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Younger Elementary Students Waste More School Lunch Foods than Older Elementary Students

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Abstract

Background—Children may not receive the nutritional benefits from school lunch meals if they do not eat the foods served.

Objective—This study investigated whether there were differences in school lunch foods consumed and wasted by grade level of elementary school students.

Design—In this cross-sectional study, anonymous meal observations were conducted after students selected their reimbursable school lunch meals in the cafeteria lunch line. The amount of foods selected and consumed was recorded using the quarter waste method and food waste was calculated using the information recorded.

Participants/setting—During the spring of 2013, eight elementary schools (50% low income) enrolling children in kindergarten through grade 5 in one school district in the Houston, Texas area were selected by the Child Nutrition Director.

Main outcome measures—The amount of kilocalories (kcal) and foods consumed and the percentage wasted were assessed.

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Statistical analyses performed—Analysis of Covariance (ANCOVA) and post hoc analysis were used to examine food consumption and plate waste by grade level [kindergarten and grade 1 (K-Gr1), grade 2 and 3 (Gr2-3) and grade four and five (Gr4-5)], controlling for student sex and school level free/reduced priced meal eligibility (FRP).

Results—There were 568 nonrandom lunch meal observations of students included in the analyses. Approximately 48% of the observations were from boys; 50% were from low income schools, and were evenly divided by grade. In general, students in K-Gr1 consumed fewer kcal than both Gr2-3 and Gr4-5 students, and Gr2-3 students consumed significantly fewer kcal than Gr4-5 students. K-Gr1 students also consumed less and wasted more total and red-orange vegetables, total/whole/refined grains, and total protein foods than the older students. Gr2-3 students wasted more calories and total grains than Gr4-5 students. K-Gr1 wasted more fruit than Gr2-3 students.

Conclusions—Overall, younger students in elementary schools (K-Gr1) consumed less of the foods they selected for their lunch meals, and wasted more than older elementary school students. Future studies should investigate why younger children wasted more food and potential strategies to reduce food waste by younger students.

Keywords

National School Lunch Program; plate waste; elementary schools; grade levels

INTRODUCTION

Established in 1946, the National School Lunch Program (NSLP) is one of the largest federal nutrition assistance programs in the United States. About 7.1 million children participated in the NSLP by the end of its first year compared to about 31 million students who participated each day in 2012.¹ Over time, the NSLP has revised its nutrition standards to ensure students receive meals that are aligned with the United States Dietary Guidelines for Americans.² The United States Department of Agriculture (USDA) made changes to the NSLP and School Breakfast program after the Healthy, Hunger-Free Kids Act of 2010 was passed. The new nutrition standards and meal patterns were implemented during the 2012–2013 school year.³ The changes included weekly minimum and maximum calorie levels for each school grade level group (elementary, middle, high school), zero trans fat, a weekly 10% average for saturated fat, and reduced sodium levels to be implemented over 10 years.³ Fruit and vegetables were separated into two groups, with two servings (up to ½ cup each) of vegetables and one serving (1/2 cup) fruit per meal, plus weekly specifications for the vegetable subgroups.³ Fifty percent of the grains were to be whole grain rich foods, with increases to 100% by 2014.³ To reduce waste, the offer versus serve option (OVS) was maintained, giving students the option to choose at least three of the five food items (fruits, vegetables, meat/meat alternative, dairy and grain) offered in the lunch meal. However, the students had to select one fruit or a vegetable serving for the meal to count as reimbursable.⁴

When healthy foods are not consumed, children may not receive the optimal nutritional benefits available from school lunches.⁵ Because about 70 % of the meals were provided to students at a free or reduced price (FRP) in 2012,⁶ food waste may especially impact

students from low-income families who depend on school meals for up to half of their daily energy intake.⁵ Food waste also represents a loss of the energy and other resources used to produce the food.^{7, 8} The disposal of wasted food also costs money, uses limited resources (e.g., landfill), and may impact the environment (emissions).^{7, 8}

Food waste in the NSLP is a concern of the USDA. An early study assessed NSLP plate waste in two Alabama elementary schools in 1986, 62% of the students were African-American.⁹ Data collectors observed 371 lunch trays and estimated consumption and waste. Overall plate waste was 12.9%. However, students in kindergarten and grade 1 consumed only 75 to 80% of foods selected, while grade 4, 5 and 6 students consumed 90–95%.⁹ Overall waste of 12% of energy was also reported from 24-hour dietary recalls from 1744 students in grades 1–12 participating in the 1992 School Nutrition Dietary Assessment Study 1 (SNDA 1).¹⁰ Waste was higher for younger children (14%) (6 – 10 years) as well as 11–14 (17%) and 15–18 (11%) year old females compared with 11–14 year old (8%) and 15–18 (5%) year old males.¹⁰

Food waste from 5420 trays of students (58–82% Hispanic) in grades 2 to 6 was weighed in a study published in 2010.¹¹ Compared with grade 5 students, grade 2 students consumed less grain (1.78 vs 1.51 servings), fruit (0.45 vs 0.32 servings), dairy (0.54 vs 0.40 servings), and meat (1.58 vs 1.49 servings).¹¹

Two studies directly assessed grade level differences in waste. Mixed results were reported from a Louisiana study in one school with African-American students in grades 3–6 conducted in 1993.¹² In general, grade 5 students wasted significantly more fruit, bread, and pasta/rice than students in the other grades, and more entrée than grade 6 students. However, grade 6 students wasted significantly more potatoes and starch than the other grades, and more vegetables than grade 3 students.

A Colorado study, conducted in the fall of 2010, documented plate waste by grade level for students in three elementary schools using digital photography and visual estimation.¹³ For grade 5 children, food waste ranged from 12.6% for entrees to 38.7% for grains. In contrast, food waste for grade 1 children was significantly higher, ranging from 35% for entrees to 54.7% for grains.¹³

Only a few studies have investigated waste after the new meal patterns were implemented in 2012, and differences by grade level were not provided. A 2013 study measured food waste from 304 lunch trays of prekindergarten (n=73) and kindergarten (n=231) students in one school in the southwest region of the United States for one week.¹⁴ Researchers photographed meals as selected on the students' trays, and then aggregated waste into bins (entrée, fruit, vegetables, milk) at the end of the lunch period. Over the week, 51.4% of the vegetables, 51% of the entrees, 45.5% of milk and 33% of the fruit were wasted.¹⁴ A study conducted in the fall of 2012 measured plate waste of 864 Massachusetts students in grades 3 to 8 in four schools who provided active consent. Approximately 12.1% of the entrees, 46.1% of milk, 58.9% of vegetables, and 44.8% of fruit were wasted.¹⁵ Over a 2 year period, the food waste of Connecticut middle school students in 12 schools was assessed using digital photography of the lunch trays selected followed by weighing of the foods remaining

at the end of the lunch period.¹⁶ Between 2013 (n=465) and 2014 (n=373), waste declined from 39.3% to 25.7% for fruit, from 72.1% to 36.4% for vegetables, from 32.1% to 16.4% for entrees, and from 46.4 to 43.3% for milk.¹⁶ A Wisconsin study used photographs to assess plate waste of 7117 lunch trays from students in grades 3–5 between 2010 and 2013. Combined fruit and vegetable waste for children in the third, fourth, and fifth grades was 27%, 28%, and 26%, respectively.¹⁷

School cafeteria managers have also been queried on student plate waste. A national random sample of 1887 public school cafeteria managers completed a survey on plate waste during the 1995–96 school year.¹⁸ The managers reported that food waste was highest in the elementary schools and lowest in the high schools. Approximately 78% believed that student attention on recess or free time, and socializing rather than eating was a reason for waste.

Given that the goal of the new school nutrition standards and meal patterns is to improve child nutrition, understanding how much food is wasted by students in different grade levels after the new meal patterns were implemented in 2012 is a topic of significant interest. Whether there are differences in NSLP food waste by grade level could inform school food service practices. This study investigated whether the amount of NSLP lunch food consumed and wasted differed by grade level for elementary school students in kindergarten through grade 5.

METHODS

Observations of reimbursable school lunch meals were conducted in 8 elementary schools in one school district in the greater Houston, Texas, area during the spring of 2013. All schools enrolled students in kindergarten through grade 5. The director of the child nutrition department selected the schools based on the percent of children eligible for FRP meals. Four low and four middle income elementary schools were selected in which 51–76% and 8–28% of the students, respectively, were eligible for FRP meals. The average number of students in the schools was 731 (range 600–900). Race and ethnicity data for the schools as reported by the school district were 7% African-American, 37% Hispanic, 46% White, and 10% Other. The average NSLP participation rate for these eight schools was 62.5%.

The study was approved by the Institutional Review Board of Baylor College of Medicine. It was exempted from obtaining individual parental consent because observations were conducted anonymously. The district superintendent and the principals of each school agreed to participate in the study.

Procedure

The district had a 2 week menu cycle that was followed in all the elementary schools, and OVS was utilized. The daily menus included two entrees, two fruit servings, two vegetable servings, 1% white milk, and skim chocolate and strawberry milk. The entrees, fruit, and vegetable servings were pre-portioned for self-service, were the same for all grades, and met the new menu pattern serving sizes. There were no salad bars.

Five trained data collectors¹⁹ visited each school weekly in an assigned rotation during February and March, 2013, so that the observations were conducted on all days of the week in all eight schools. The menu items were preprinted on observation sheets. Each elementary school classroom was assigned to two tables in the cafeteria; teachers' names and lunch times were posted on each table. The data collectors mapped the cafeteria and identified the tables to be observed each day, in order to obtain 8–10 observations per grade level. Equal numbers of boys and girls were also observed. The students had a 30 minute lunch period; teachers brought their classes to the cafeteria in a continuous flow from 10:45 am to 12:45 pm, and returned to lead them to their next class. The older classes had the later lunch periods.

Each data collector first checked the observation checklist with the cafeteria line lunch items and menu for the day; changes were noted on the checklist. They did not measure the served items to check on accuracy. As the children left the cafeteria line and sat at the assigned tables, the observer selected the first three to four students with a reimbursable NSLP meal, defined as a meal containing at least three of the five lunch food group components. This was a convenience sample. The observations of these selected students were conducted unobtrusively from a distance. The data collector training was reported in a previous study.¹⁹

The data collectors recorded the foods that the students selected in the cafeteria line, foods obtained from other sources (home, a la carte, friend, etc.), and whether and how much food was consumed. There were extra spaces to write in foods not on the observation sheets, such as foods from friends. For each item, the amount eaten was recorded using a modified quarter waste method (0, 1/4, 1/2, 3/4, all); average serving weights of the menu items were not calculated prior to observations.²⁰ Student sex and grade were also recorded.

Both the food selected and food consumed data were then entered into separate Nutrition Data System for Research files (version 2012, Nutrition Coordinating Center, University of Minnesota) by trained dietitians. The school recipes were obtained and converted into NDSR recipes for these school-specific menu items. The NDSR outputs provided calories and food groups selected and consumed, enabling the calculation and analyses of waste. The data were organized into three study groups by combining two grade levels: kindergarten + grade 1 (K-Gr1), grades 2 + 3 (Gr2-3), and grades 4+5 (Gr4-5) to allow ease of interpretation of results.

Statistical Analysis

The analysis examined differences in the amount of foods consumed and the percentage wasted by grade level. Analysis of Covariance (ANCOVA), controlling for student's sex and school level FRP, was conducted, followed with post hoc analysis if the between-subject factor (grade level) was significant. The level of significance was defined as $P < 0.05$. All the analyses were performed using SAS (version 9.3, 2011, SAS Institute Inc.).

RESULTS

Observations were conducted on lunches selected by 573 students from four low and four middle income elementary schools. Seven records were missing grade and were not included

in the analyses. A la carte foods were on 201 trays (35%), foods from friends were on 37 trays (6.5%), and six trays (1%) had foods consumed from an unknown source. These foods were included in the analyses for this paper. Approximately 48% of the lunch observations were for boys and 50% of the observations were for students attending low income schools. The observations were evenly distributed across the six grades (15.5 to 17% observations per grade).

Significant grade level differences in consumption were documented (Table 1). K-Gr1 students consumed significantly fewer total calories than Gr2-3 and Gr4-5 students. K-Gr1 students consumed significantly lower amounts of total vegetables, whole grains, other grains and total grains, and total protein foods than Gr4-5 students and less red orange vegetables and total grains than Gr2-3 students. Gr2-3 students consumed significantly fewer total calories and less vegetables and total protein foods than students in Gr4-5.

Significant differences in waste were also found (Table 2). K-Gr1 students wasted a significantly higher percentage of calories than students in Gr2-3 and Gr4-5, and Gr2-3 students a higher percentage of calories than Gr4-5 students. K-Gr1 students also wasted a significantly higher percentage of fruit + juice, total vegetables, red orange vegetables, and other vegetables, total grains, whole grains, other grains, and total protein foods than Gr4-5 students. K-Gr1 wasted more fruit than Gr2-3 students and Gr2-3 students wasted more total grains than students in Gr4-5.

DISCUSSION

Plate waste is a major concern for the NSLP and indicates that children may not fully benefit from having nutritious food in school meals.⁵ This study examined whether plate waste in elementary schools differed by grade level after the new meal patterns were implemented in the fall of 2012. Although the menus met the new NSLP meal guidelines implemented in the 2012–2013 school year,^{2, 3} only the mean calorie intake of Gr4-5 students (560 calories) was within the range specified for elementary school students (550–650 calories), and no grade level group consumed the amounts of fruit, vegetables, total or whole grains, protein foods, or milk corresponding to the NSLP menu pattern.² The younger students in K-Gr1 wasted significantly more energy (43%), fruit+juice (43%) and fruit (29%), vegetables [total (67%), red orange (100%) and other vegetables (60%)], grains [total (56%), whole (44%) and other grains (66%)], and total protein foods (66%) than students in Gr4-5.

Of note is the almost 2 hour difference in lunch periods that occurred between the younger students (10:45 am) and older students (12:45 pm). Serving lunch too early (e.g., 10 a.m.) has been a concern because children may not be hungry for lunch if it is too close to breakfast.^{21–23} The USDA recommendation is for lunch periods to be scheduled as near the middle of the school day as possible.²⁴

The authors of two previous plate waste studies noted that the younger students had lunch beginning at 10:30 am and might not have been as hungry as the older students who ate later.^{9, 11} Both authors suggested that delaying lunch so that it is not too early might reduce waste.^{9, 11} Starting the lunch period later to reduce waste was also endorsed by 21% of

urban, 14% of suburban, and 20% of rural school public school cafeteria managers (n=1887) who completed a survey on plate waste during the 1995–96 school year.¹⁸

National data from the 2010 the School Nutrition Dietary Assessment Study IV (SNDA IV) reported that lunch service started before 11 a.m. in 38% of schools, and between 11 a.m. and 1:30 p.m. in 58% of schools. Larger schools reported the earlier start time.²⁵ This is an important area for future research. Efforts to move lunch periods closer to noon might reduce waste and improve consumption.

As noted previously, school studies conducted after 2012 have documented waste, but not by specific grades. Most were conducted in distinct geographic areas with a limited number of meal observations, used two methods for collecting data (weighing waste or observation of amount selected and consumed), and presented results in several ways (aggregated by food group, combined fruit and vegetables, individual waste). In 2013, prekindergarten and kindergarten students' food waste was aggregated and weighed in the cafeterias.¹⁴ The study took place in one school in the southwest region of the United States. Fifty-one percent of the vegetables, 51% of the entrees, 45.5% of milk and 33% of the fruit were wasted.¹⁴ These values are somewhat similar to the values for the K-Gr1 students in this south Texas study for fruit (31.5%), but somewhat higher for milk (37.4%) and vegetables (43.4%). There was no direct comparison for entrees. These differences might be the result of weighing plate waste versus observation and estimation.

Another study in the fall of 2012 included Massachusetts students in grade 3 to 8 from four schools and documented waste of 12.1% of the entrees, 46.1% of milk, 58.9% of vegetables, and 44.8% of fruit.¹⁵ Foods left on trays were weighed, and might account for the higher values compared to those for the older grade level groups in the current study: 23.2% (Gr2-3) and 22.1% (Gr4-5) for fruit, 33.8% (Gr2-3) and 26% (Gr4-5) for vegetables, and 30.1% (Gr2-3) and 27.7% (Gr4-5) for milk. However, there were older students in grades 6 to 8 who might have contributed to the higher waste in that study. Future research should also include students in middle and high schools and assess grade level differences in waste for these secondary school students.

Two of the three studies conducted before 2012 documented higher waste by younger students. The Colorado study was conducted with 185 randomly selected students from each of three elementary schools and used digital photography of lunch trays as selected and then after students were finished, followed by visual estimation to calculate foods wasted.¹³ The students had 20 minutes for lunch, compared to the 30 minutes for the students in the current study, which might influence waste.²⁶ The first grade students wasted significantly more canned (48.2%) and fresh fruit (51.3%) than fourth (26.7% to 34.2%) and fifth grade students (28% to 21.9%); more vegetables (47.8%) than second to fifth grade students (16.5% to 40.3%); more grains (54.7%) than fourth (35%); and fifth grade students (38.7%); more entrées (35.7%) than third (23.5%) to fifth (12.6%) students, and milk (43%) than third (29.3%) to fifth (25.1%) grade students.¹³ The amount of fruit, grains, and milk wasted by first graders was greater than that found in the current study for K-Gr1 students. However, the waste for the older students was similar to the Gr4-5 students in the current study for fruit (22%) and milk (27.7%), but higher for vegetables (26%) and grains (18.6%) than the

Gr4-5 students in the current study.¹³ Whether developmental differences between younger and older students influence waste patterns is unknown. The NSLP meal patterns and serving sizes for foods and beverages are similar within school level (elementary, middle and high school.) Perhaps the younger students in elementary schools need smaller portion sizes; this is an important area for future research.

Previous studies have documented that school environmental factors such as the length of the lunch period and when recess occurs may influence plate waste. In one study, students with less than 20 minutes for their lunch period were less likely to consume their entrée (64% vs. 77%), milk (62% vs. 73%), and vegetables (35% vs. 47%) compared with those who had at least a 25 minute lunch period.²⁶ Students in the current study with a 30 minute lunch period consumed more vegetables (74%, 66.2%, and 57.6% for Gr4-5, Gr2-3, and K-Gr1 students, respectively) and milk consumption was similar. Students in the current study also remained in the cafeteria for the entire lunch period; they were not able to leave early and go to a recess period. Some studies have documented that students who have recess before lunch time may be hungrier and consume more food,²⁷⁻²⁹ although some studies reported no change in plate waste with recess before lunch.^{27, 30}

Poor food quality or presentation might be other reasons for plate waste in schools. A two year pilot study in two Boston middle schools examined the effect of employing professional chefs to improve food preparation on students' food consumption behavior.³¹ After the 7-month chef program, significantly more students in the chef schools selected fruit and vegetables and consumed them, compared with students in the control schools.³¹ Engaging students in taste testing and evaluating menu items may help children become more familiar with the foods on the menus, especially for the younger student who may not be familiar with some of the food items.^{32, 33}

The main strength of this study is the use of a visual observation to identify foods selected and consumed by elementary school students. There are several limitations. The study was conducted in eight elementary schools in the Houston area and combined grades, limiting generalizability. Therefore, examining student plate waste among students in different grade levels in other Texas school districts and nationally are needed to provide more data on plate waste by grade level. In this cross sectional, observational study, selection of schools and the students observed was non-random. Randomly selecting schools and students might have produced different results. In addition, plate waste by individual children was not tracked, nor could differences in plate waste by student weight status, ethnicity, or other characteristics be assessed. Two grades were combined to form three groups for analyses, so specific patterns by individual grade level were not presented. Neither the serving portions or the amount of plate waste was assessed by weighing the foods, and results might have been different due to potential error for both the amount of foods selected and consumed. Whether students had recess before or after lunch was not assessed. The quarter waste method was modified in that the average weight of the served items was not calculated. Thus this method may not be as precise and may not be able to distinguish small differences in waste. The 2 hour difference in lunch time between the younger and older students might have contributed to the greater waste found for the younger students. Whether students who did not eat all of their lunch foods were hungry after lunch ended was not assessed. Perhaps

younger students were not as hungry or reached satiety before completing their meals, or maybe the portion sizes were too large for the younger children. Finally, since researchers did not collect 24 hour dietary recalls, measure physical activity or assess energy requirements, it cannot be determined whether plate waste was due to children being served portions exceeding their individual energy requirements or to other factors.

CONCLUSIONS AND IMPLICATIONS FOR FUTURE STUDIES

This study suggests differences in plate waste for reimbursable school lunch meals for elementary students by grade level; younger students may have wasted more food than older students. Future research should focus on reasons children do not eat the foods on their trays, and whether these reasons differ by grade level. Research could investigate the association between or impact of meal length and timing (too close to breakfast or before recess), assess how social norms influence consumption, or if issues with food preferences and quality contribute to plate waste of NSLP meals. Whether portion sizes in the menu patterns are too large for younger students should also be examined. If contributing factors to plate waste are identified, additional research could develop appropriate grade level methods and strategies to promote healthy food selection and consumption and reduce waste in school lunch meals.

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Table 1

The Amount of Kilocalories and Food Group Servings Consumed per Reimbursable Lunch Meal by 567 Students in Kindergarten through Grade 5 in Eight Houston, Texas area schools^a

	Kindergarten & Grade 1 ^b						Grades 2&3 ^c		Grades 4 &5 ^d	
	n=180			n=198			n=189			
	Mean	SE ^e		Mean	SE		Mean	SE	Mean	SE
Total kilocalories <i>c***, bd***, cd**</i>	424	24		496	24		560	24	560	24
Total Fruit and/or Juice (cup)	0.54	0.04		0.60	0.03		0.58	0.03	0.58	0.03
Fruit Only	0.30	0.03		0.33	0.03		0.28	0.03	0.28	0.03
Juice Only	0.25	0.03		0.27	0.03		0.31	0.03	0.31	0.03
Total Vegetables (cup) <i>bd**, cd*</i>	0.17	0.04		0.21	0.04		0.28	0.04	0.28	0.04
Dark Green Vegetables	0.02	0.01		0.02	0.01		0.04	0.01	0.04	0.01
Red Orange Vegetables <i>bc*</i>	0.05	0.02		0.09	0.02		0.06	0.02	0.06	0.02
Starchy Vegetables	0.01	0.01		0.02	0.01		0.04	0.01	0.04	0.01
Other Vegetables	0.05	0.01		0.04	0.01		0.05	0.01	0.05	0.01
Legumes	0.00	0.01		0.01	0.01		0.01	0.01	0.01	0.01
High Fat Vegetables <i>bd*, cd*</i>	0.04	0.02		0.04	0.02		0.08	0.02	0.08	0.02
Total Grains(oz eq) ^f <i>bc*, bd***</i>	1.61	0.16		1.87	0.16		2.08	0.16	2.08	0.16
Whole Grains <i>bd*</i>	0.52	0.10		0.59	0.10		0.71	0.10	0.71	0.10
Other Grains <i>bd*</i>	1.08	0.18		1.28	0.18		1.36	0.18	1.36	0.18
Total Protein Foods (oz eq) ^f <i>bd***, cd*</i>	1.19	0.09		1.28	0.09		1.56	0.09	1.56	0.09
Total Milk (Ounces)	4.88	0.36		5.23	0.35		5.41	0.35	5.41	0.35

^aKindergarten to Grade 5 lunch meal pattern: 1/2 to 1 cup fruit; 3/4–1 cup vegetables, with specific subgroup amounts per week (dark green, red/orange, starchy, other, legumes); 1 cup milk (fat free flavored or 1% unflavored); 1–2 ounces grains (9–12 maximum/week), with 50% whole grain rich; 1–2 ounces total lean proteins (10–12 maximum/week); 550–650 calories

* p<.05;

** p<.01;

*** p<.001

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Superscripts identify groups with significant differences.

- ^bKindergarten & Grade 1;
- ^cGrades 2 & 3;
- ^dGrades 4 & 5
- ^estandard error
- ^foz eq=ounce equivalent

The Percentage Waste of Kilocalories and Food Groups per Reimbursable Lunch Meal by 567 Students in Grades Kindergarten through 5 in Eight Houston, Texas area schools

Table 2

	Kindergarten & Grade 1 ^a n=189		Grades 2 & 3 ^b n=198		Grades 4 & 5 ^c n=189	
	Mean	SE ^d	Mean	SE	Mean	SE
Total kilocalories <i>ab*</i> , <i>ac***</i> , <i>bc**</i>	31.8	2.3	25.2	2.2	18.2	2.2
Total Fruit plus Juice (cup) <i>ac*</i>	31.5	3.1	23.2	3.0	22.1	3.0
Fruit Only <i>ab*</i>	39.3	4.1	27.4	4.0	30.4	4.2
100% Fruit Juice Only	16.8	3.7	20.3	3.3	11.8	3.3
All Vegetables (cup) <i>ac**</i>	43.4	3.8	33.8	3.7	26.0	3.5
Dark Green Vegetables	60.2	12.4	59.3	10.3	46.0	8.6
Red Orange Vegetables <i>ac*</i>	38.0	6.7	26.0	6.1	19.1	7.0
Starchy Vegetables	29.7	8.8	32.1	8.0	15.1	8.3
Other Vegetables <i>ac*</i>	42.7	5.8	35.0	5.6	26.7	5.8
Legumes	78.2	18.6	57.0	17.5	51.1	12.6
High Fat Vegetables	28.8	6.6	9.6	6.9	12.3	5.2
Total Grains (oz eq) <i>c</i> , <i>ac**</i> , <i>bc*</i>	29.0	3.1	26.9	3.1	18.6	3.1
Whole Grains <i>ac*</i>	35.2	3.9	30.8	3.9	24.5	3.7
Other Grains <i>ac*</i>	25.1	3.1	21.6	3.0	15.1	3.0
Total Protein Foods (oz eq) <i>ac**</i>	30.9	3.5	23.5	3.4	18.6	3.4
Total Milk (fat free flavored or 1% white) (ounces)	37.4	3.7	30.1	3.7	27.7	3.7

Superscripts identify groups with significant differences.

^aKindergarten & Grade 1;

^bGrades 2 & 3;

^cGrades 4 & 5

^dstandard error;

100>d

;10>d
**
;50>d
*
oz=ounce equivalent

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