.81)	n=28 2.07 (.94)	n=18 2.22 (.94)	n=15 1.87 (.92)	1.929 (.131)
37. I would choose grape	1-3[g]	n=37 2.35 (.89)	n=34 2.09 (.97)	n=29 2.62 (.75)	n=25 2.12 (.97)	2.259 (.085)
40. I would eat vegetables	1-4[h]	n=39 2.95 (.83)	n=35 2.80 (1.08)	n=29 3.00 (1.10)	n=25 2.92 (1.08)	.233 (.873)
41. I would eat fruit	1-4[h]	n=37 3.78 (.63)	n=32 3.78 (.55)	n=28 3.79 (.63)	n=25 3.76 (.60)	.010 (.999)

Questions (matched for 4 yrs)	Response	Mean (SD)				F-statistics (p-value)
		2013=5th	2014=6th	2015=7th	2016=8th	
42. I would eat candy	1-4[h]	n=37 2.19 (1.02)	n=32 1.84 (.92)	n=29 2.31 (.97)	n=26 2.04 (1.04)	1.290 (.281)
43. I would eat chips	1-4[h]	n=39 1.97 (1.06)	n=28 1.64 (.87)	n=26 2.12 (.95)	n=26 2.23 (1.14)	1.710 (.169)
44. I would drink soda, fruit drink and other sweetened drinks	1-4[h]	n=38 1.92 (1.08)	n=31 1.74 (.89)	n=29 2.31 (1.00)	n=27 2.04 (.85)	1.815 (.148)
45. I would drink water	1-4[h]	n=39 2.72 (1.39)[A]	n=34 2.56 (1.24)[A]	n=30 3.57 (.97)[B]	n=28 3.64 (.83)[B]	**7.544 (<.001)**
46. I would cook with my family	1-4[h]	n=38 3.47 (.95)[A]	n=16 3.00 (1.21)[AB]	n=28 2.89 (.96)[AB]	n=25 2.36 (1.15)[B]	**5.853 (.001)**
47. I would work in a garden	1-4[h]	n=37 2.68 (1.25)[A]	n=33 2.61 (.90)[A]	n=27 1.78 (1.01)[B]	n=27 1.78 (1.01)[B]	**6.768 (<.001)**
48. I would go food shopping with my family	1-4[h]	n=36 3.69 (.58)[A]	n=33 3.55 (.71)[A]	n=29 3.21 (1.05)[A]	n=26 2.77 (.95)[B]	**7.337 (<.001)**

a. 1=really don't like; 2=don't like; 3=like; 4=really like
b. 1=hardly ever; 2=about once a week; 3=a few times a week; 4=every day; 5=more than once a day
c. 1=no; 2=probably not; 3= maybe; 4=probably; 5=yes
d. 1=not at all; 2=with a lot of help; 3=with a little help; 4=yes, with no help
e. 1=very unhealthy; 2=unhealthy; 3=healthy; 4=very healthy
f. 1=very weak; 2=weak; 3=strong; 4=very strong
g. 1=most processed; 2=minimally processed; 3=whole food
h. 1(4)=hardly ever; 2(3)=once in a while; 3(2)=some days; 4(1)=most days *(R)=reversed
Letters "A,B, AB" indicate group differences: including the same letter in superscript means that two groups do not have significant differences

Using 2016 data, digital photo and ARS survey data were matched and correlation analyses were performed to see whether or not there are any associations between students' fruit and vegetable consumption and ARS survey answers. Blue highlights indicate significant associations between two data. More complex models cannot be performed (e.g. regression models with multiple year data) due to small sample size.

Table 4. Correlations between FV intake and survey data in 2016: 3rd grade (n=28)

Correlation coefficients	Cooked V on tray	Salad on tray	Any V on tray	Cooked V any eaten	Salad any eaten	Any V eaten	Fruit on tray	Fruit any eaten
1. I like the taste of leafy greens	.194	.216	.271	.016	.160	.099	**.540***	**.547***
2. I like the taste of spinach	.118	.255	.255	**.492***	.193	**.662****	.253	.280
3. I like the taste of carrots	.051	.262	.189	.316	.250	**.457***	.348	**.420***
4. I like the taste of tomatoes	-.203	-.053	-.251	.048	-.143	.051	.043	-.040
5. I like the taste of salad	-.108	.128	-.067	.127	.090	.165	.360	.090
6. I like the taste of squash	.242	.013	-.011	-.110	.077	.067	.286	**.422***
7. I like the taste of whole grains	.012	.170	.056	-.007	.147	.135	**.813****	**.568****
8. I like the taste of whole wheat bread	-.127	-.330	-.427	-.397	**-.464***	**-.490***	.113	.039
9. I like the taste of beans	.282	-.097	.083	.016	-.097	-.133	.015	.101
10. I eat candy	.025	-.017	.012	-.090	.000	-.052	.128	.314
11. I eat chips	.033	.077	.161	-.130	.051	-.080	.189	.255
12. I drink soda, fruit drink or other sweetened drinks	.249	-.105	.180	.098	-.141	-.087	.270	.375
13. I eat vegetables	-.081	-.358	-.373	-.077	-.298	-.276	**-.407***	**-.509***
14. I eat fruit	.002	-.183	-.078	-.061	-.155	-.155	-.124	-.277
15. I would try a new vegetable at home	.142	-.072	-.008	.039	-.051	.003	.344	.221
16. I would try a new vegetable at school	.119	-.206	-.033	.030	-.138	-.125	.385	**.543****

Correlation coefficients	Cooked V on tray	Salad on tray	Any V on tray	Cooked V any eaten	Salad any eaten	Any V eaten	Fruit on tray	Fruit any eaten
17. I would try a new soup	.205	-.017	.158	-.058	.103	-.010	**.624****	.329
18. I would try a new salad	-.079	.161	.086	-.354	.161	-.261	.318	.317
19. I want to ask someone in my family to buy vegetables I like	.201	.214	.282	-.054	.193	.110	-.041	.168
20. I want to go shopping with my family to buy vegetables I like	.060	.203	.132	.013	.163	.119	.110	.376
21. I want to pick out vegetables I like and put them in the shopping basket	.134	.056	.076	.043	.131	.117	**.448***	.369
22. I want to ask someone in my family to make vegetables I like for dinner	.151	-.022	.067	-.021	.011	-.068	.195	.206
23. I want to eat vegetables even if I have to prepare them first	-.214	.199	-.077	-.328	.122	-.211	.163	.067
24. I can make a salad	-.101	.294	.091	-.228	.294	.062	.098	-.115
25. I can make a dressing	.149	-.076	.050	.065	-.260	-.132	-.153	-.210
26. I can make a soup	-.215	.145	-.044	-.383	.190	-.203	.048	-.259
27. I can cut with a knife	-.284	.187	0.000	-.087	.187	.063	**.576****	.313
28. I can follow a recipe	-.200	.057	.003	.101	-.014	.002	.098	-.064
29. I can measure with a measuring cup	-.118	.135	.066	.011	.033	.083	.061	-.163
30. I would choose apple	.089	-.086	.023	.198	.035	.143	.074	.049
31. I would choose corn	.100	-.106	.075	.014	-.155	-.118	.150	.051
32. I would choose potato	-.222	.241	.243	.126	.047	.070	**.657****	.436
33. I would choose carrot	.033	-.106	.042	.251	-.044	.235	-.024	.000
34. I would choose grape	.313	.042	.326	.277	-.004	.169	.141	.209
35. I would choose rice	-.379	-.315	**-.432***	.073	-.315	-.307	-.275	-.132
36. I would choose bread	**-.451***	.055	-.263	-.011	-.005	-.013	-.109	-.003
37. I would eat vegetables	-.103	-.334	-.271	.108	-.347	-.179	**-.408***	**-.543****
38. I would eat fruit	**-.437***	-.176	**-.495***	-.372	-.136	-.361	.046	-.267
40. I would eat chips	.214	.196	.360	.032	.134	.182	**.419***	.365
41. I would drink soda, fruit drink and other sweetened drinks	.171	.094	.201	-.134	-.008	-.069	.024	.123
42. I would drink water	-.237	.122	-.054	-.166	.170	.065	.169	.041
43. I would cook with my family	-.259	-.176	-.288	-.138	-.200	-.225	.215	.023
44. I would work in a garden	.213	-.220	-.027	.113	-.139	.038	-.075	-.052
45. I would go food shopping with my family	-.162	.117	.063	.127	-.050	.101	.115	-.088

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

"V" means vegetables

Table 5. Correlations between FV intake and survey data in 2016: 5th & 8th grade (n=52)

Correlation coefficients	Cooked V on tray	Salad on tray	Any V on tray	Cooked V any eaten	Salad any eaten	Any V eaten	Fruit on tray	Fruit any eaten
1. I like the taste of leafy greens	.037	.132	.081	.222	.135	.236	**.449***	.197
2. I like the taste of spinach	.007	-.094	-.033	-.038	-.152	-.085	-.061	-.097
3. I like the taste of carrots	.032	.164	.075	.199	.157	.195	.270	.139
4. I like the taste of tomatoes	-.211	-.149	-.268	-.085	-.151	-.095	.043	.153
5. I like the taste of salad	-.105	.198	-.036	.131	.202	.168	-.042	-.151
6. I like the taste of squash	.240	-.181	.135	**.380***	-.174	.278	-.114	-.085
7. I like the taste of whole grains	-.066	**-.419***	-.245	.073	**-.451****	-.101	.034	-.123
8. I like the taste of whole wheat bread	-.137	-.253	-.239	.118	-.263	.014	.128	.050
9. I like the taste of beans	-.164	-.287	-.295	.114	-.304	-.041	.000	-.295
10. I eat candy	.140	.310	.271	.217	.280	.290	.316	.107
11. I eat chips	-.068	.080	-.015	-.158	.039	-.147	.076	-.058
12. I drink soda, fruit drink or other sweetened drinks	.111	.200	.164	.145	.177	.120	.155	.002
13. I eat vegetables	.038	-.050	.013	.148	-.034	.140	.092	.056
14. I eat fruit	-.113	-.187	-.169	.058	-.148	.029	.111	.235
15. I would try a new vegetable at home	-.027	**-.361***	-.153	-.106	**-.349***	-.199	.009	-.031
16. I would try a new vegetable at school	-.132	**.337***	-.058	-.129	.291	-.089	.014	.128
17. I would try a new soup	-.097	-.006	-.116	.049	-.001	.011	-.049	-.095
18. I would try a new salad	-.168	.076	-.155	.030	.056	.000	.089	.058
19. I want to ask someone in my family to buy vegetables I like	-.053	-.252	-.141	-.186	-.256	-.247	.127	-.083
20. I want to go shopping with my family to buy vegetables I like	.020	.044	.060	-.134	.008	-.144	.278	.143
21. I want to pick out vegetables I like and put them in the shopping basket	-.102	.032	-.081	-.257	.019	-.253	.058	.035
22. I want to ask someone in my family to make vegetables I like for dinner	-.022	-.187	-.076	-.179	-.180	-.223	.107	.225
23. I want to eat vegetables even if I have to prepare them first	-.271	.073	-.210	-.297	.040	-.251	-.008	-.005
24. I can make a salad	-.026	.227	.055	.219	.231	.302	-.232	-.050
25. I can make a dressing	-.086	.112	-.010	-.025	.125	.123	-.323	.243
26. I can make a soup	.032	.135	.071	.253	.151	.245	-.085	-.063
27. I can cut with a knife	-.005	.076	.017	.088	.078	.095	-.234	-.047
28. I can follow a recipe	-.218	-.021	-.223	-.251	-.044	-.249	-.078	-.064
29. I can measure with a measuring cup	-.121	.181	-.033	.113	.183	.162	.261	.097
30. If I eat candy, chips and soda everyday, I will be	.017	-.142	-.027	.122	-.137	.094	-.214	-.090
31. If I eat vegetables everyday, I will be	.250	.164	.311	.044	.165	.107	-.245	-.043
32. If I eat vegetables everyday, my body will be	.129	.212	.197	.019	.215	.119	-.242	-.016
33. I would choose apple	-.183	-.031	-.223	.022	.017	.018	-.118	.017

Correlation coefficients	Cooked V on tray	Salad on tray	Any V on tray	Cooked V any eaten	Salad any eaten	Any V eaten	Fruit on tray	Fruit any eaten
34. I would choose corn	-.177	-.058	-.242	.122	-.063	.050	.039	.275
35. I would choose potato	-.185	**-.392***	-.346	.015	-.362	-.070	-.275	.028
36. I would choose carrot	-.102	-.053	-.165	-.341	-.053	-.344	-.128	-.258
37. I would choose grape	.085	-.169	-.006	-.030	-.177	-.067	-.318	-.077
38. I would choose rice	-.186	-.158	-.242	-.111	-.161	-.140	.038	-.173
39. I would choose bread	-.047	.165	.024	-.042	.199	.066	-.028	-.002
40. I would eat vegetables	.105	-.079	.040	.179	-.038	.165	.084	.106
41. I would eat fruit	**.335***	-.064	.302	.285	-.026	.252	.024	.108
42. I would eat candy	**-.426***	-.103	**-.471***	-.339	-.103	-.379	-.177	-.077
43. I would eat chips	-.235	.008	-.246	-.091	.008	-.096	.248	.002
44. I would drink soda, fruit drink and other sweetened drinks	.035	-.137	-.043	.029	-.109	-.022	.109	.010
45. I would drink water	-.226	.110	-.187	**-.337***	.112	-.285	**.478****	.275
46. I would cook with my family	-.077	.075	-.032	-.195	.104	-.098	-.044	.133
47. I would work in a garden	-.052	.066	-.006	.066	.044	.087	.058	.038
48. I would go food shopping with my family	.215	-.250	.143	-.151	-.209	-.182	.100	.142

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed); "V" means vegetables